# 12 LEAD EKG

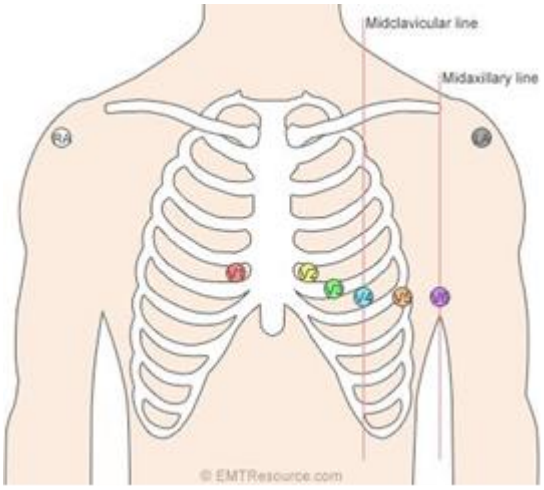
**Procedure**: Performing a pre-hospital 12 lead EKG should be considered when AMI is suspected and early notification to the receiving facility may serve to reduce the time to intervention. Clinical presentation of AMI includes, but is not limited to, one or more of the following symptoms: chest pain, radiation of pain to the neck, jaw, shoulder or arm, nausea, vomiting, diaphoresis, dyspnea, weakness, confusion or syncope.

- A "normal" EKG does not preclude the diagnosis and routine treatment of patients suspicious for cardiac disease.
- The management of unstable patients with malignant arrhythmias or hemodynamic instability should take precedence over obtaining a 12 lead EKG
- Do not delay transport for an unstable patient to acquire the 12 lead EG

Criteria for STEMI Alert includes:

- Active Chest Pain and/or a patient with acute coronary syndrome history
- 2mm ST elevation in 2 or more contiguous leads
- Absence of LBBB
- Absence of a pacemaker
- Ages 20 and older

| Electrode | Placement |
|---|---|
| **V1** | 4th Intercostal space to the right of the sternum |
| **V2** | 4th Intercostal space to the left of the sternum |
| **V3** | Midway between V2 and V4 |
| **V4** | 5th Intercostal space at the midclavicular line |
| **V5** | Anterior axillary line at the same level as V4 |
| **V6** | Midaxillary line at the same level as V4 & V5 |
| **RL** | Anywhere above the ankle and below the torso |
| **RA** | Anywhere between the shoulder and the elbow |
| **LL** | Anywhere above the ankle and below the torso |
| **LA** | Anywhere between the shoulder and the elbow |




**Electrode Placement**

1. Skin Prep
    a. Avoid hair and thick muscle mass
        i. Shave hair if needed
    b. Cleanse site with alcohol to remove dirt and oil
2. Correct placement is paramount. See reference above
3. Once electrodes are in place do not remove them. To maintain consistency.

## AUTOMATIC EXTERNAL DEFIBRILLATION (AED)

Use of AEDs in the pre-hospital setting is limited to properly trained personnel at the First Responder level and above.

1. AED training programs must adhere to guidelines established by the AHA. In addition, the training must also be recognized and approved by the off-line medical director for Shoshone County EMS providers.
2. All certified personnel utilizing the AED must be evaluated by trained person(s) within each department prior to utilizing the AED in the field.
3. Every certified provider shall participate in at least 2 hours of classroom / hands on training of specifically directed AED / cardiac arrest programs on an annual basis.
4. Periodic AED practice may be required.
5. Documentation of full training and practice training must be maintained at each department for a minimum of two years.
6. Public safety agencies in Shoshone County with First responders or above who wish to maintain an AED will be encouraged to establish contact with individual departments for training and troubleshooting issues and utilize the SCEMSC medical director as needed.
7. AED devices should be automatic or semi-automatic and should be equipped with "code summary". All agencies utilizing AEDs shall stock extra batteries with the device.
8. AED-authorized providers may apply the device only under the following conditions:
    a. if the patient is in complete cardiac arrest
    b. greater than 1 year of age and unconscious
9. Once an authorized provider initiates resuscitation and use of an AED, patient care efforts must continue until relieved by a higher trained EMS provider.
10. Before an ALS provider transports the patient to the hospital, the AED should be replaced with the ALS provider's manual defibrillator to allow the AED to remain in the service area following the patient transfer.
11. When AED-trained providers are present along with ALS providers, the ALS-trained (and authorized) providers always have authority over the scene in accordance with pre-established SCEMSC guidelines.
12. ECG rhythms should not be analyzed by AEDs if the patient is in a moving vehicle. Exception: If an ALS provider, by visual ECG interpretation, confirms the presence of a shockable rhythm.
13. The Medical Director shall review all AED calls.

Certified First Responders / EMT-Basics and EMT-Advanced Standing Orders

1. Immediately verify cardiac arrest by the absence of consciousness, carotid pulse and respirations.
2. Initiate CPR per AHA / ARC guidelines.
3. Place oral or nasal pharyngeal device in patient's airway.
4. Ventilate, using BVM or pocket mask with high flow oxygen.
5. Apply AED leads / electrodes to patients chest (white=right / red=left) (or with Zoll AED = placement of round electrode on chest and square electrode on upper portion of back).
6. Turn AED on (note self-test).
7. Stop CPR, press the analyze button (if the AED recognizes a shockable rhythm, the AED will begin to charge).
8. Proceed as directed.

**(Continued Next Page)**

## AUTOMATIC EXTERNAL DEFIBRILLATION (AED) – (Continued

9. Once the AED charges, it will prompt the provider to "press to shock". Before doing so, clear yourself from patient ("I'm clear"), ensure others are clear of patient ("you're clear") and ensure all are clear of patient ("we're all clear").
10. Press the shock button (the AED will shock at 200 monophasic joules (120 biphasic joules)).
11. After the first shock is delivered, immediately start CPR for 2 minutes (Do Not Check pulse.)
12. After 2 minutes of CPR repeat steps 8 through 12.

Note: the AED will administer two shocks at 200 monophasic joules (120 –150 biphasic joules), followed by a third shock at 360 monophasic joules (200 biphasic joules). It should not be changed unless specifically directed by on-line medical direction.

13. If the AED states, no Shock Advised start CPR and continue for 2 minutes.
14. Reanalyze if Shock advised go to steps 8 through 12
15. If patient regains a perfusing rhythm after receiving shocks and later re-fibrillates:
    a. Restart the treatment sequence from the beginning
16. Potential hypothermic patients: may not respond well to defibrillation, the provider should check with online physician at SMC before defibrillating patient

Use of AED on pediatric patient's (1-8 years of age)

1. Indications of use include unconsciousness AND absence of normal breathing AND absence of pulse.
2. Place electrodes correctly on patient (Medtronic placement =sternum / apex portion of chest). Ensure electrodes are firmly on patient
3. Some Medtronic AEDs have teddy bear plug into the AED, which automatically reduces the amount of joules. Ensure that you are using pediatric electrodes or too much energy may be delivered to the patient.

If an AED fails to function during operation on a patient, the following will be done:

1. the unit will immediately be taken out of service
2. the SEMESC Chief will be notified as soon as possible of failure
3. If AED shows message of "check electrodes" then ensure:
    a. electrodes are placed on patient correctly
    b. electrodes are secured to patient tightly
    c. integrity of AED cables are without cracks or breaks
4. The cardiac arrest review package will consist of the following:
    a. Basic / Intermediate run report
    b. Paramedic run report
    c. run review sheet (see attachment)

**(End)**

## ASSESSMENT ADULT

**Clinical Indications:**

Any patient who does not meet the definition of a pediatric patient.

**Procedure:**

1. Scene size-up, including universal precautions, scene safety, environmental hazards assessment, by-stander safety, and patient/caregiver interaction
2. Assess need for additional resources.
3. Initial assessment includes a general impression as well as the status of a patient's airway, breathing, and circulation.
4. Assess mental status and disability (e.g., GCS, AVPU)
5. Establish spinal immobilization if suspicion of spinal injury.
6. Perform a focused history and physical based on patient's chief complaint.
7. Assess need for critical interventions.
8. Complete critical interventions and perform a complete secondary exam to include a baseline set of vital signs as directed by protocol.
9. Maintain an on-going assessment throughout transport to include patient response, possible complications of interventions, need for additional interventions, and assessment of evolving patient complaints/conditions.
10. Include Immunizations, Allergies, Medications, Past Medical History, last meal, and events leading up to injury or illness where appropriate.
11. Document all findings and information associated with the assessment, performed procedures, and any administration of medications in the patient care report (PCR).

**(End)**

## ASSESSMENT PEDIATRIC

**Clinical Indications:**

Any patient **<12 years** of age or who can be measured with the Broselow-Luten Resuscitation Tape.

**Procedure:**

1. Scene size-up, including universal precautions, scene safety, environmental hazards assessment, by-stander safety, and patient/caregiver interaction.
2. Assess need for additional resources.
3. Assess patient using the pediatric triangle of ABCs:
   a. Airway and appearance: speech/cry, muscle tone, inter-activeness, look/gaze, movement of extremities
   b. Work of breathing: absent or abnormal airway sounds, use of accessory muscles, nasal flaring, body positioning
   c. Circulation to skin: pallor, mottling, cyanosis
4. Establish spinal immobilization if suspicion of spinal injury.
5. Establish responsiveness and disability appropriate for age (AVPU, GCS, etc.)
6. Color code using Broselow-Luten tape.
7. Perform a focused history and physical exam based on patient's chief complaint. Recall that pediatric patients easily experience hypothermia and thus should not be left uncovered any longer than necessary to perform an exam.
8. Assess need for critical interventions.
9. Complete critical interventions and perform a complete secondary exam to include a baseline set of vital signs as directed by protocol. If > 3 years of age, record BP. If < 3 years of age, record cap refill.
10. Maintain an on-going assessment throughout transport to include patient response, possible complications of interventions, need for additional interventions, and assessment of evolving patient complaints/conditions.
11. Include Immunizations, Allergies, Medications, Past Medical History, last meal, and events leading up to injury or illness where appropriate.
12. Document all findings and information associated with the assessment, performed procedures, and any administration of medications in the patient care report (PCR).

**(End)**

## BLOOD GLUCOSE ANALYSIS

**Clinical Indications:**

- Patients with suspected hypoglycemia (Known Diabetic, Abnormal mental status, Sweating with rapid heart rate, Seizures, Focal neurological deficit, Behavioral changes.)

**Procedure:**

- Prepare the device according to the manufacturer's instructions
- Explain the procedure to the patient
- Obtain verbal consent, if possible, from patient or family
- Use body substance isolation procedures
- Cleanse the puncture site prior to obtaining blood sample
- Obtain a drop of blood
- Apply the blood to the test strip according to the manufacturer's instructions
- Obtain and record the reading from the device
- Apply a dressing to the patient's puncture site
- Properly dispose of test supplies
- Continue your assessment and treatment of the patient

**Skills Maintenance Suggestions:**

- Calibrate a glucometer and perform a Blood Glucose Analysis on a periodic basis

**(End)**

## CAPNOGRAPHY

**Clinical Indications:**

- Capnography should be used when available with the use of all invasive airway procedures including endotracheal, nasotracheal, cricothyrotomy, or Blind Insertion Airway Devices (BIAD).
- Capnography should also be used when possible with CPAP.

**Procedure: Assemble, prepare and operate device according to manufacturer guidelines and instructions.**

1. Attach Capnography sensor to the BIAD, endotracheal tube, or oxygen delivery device.
2. Note and document CO level and waveform changes. See protocols for specific target values.
3. CO2 level should be continuously monitored throughout care and transport.
4. Any loss of CO2 detection or waveform indicates an airway problem and should be investigated and documented.
5. Document the procedure and results in the Patient Care Report (PCR)

**Skills Maintenance Suggestions:**

· Review manufacturer guidelines for your agency device.

**(End)**

## CPAP

INDICATIONS:
For ***consideration*** (for patients <8) in **moderate to severe** respiratory distress secondary to:

- CHF/Acute Pulmonary Edema
- asthma/reactive airway disease,
- near drowning,
- COPD,
- acute pulmonary edema (cardiogenic and non-cardiogenic),
- pneumonia who present with *any* of the following:
  - Pulse oximetry < 88% not improving with standard therapy
  - ETCO2 > 50mmHg
  - Accessory muscle use/retractions
  - Respiratory rate > 25
  - Wheezes, rales, rhonchi
  - Signs of respiratory fatigue or failure

POTENTIAL ADVERSE EFFECTS:

- Hypotension
- Risk of pneumothorax
- Gastric Distention, and vomiting
- Risk of corneal drying

CONTRAINDICATIONS

***Physiologic***

- Unconscious, Unresponsive, or inability to protect airway.
- Inability to sit up
- Respiratory arrest or agonal respirations (Consider Intubation)
- Persistent nausea/vomiting
- Hypotension- Systolic Blood Pressure less than 90 mmHg
- Inability to obtain a good mask seal

***Pathologic***

- Suspected Pneumothorax
- Shock associated with cardiac insufficiency
- Penetrating chest trauma
- Facial anomalies /trauma/burns
- Closed Head Injury
- Has active upper GI bleeding or history of recent gastric surgery (2 WEEKS)
- Vomiting

PRECAUTIONS:

- History of Pulmonary Fibrosis
- Claustrophobia
- Has failed at past attempts at noninvasive ventilation
- Complains of nausea or vomiting
- Has excessive secretions
- Has a facial deformity that prevents the use of CPAP

## CPAP (Continued)

Assess the patient, treat ABC problems, obtain baseline vitals and establish a transport plan based on general impression. Obtain medical history.

1. Administer High flow oxygen, do risk vs benefit assessment. Evaluate for need for intubation instead of CPAP.
2. **Assess for inclusion and exclusion criteria. <u>Medical Control Required if BP less than 90 systolic.</u>**
3. Initiate other therapies as indicated.
4. Describe procedure to patient and obtain consent, if possible. Use coaching to calm the patient during application.
5. Assemble CPAP device, assure there is enough oxygen to power the device.
6. Administer CPAP:
    a. Initial setting at 2-5 cmH2O, MAX: 10 cmH2O (5 cmH20 for COPD/Asthma/non-CH causes)
    b. Coaching will be required to reduce anxiety.
    c. If coaching is unsuccessful, then consider low dose sedation. (Contact medical control or local protocol)

| Flow Rate: | 8 L/min | 10 L/min | 12 L/min | 15 L/min | 20 L/min | 25 L/min |
|---|---|---|---|---|---|---|
| Pressure: | 5 cmH2O | 8.0 cmH2O | 10.0 cmH2O | 15.0 H2O | 18.0 H2O | 20.0 H2O |
| Oxygen | 45% | 50% | 55% | 65% | 70% | 75% |

7. Consider placing Gastric Tube
8. Critical Reassessments
    a. V/S and reassessments every 5 minutes or sooner as needed.
    b. Evaluate for complications every 5 minutes.
9. Discontinuing CPAP: CPAP therapy needs to be continuous and should not be removed unless the patient:
    a. cannot tolerate the mask, success of tolerance to the treatment increased with proper coaching by EMS crew
    b. requires suctioning or airway intervention,
    c. experiences continued or worsening respiratory failure,
    d. Develops severe hypotension
    e. A pneumothorax is suspected.
    f. Intermittent positive pressure ventilation and/or intubation should be considered if patient is removed from CPAP therapy.
10. Record time of administration, dose, complications (if any), and patient response.
11. Transport or arrange for appropriate prompt transport and perform ongoing assessment en route. Assist ventilations, intubate, or begin CPR, or initiate other treatment protocols as needed.
12. Notify receiving hospital of need for CPAP at bedside.
13. Complete required documentation

**(End)**

## ENDOTRACHEAL INTUBATION

**Purpose:**

To establish a clear, open and functioning airway for the oxygenation of the patient with possible respiratory insufficiency or potential airway compromise.

**Indications:**

1. Immediate or impending airway or ventilatory compromise when the patient's airway and oxygenation cannot be adequately maintained with a BVM.
   a. Respirations less than 10 or greater than 30 breathes per minute, with signs of respiratory insufficiency.
   b. Glascow coma score of 8 or less.

**Precautions:**

1. Always start with basic life support first, oropharyngeal airway with BVM and supplemental oxygen, once the scene is stabilized, and personnel and equipment are assembled should the intubation be attempted.
2. Do not pry the laryngoscope against the teeth. The jaw should be lifted with direct upward traction on the laryngoscope.
3. Suction must be ready! Regurgitation is common, especially when the esophagus is entered and the tube must be replaced.

**Recommended Guidelines:**

1. Timing of intubation:
2. Upon arrival at arrest, CPR and cardioversion take priority.
   A) Begin CPR for two minutes.
   B) Cardioversion following the Defib Protocol
   C) If shock not indicated twice, or three shocks delivered unsuccessfully, one EMT continues CPR while the Paramedic intubates the patient.
3. Assemble the equipment while continuing ventilation:
   A) Choose the tube size
   B) Introduce the stylet (if necessary) and be sure it stops 1/2” short of the tube’s distal end. Connect syringe and test cuff.
   C) Assemble the laryngoscope and check the light.
   D) Connect and check suction.
4. Position patient:
   A) Without suspicion of C-spine injury, neck flexed forward, head extended backward. Occiput should be level with or higher than back of shoulders. (Sniffing Position)
   B) With possible C-spine injury neck must be kept in neutral in line while performing intubation or consider naso-intubation.
5. Oxygenate patient with high flow O2 via BVM for at least 1 minute prior to attempting intubation.

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## ENDOTRACHEAL INTUBATION (Continued)

6. Under Direct Visualization pass ET tube between cords, then inflate cuff until a seal is obtained. (start with 4 cc's)
7. Check Tube placement by listening for breath sounds over the stomach and the right and left anterior chest. Observe the symmetrical rise and fall of the chest. Watch for the formation of moisture inside the tube.
8. Waveform Capnography should be utilized to confirm and monitor all endotracheal tube placement in the field, during transport and before or after any transfer of care. The assessment of End-tidal CO2 is paramount to both advanced airway care and resuscitation but other examination parameters (including symmetric breath sounds, absence of sounds over the epigastrium, fogging of the tube and pulse oximetry) should also be noted and documented in the assessment of all advanced airways.

**Complications and special notes:**

1. Esophageal intubation should be avoided by direct visualization of the cords and endotracheal tube tip throughout the procedure. Listen carefully and check to see that the patient looks better (pupils constricting, color improving) when ventilating. If a patient becomes hypoxic, or vital signs deteriorate at any time following endotracheal intubation, suspect incorrect tube placement, and reassess placement including revisulize.
2. Intubation of the right mainstem bronchus is very common. If no breath sounds are heard on the left, deflate the cuff and withdraw the tube slightly then reinflate cuff and check again.
3. Tube sizes
   0 - 1 year old 3.5 - 4.0
   1 - 3 year old 4.0 - 4.5
   3 - 6 year old 4.5 - 5.5
   6 - 10 year old 5.5 - 6.0
   11 - 14 year old 6.5 - 7.0

   Adult male 7.5 - 8.0 average
   Adult female 7.0 average
   Another rule of thumb is to use the tube that is closest in diameter to the patient's little finger.
4. Never interrupt ventilation for more than 30 seconds to intubate, if unable to intubate, back out and oxygenate the patient for 1 minute with BVM then make second attempt, if still unable to intubate, have another person try if they are unable, protect airway with next available means (King Airway or Oropharyngeal airway).

**(End)**

## FAMILY SUPPORT – DECEASED PATIENT

1. If the resuscitation is underway and the outlook is poor, prepare the family by telling them so.
2. At the moment of calling the code, let the family know with no uncertainty that death has occurred.
3. If you can, with any degree of honesty, tell the family the following:
   a) That you did all you could and were successful in doing those things that could have helped, but the efforts were to no avail.
4. To the best of your ability, offer words of condolence.
5. Make physical contact with the family members if you are comfortable in doing so.
6. Offer to contact family, friends, or clergy to provide immediate support.
7. Answer any questions the family might have.
8. Allow the family members to view the body if they desire,
9. Remain with the family as long as other emergency responsibilities do not call you away, to show your respect and concern.

**(End)**

# HELICOPTER SAFETY

## LANDING ZONE SELECTION

1. Landing Zone Preparation. These are the recommended LZ requirements. If any component is not possible contact the air ambulance for further direction or alternate LZ selection.
   a. Size - The preferred size of landing zone is 100 ft. X 100 ft (minimum).
   b. Slope – The slope of the ground should be no more than 5 degrees (gentle slope).
   c. Surface – The ground must be a firm surface, preferably, with no loose dirt or snow. If necessary, and available, consider wetting down dirt surfaces. Loose snow can be compacted with snowmobiles.
   d. Hazards/Obstructions
      i. Hazardous Materials – The presence of hazardous materials MUST be relayed prior to their approach to the scene.
      ii. Clear Area - Area is clear of loose debris, large rocks, posts, stumps, vehicles, people, animals, and other hazards.
      iii. Overhead - Free of overhead obstructions (wires, antennas, poles)
   e. Marking/Lighting
      i. The four corners of the landing zone should be marked. During the daytime, this can be done with traffic cones. At night, flashlights, "LZ lights" or low-beam headlights can be used. Flares, if used at all, must be used with extreme caution as they present a fire hazard.
      ii. Identified hazards should be illuminated if possible.
      iii. NEVER direct any lights up at the aircraft or use high-beam headlights.
      iv. The pilot always has the final say with regards to landing zones. He/she may request an alternate site be chosen.

## COMMUNICATIONS

Landing Zone Communications. The landing zone officer is responsible for radio communications with the responding air ambulance. Approximately l0 minutes out from landing zone, pilot or flight crew will contact you on the designated scene frequency. At this time, brief helicopter crew on the landing zone, location of obstacles, direction of wind, and possible landing direction. Give a patient update for the flight crew. If you see the helicopter before pilot locates the landing zone, give them direction relative to helicopter. For example, "we're at your (meaning the pilot's) three o'clock" or "we are north of you"

## SAFETY

1. Landing Zone safety
   a. Approaching the aircraft
      i. Ensure no one approaches the aircraft until specifically directed by the pilot or crew.
      ii. Always approach from the front half of the aircraft (9 o'clock to 3 o'clock), in view of the pilot and while maintaining eye contact.
      iii. Approach from the downhill side if landed on a slope.
   b. The tail rotor is an especially dangerous area because the blades may be nearly impossible to see. NEVER go near the tail of the aircraft while it is running.
   c. Rotor wash is the air forced down by the main blades. Creating "winds" near 100 MPH, all loose objects such as hats, sheets, blankets, etc. must be secured

**(End)**

## HEMMORAGE CONTROL

**EMT/AEMT/PARAMEDIC:**

1) Direct Pressure to wound
2) If bleeding continues apply CAT (Combat Application Tourniquet) approximately 3 inches proximal to wound. If the wound is on a joint, or just distal to the joint, apply the tourniquet above the joint.
3) Tighten until bleeding stops (venous oozing is acceptable) and/or distal pulse is absent.
4) If one tourniquet is not sufficient a second should be applied just proximal to the first.
5) Do not cover the tourniquet with a dressing.
6) Once a tourniquet has been applied, do not remove or loosen it unless ordered by medical direction.
7) Note time of tourniquet application and communicate this to the receiving care providers.

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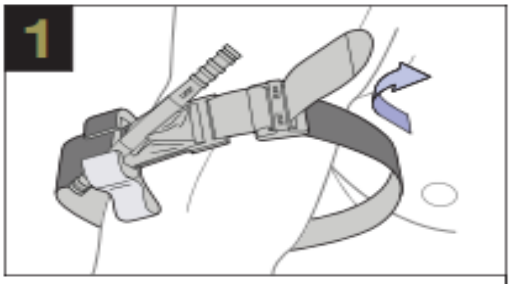
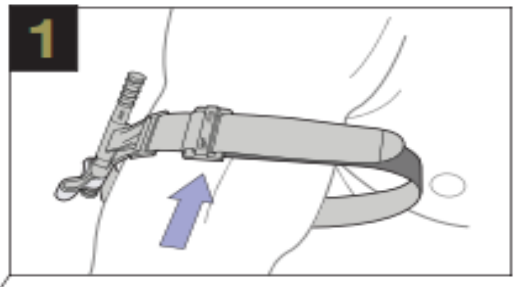
C·A·T. COMBAT APPLICATION TOURNIQUET.

**INSTRUCTIONS FOR USE**

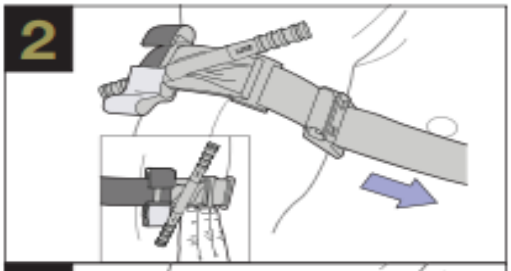



**TWO-HANDED APPLICATION**
Route the band around the limb, pass the tip through the slit of the buckle, and position the CAT 2-3" above the bleeding site directly to the skin.*

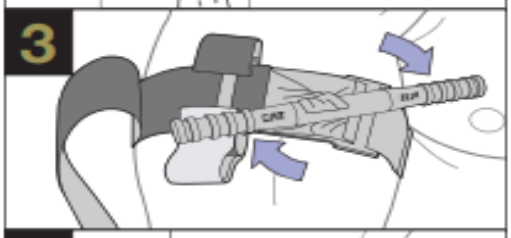
**OR**



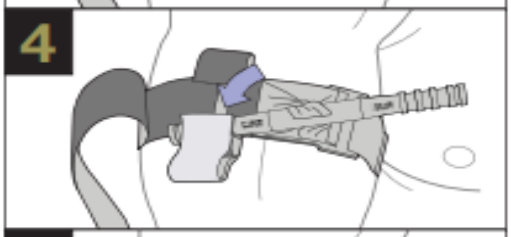

**ONE-HANDED APPLICATION**
Insert the injured limb through the loop in the band and position the CAT 2-3" above the bleeding site directly to the skin.*



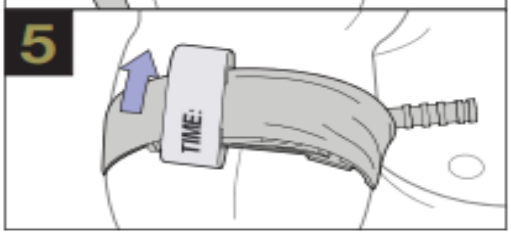

Pull band tightly and fasten it back on itself all the way around the limb, but not over the rod clips. Band should be tight enough that tips of three (3) fingers cannot be slid between the band and the limb. If the tips of three (3) fingers slide under band, retighten and re-secure.




Twist the rod until bleeding has stopped.




Secure the rod inside a clip to lock it in place. Check for bleeding and distal pulse. If bleeding is not controlled, or distal pulse is present, consider additional tightening or applying a second CAT above and side-by-side to the first. Reassess.




Route the band between the clips and over the rod. Secure rod and band with TIME strap. Record time of application.

*If you cannot be sure or cannot take the additional time to examine where the bleeding is coming from based on the situation, the CAT can be effectively applied over clothing as high on the arm or leg as possible. The CAT must NOT be applied over solid objects within the clothing. As soon as the situation permits, the injured limb should be evaluated and the CAT re-positioned 2"-3" above the injury directly to the skin.

**(End)**

## INJECTIONS: SUBCUTANEOUS (SQ) / INTRAMUSCULAR (IM)

**Clinical Indications:**
When medication administration is necessary, and the medication is to be given via the SQ or IM route using a syringe or an auto injector.

**Procedure:**

1. Receive and confirm medication order or perform according to standing orders.
   For glucagon, mix diluent with powder following manufacturers recommendations using sterile technique.
   Ensure clarity and color of the medication is appropriate.
   Check expiration date
   Withdraw medication from ampules or vials using sterile technique. An equal volume air may need to be injected into the medication vial to equalize pressure before medication is withdrawn. Use a filter needle to withdraw medication from a glass ampule; dispose after draw.
2. Expel air from the syringe and needle before injection.
3. Explain the procedure to the patient and reconfirm patient allergies. Confirm the 6 "Rights"
   **Rights: Right medication**
   **Right route**
   **Right time**
   **Right person**
   **Right dose**
   **Right documentation**

1. The most common site for SQ injection is the upper arm.
   Injection volume should not exceed 1 ml.
2. The possible injection sites for IM injections include the deltoid, buttock and thigh.
   Injection volume should not exceed 2 ml for the deltoid
   Injection volume should not exceed 5 ml in the thigh or buttock. *(Brady)*
3. The thigh should be used for injections in pediatric patients.
   Injection volume should not exceed 1 ml.
4. Expose the selected area and cleanse the injection site with alcohol.
5. Insert the needle into the skin with a smooth, steady motion

**IM: 90-degree angle, skin flattened**
**Needle size: 21-25 gauge 5/8-1.5"**

1. Aspirate for blood, if blood is aspirated, choose new site.
2. Inject the medication slowly.
3. Withdraw the needle quickly and dispose of properly without recapping.
4. Apply pressure to the site.
5. Monitor the patient for the desired therapeutic effects as well as any possible side effects.
6. Document the medication, dose, route, and time in the patient care report (PCR).
7. For Epi-Pen, remove cap and push injector firm against the patient's lateral thigh. Hold in place for 10 seconds after it activates.

**Skills Maintenance Suggestions:**

1. Practice complete Epi-Pen, IM procedure on appropriate simulated sites on a periodic basis.

**(End)**

## INTRAOSSEOUS INFUSIONS

**INDICATIONS:**

EZ-IO AD® (> 40 kg (12 y/o) & EZ-IO PD® (3 – 39 kg) EZ-IO LD® (morbidly obese patients)

1. Intravenous fluids or medications are needed and a peripheral IV cannot be established in 2 attempts or 90 seconds AND the patient exhibits one or more of the following:
    a. An altered mental status
    b. Respiratory compromise
    c. Hemodynamic instability
2. EZ-IO AD® & EZ-IO PD® & EZ-IO LD® may be considered PRIOR to peripheral IV attempts in the following situations:
    a. Cardiac arrest (medical or traumatic)
    b. Profound hypovolemia with alteration of mental status
    c. Patient in extremis with immediate need for delivery of medications and or fluids
    d. As required for patient situation

**CONTRAINDICATIONS:**

- Fracture of the bone selected for IO infusion (consider alternate site)
- Excessive tissue at insertion site with the absence of anatomical landmarks (consider alternate site)
- Previous significant orthopedic procedures (IO within 24 hours, prosthesis - consider alternate tibia)
- Infection at the site selected for insertion (consider alternate site)
- Pelvic fracture on affected side

**CONSIDERATIONS:**

- Flow rate: Due to the anatomy of the IO space you will note flow rates to be slower than those achieved with IV catheters.
- Ensure the administration of an appropriate rapid syringe bolus (flush) prior to infusion NO FLUSH = NO FLOW
    - Rapid syringe bolus (flush) the EZ-IO AD® with 10 ml of normal saline
    - Rapid syringe bolus (flush) the EZ-IO PD® with 5 ml of normal saline
- Repeat syringe bolus (flush) as needed
- To improve continuous infusion flow rates always use a syringe, pressure bag or infusion pump.

**SITES:**

- Preferred Site – 1-2 cm below tibial tuberosity on flat anteromedial tibial surface
- 2nd Site – 1-2 cm proximal to medial malleolus on the medial aspect of the tibia
- 3rd Site – 1-2 cm proximal to the lateral humeral head (for patients > 40 kg (12 y/o)

**Pain:**

Insertion of the EZ-IO AD® & EZ-IO PD® & EZ-IO LP® in conscious patients has been noted to cause mild to moderate discomfort (usually no more painful than a large bore IV). However, IO Infusion for conscious patients has been noted to cause severe discomfort. Prior to IO syringe bolus (flush) or continuous infusion in conscious patients, consider SLOWLY administering Lidocaine 2% through the EZ-IO hub.

**(Continued Next Page)**

## INTRAOSSEOUS INFUSIONS (Continued)

- EZ-IO AD/LD® Slowly administer 20 – 100 mg Lidocaine 2%.
    - Use judiciously with cardiac patients
- EZ-IO PD® Slowly administer .5 mg /kg Lidocaine 2%

**EQUIPMENT:**

- EZ-IO® Driver
- EZ-IO AD® or EZ-IO PD® or EZ-IO LD® Needle Set
- Alcohol or Betadine Swab
- EZ-Connect® or Standard Extension Set
- 10 ml Syringe
- Normal Saline (or suitable sterile fluid)
- Pressure Bag or BP Cuff
- 2 % Lidocaine

**PROCEDURE:**

1. Locate appropriate insertion site
2. Prepare insertion site using aseptic technique. Thoroughly cleanse area with alcohol wipes followed by betadine swabs followed by alcohol wipes
3. Prepare the EZ-IO® driver (Power or Manual) and appropriate needle set
4. Stabilize site and insert appropriate needle set (Hold EZ-IO driver at a 90°angle to the bone)
5. Remove EZ-IO® driver from needle set while stabilizing catheter hub
6. Remove stylette from catheter, place stylette in shuttle or approved sharps container
7. Confirm placement
8. Connect primed EZ-Connect®
9. Consider slowly administering appropriate dose of Lidocaine 2% IO to conscious patients
10. Syringe bolus (flush) the EZ-IO® catheter with the appropriate amount of normal saline.
11. Utilize pressure (pressure bag or bp cuff at 30mmhg) for continuous infusions where applicable
12. Begin infusion
13. Dress site, secure tubing
14. Monitor EZ-IO® site and patient condition

**(End)**

## IV MAINTENANCE

PURPOSE:

To monitor and maintain an open and functional IV line and/or IV site.

INDICATIONS:

1. Shoshone County EMT's may transfer IV patients with:
   a) Saline Lock inter facility transfers only.
2. A Paramedic Nurse or Physician must attend the patient if an IV involves:
   a) Any Medication
   b) Volume replacement at greater than 200 cc./hr.
   c) Blood

RECOMMENDED GUIDELINES:

6. Prior to transport:
   a) Can the IV be converted to a Saline lock?
   b) Is the IV running and appropriately taped with an arm board in place?
   c) Is the IV running at the correct flow rate?
   d) Is a full bag of IV solution hung prior to transport?
   e) Take an extra bag of IV solution per patient.
7. During transport:
   a) Monitor the flow rate every 15 minutes and record.
   b) Observe the line for any kinks.
   c) Observe for any infiltration at the IV site.
   d) Change the IV solution when there is 50 cc. remaining and record the time of solution change.
   e) Record the volume of fluid infused during transport.
8. If the IV infiltrates, stop the IV, but DO NOT pull the IV.
   a) If the EMT is IV certified, the IV may be discontinued and restarted if indicated.

**(End)**

## KING AIRWAY

**Indications:**

Airway management when other techniques have failed, or equipment is not available.
Airway management technique in failed airway algorithm prior to surgical procedures.

**Contraindications:**

- **Patient with an intact gag reflex**
- **Ingestion of a caustic substance or suspected esophageal perforation or injury,**
- **Patient less than 35 inches in height.**

**Procedure:**

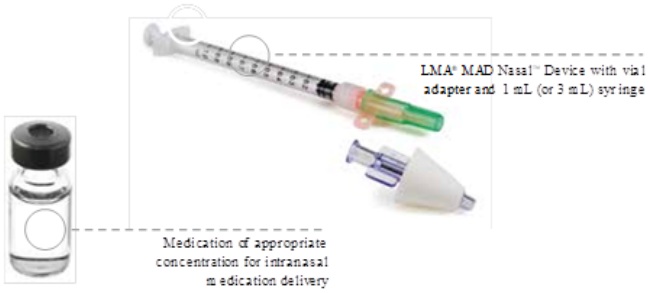
1. Assess ABC's
2. Ventilate patient with airway adjuncts and BVM with 100% oxygen during preparation of King Airway
3. Expedite placement of King Airway while facilitating other care interventions. Do not allow placement of King Airway to delay CPR or patient care priorities.
4. Establish appropriate King Airway size / inflation settings for patient size:
    - LT-D Size 2 (Green) 35-45 inch height Inflate to: 25-35 ml
    - LT-D Size 2.5 (Orange) 41-51 inch height Inflate to: 30-40 ml
    - LTS-D Size 3 (Yellow) 4-5 ft. height Inflate to: 40-55 ml
    - LTS-D Size 4 (Red) 5-6 ft. height Inflate to: 50-70 ml
    - LTS-D Size 5 (Purple) > 6 ft. height Inflate to: 60-80 m
5. Test cuff inflation system with air then deflate
6. Place patient's head in a neutral position. If trauma is suspected insure manual cervical spine motion restriction.
7. Hold the King Airway at the connector with the dominant hand.
8. With the non-dominant hand, hold the mouth open and apply a chin left.
9. Using a lateral approach introduce the lubricated tip into the mouth.
10. Advance the tip behind the base of the tongue while rotating tube back to the midline so that the blue orientation line faces the chin of the patient
11. Without exerting excessive force, advance the tube until base of the connector is aligned with teeth or gums.
12. Inflate the King Airway with the appropriately sized volume of air as referenced above.
13. Attach the manual resuscitator bag to the King Airway.
14. While bagging the patient, gently withdraw the tube until ventilation becomes easy and free flowing.
15. Adjust cuff inflation if necessary to maintain a seal of the airway at the peak ventilator pressure employed.
16. Confirm correct placement by listening for breath sounds, observing the chest rise and fall, presence of ETC02 and a stable of rising SP02.
17. Secure the King Airway in place.
18. The LTS-D may facilitate the passage of up to 18 French gastric tube for suctioning.
19. Re-check tube position after each patient movement and on transfer of care to another provider.
20. Insure that caregiver receiving care of patient is knowledgeable regarding the proper use and function of this device.

**(End)**

# LMA® MAD Nasal™ Intranasal Mucosal Atomization device

LMA® MAD Nasal™ INTRANASAL MUCOSAL ATOMIZATION DEVICE

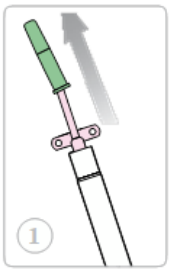
## Materials



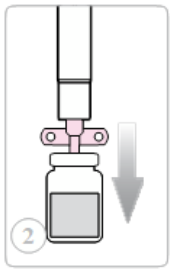

### Tips To improve success

1. Minimize volume, maximize concentration
   - 1/3 mL per nostril is ideal, 1 mL is maximum
   - Use the appropriately concentrated drug
2. Maximize total mucosal absorptive surface area
   - Atomize the drug (rather than drip it in) to cover broad surface area
   - Use BOTH nostrils to double the absorptive surface area
   - Aim slightly up and outwards to cover the turbinates and olfactory mucosa
3. Beware of abnormal mucosal characteristics
   - Mucous, blood and vasoconstrictors reduce absorption
   - Suction nostrils or consider alternate drug delivery method in these situations

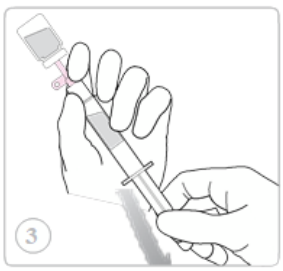
## procedure



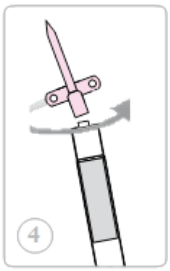

**STEP 1:** Remove and discard the green vial adapter cap.



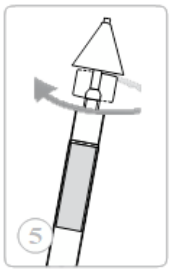

**STEP 2:** Pierce the medication vial with the syringe vial adapter.




**STEP 3:** Aspirate the proper volume of medication required to treat the patient (an extra 0.1 mL of medication should be drawn up to account for the dead space in the device).

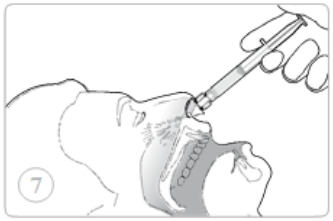



**STEP 4:** Remove (twist off) the syringe from the vial adapter.

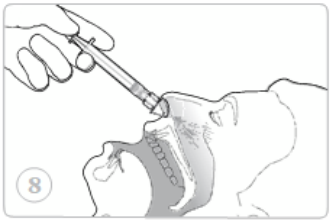



**STEP 5:** Attach the MAD Nasal™ Device to the syringe via the luer lock connector.


**STEP 6:** Using the free hand to hold the occiput of the head stable, place the tip of the MAD Nasal™ Device snugly against the nostril aiming slightly up and outward (toward the top of the ear).




**STEP 7:** Briskly compress the syringe plunger to deliver half of the medication into the nostril.




**STEP 8:** Move the device over to the opposite nostril and, repeating steps 6 and 7, administer the remaining medication into the nostril if indicated.



Teleflex®

# NASOTRACHEAL INTUBATION

**Purpose:**

To establish a clear, open and functioning airway for the oxygenation of the patient with possible respiratory insufficiency or potential airway compromise.

**Indications:**

1. Immediate or impending airway or ventilatory compromise when the patient's airway and oxygenation cannot be adequately maintained with a BVM.
    a. Respirations less than 10 or greater than 30 breathes per minute, with signs of respiratory insufficiency.
    b. Glascow coma score of 8 or less.
2. When direct visualization of the posterior pharynx is contraindicated because of difficulty of oral access or the possibility of neck injury.

**Contra Indication:**

Respiratory arrest.
Suspect basilar skull fracture.

**Precautions:**

1. Head must be exactly in midline for successful intubation.
2. Suction must be ready! In addition to vomiting, bleeding in the posterior pharynx may occur secondary to the trauma of the tube.
3. Nasotracheal intubation is more time consuming than oral tracheal intubation. Therefore, this is not an “emergency” procedure. The patient should be ventilating, and the situation should be calm enough to be able to hear the air exchange.
4. Avoid inducing bilateral nasal hemorrhage by forcing a nasotracheal tube on multiple attempts.

**Recommended Guidelines;**

8. Choose correct ET tube size, limited to nasal canal diameter.
9. Position patient with head in midline, neutral position.
10. Oxygenate at least 1 minute with BVM prior to attempt.
11. Lubricate the ET tube. (consider Lidocaine jelly or spray)
12. With gentle steady pressure, advance the tube through the nose to the posterior pharynx. Use the right nares if possible.
13. Advance tube while watching for moisture in tube and listening for air movement, once resistance is felt at the approximate level of trachea, pause and wait for inhalation just before the final advance.
14. advance the tube about one inch further then inflate the cuff with about 5 cc’s
15. Ventilate and check for breath sounds bilaterally and over the epigastrium.

**Complications and special notes:**

1. “Blind” nasotracheal intubation is very “elegant” technique to perform. The secret to blind intubation is perfect positioning and gentle patience.
2. In patients without neck injury or intact gag reflex, a laryngoscope may be used to visualize the location of the tube. Magill forceps are useful to direct the tube.

**(End)**

## NEEDLE CRICOTHYROIDOTOMY

**INDICATIONS**: Life-threatening upper airway obstructions where other non-invasive or manual measures have failed to establish an airway and attempts at ventilation have failed and ET intubation is not feasible. FOR PATIENTS > 2 YEARS OF AGE.

**PROCEDURE:**

1) Place patient supine, taking spinal precautions
2) Identify the cricothyroid membrane in the midline between the thyroid and cricoid cartilage
3) Prep area with Betadine swab
4) Assemble a #10-14 gauge, 5.0 cm, over-the-needle catheter to a 6- to 12-ml syringe
5) Puncture the skin midline and directly over the cricothyroid membrane (i.e., midsagittal)
6) Direct the needle at a 45-degree angle caudally
7) Carefully insert the needle through the lower half of the cricothyroid membrane, aspirating as the needle is advanced
8) Aspiration of air signifies entry into the tracheal lumen
9) Withdraw stylette while gently advancing catheter downward into a position, being careful not to perforate the posterior wall of the trachea
10) Attach the catheter hub to an appropriate ventilating device connected with tubing to an oxygen source. O2 flow meter should be set at 15 LPM (50 PSI. NOTE: Adequate PaO2 can be maintained for 30-45 min.
11) Intermittent ventilation can be achieved by placing the thumb over the side port of the tubing, using the rhythm of one second on and four seconds off
12) Observe lung inflation and auscultate the chest for adequate ventilation
13) Secure the apparatus to patient's neck

**COMPLICATIONS**:

1) Asphyxia
2) Aspiration
3) Cellulitis
4) Esophageal perforation
5) Hematoma
6) Posterior tracheal wall perforation
7) Subcutaneous and/or mediastinal emphysema
8) Thyroid perforation
9) Inadequate ventilations leading to hypoxia & death

**(End)**

## NEEDLE THORACOSTOMY

**INDICATIONS:** Suspected tension pneumothorax associated with hypotension, tachycardia, and jugular vein distention.

**Associated signs:**

1) Tachypnea
2) Cyanosis
3) Hyperexpansion
4) Tracheal deviation
5) Subcutaneous emphysema
6) Unilateral diminished breath sounds

**PROCEDURE**: (Observe strict aseptic precautions)

1) Identify 2nd intercostal space in the mid-clavicular line
2) Prep area with Betadine swab
3) Use 16g angiocath {minimum) with 10 cc syringe attached
4) Aspirate 1 cc of air into the syringe
5) Introduce the catheter in a vertical fashion through the skin and express the 1 cc of air into the subcutaneous tissue
6) Advance the catheter over the superior border of the lower rib into the pleural space and aspirate air
7) Remove the syringe and needle, leaving the catheter in place

**CONSIDERATIONS**: (May create a pneumothorax)

If no air is aspirated upon catheter placement, the syringe & needle is still removed, leaving the catheter in place and frequently reassess the patient's respiratory status.

**(END)**

# PACING

INDICATIONS: ( Do Not Delay TCP for IV or drugs to take effect.)

1. 3rd or 2nd degree block
2. Symptomatic bradydysrhythmia not responding to Atropine

**CONTRAINDICATIONS:**

1. Patient < 12 years of age
2. Patient meeting death in field criteria

**PROCEDURE**:

1. CPR, as indicated
2. Establish rhythm and baseline vitals
3. High flow 02
4. Atropine per appropriate arrhythmia protocol
5. Attach pacing electrodes
   a) Select: demand operation if stand-alone pacemaker
   b) Adjust EKG gain to sense intrinsic QRS. complexes
   c) Pacing rate 80-100 BPM
   d) Set current {start low and increase until capture)
6. Activate pacer
   a) At capture, decrease current until just above capture threshold
   b) EKG capture: change in QRS., wide QRS.
   c) Mechanical capture: pulse, rise in BP, increase in LOC., improved color, temp., etc.
7. Document with rhythm strips
8. If patient conscious, assess patient comfort. Consider **Versed 1-5 mg** IV
9. If patient unconscious, assess BP and pulse
10. If no improvement with pacer, institute drug therapy per appropriate arrhythmia protocol
11. If no response to pacer or ACLS drugs, contact receiving physician

**DOCUMENTATION:**

1. Date, time, baseline rhythm, pacing rhythm strips
2. Current required to capture
3. Pacing rate and mode selected
4. Patient response to pacing: electrical/mechanical
5. Medications used
6. Date and time pacing terminated

**(End)**

## PAIN ASSESSMENT DOCUMENTATION

**Clinical Indications:**

Any patient with pain

**Definitions:**

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.

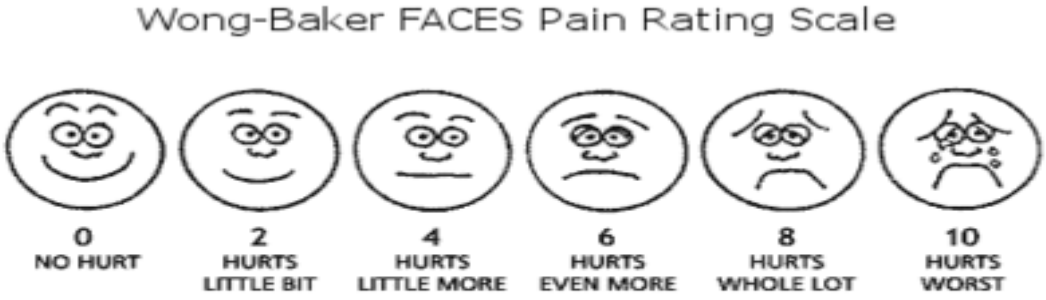
Pain is subjective (whatever the patient says it is)

**Procedure:**

1. Initial and ongoing assessment of pain intensity and character is accomplished through the patient's self-report.
2. Pain should be assessed and documented in the PCR during initial assessment, before starting pain control treatment, and after pain control treatment.
3. Pain should be assessed using the appropriate approved scale.
4. Two commonly used pain scales are the "0 – 10" and the Wong - Baker "FACES".

**0 – 10 Scale:** the most familiar scale used by EMS for rating pain with patients. It is primarily for adults and is based on the patient being able to express their perception of the pain as related to numbers. Avoid coaching the patient; simply ask them to rate their pain on a scale from 0 to 10, where 0 is no pain at all and 10 is the worst pain ever.

**Wong – Baker "FACES" scale:** this scale is primarily for use with pediatrics but may also be used with geriatrics or any patient with a language barrier. The faces correspond to numeric values from 0-10. This scale can be documented with the numeric value.




From Wong D.L., Hockenberry-Eaton M., Wilson D., Winkelstein M.L., Schwartz P.: Wong's Essentials of Pediatric Nursing, ed. 6, St. Louis, 2001, p. 1301. Copyrighted by Mosby, Inc. Reprinted by permission.

**(End)**

## PULSE OXIMETRY

**Clinical Indications:**

Patients with suspected hypoxemia.

**Procedure:**

1. Apply probe to patient as recommended by the device manufacturer. Pediatric patients may require pediatric specific sensors.
2. Allow machine to register saturation level. Monitor patient for a few minutes as oxygen saturation can vary.
3. Verify pulse rate on monitor with actual pulse of the patient.
4. Record time and initial saturation percent on room air if possible in the patient care report (PCR).
5. Monitor critical patients continuously until arrival at the hospital.
6. Document percent of oxygen saturation every time vital signs are recorded and in response to therapy to correct hypoxemia.
7. Treat the patient, not the data provided by the device. Use the pulse oximetry as an added tool for patient evaluation.
8. The pulse oximeter reading should never be used to withhold oxygen from a patient in respiratory distress .
9. Factors which may reduce the reliability of the pulse oximetry reading include:
    - Poor peripheral circulation (shock, hypothermia, cool extremities)
    - Excessive pulse oximeter sensor motion
    - Fingernail polish (may be removed with acetone pad)
    - Carbon monoxide bound to hemoglobin
    - Inflation of BP cuff on same extremity as pulse ox probe.

**Skill Maintenance Suggestions:**

- Practice placing pulse oximeter on all size patients on a periodic basis.

**(End)**

## RAPID SEQUENCE INTUBATION (RSI)

**Purpose:**
To assist in performing intubation in patients that are difficult, due to the presence of a gag reflex, and where optimal protection of the airway is a potential lifesaving maneuver.

1. **Equipment:**
   a) Bag-valve-mask with functioning O2 system
   b) Suction unit with rigid pharyngeal tip.
   c) Laryngoscope and endotracheal tubes
   d) Atropine
   e) Lidocaine
   f) Succinylcholine chloride (at least 2 doses) or another available paralytic.
2. Ensure that a functioning secure IV line is in place
3. Establish cardiac monitor
4. Assist ventilation with supplemental O2 as necessary oxygenate prior to intubation attempt
5. Pre-medicate as appropriate.
   a) Pediatric patients < 2 yo Administer **Atropine .02 mg/kg** IV bolus
   b) Administer **Midazolam IV/IO (adult 2-5 mg; peds 0.15-0.30 mg/kg)** or **Etomidate (0.3 – 0.6 mg/kg IV/IO)**. Use Etomidate over Midazolam if patient is hemodynamically unstable. - Consider appropriate dosage of pain medicine **(Morphine 2-10 mg IV/IO)**
6. Administer **1.5-2.0 mg/kg Succinylcholine IV/IO** (may administer IM in large muscle mass if unable to start an IV).
   a) Occlude the esophagus by applying cricoid pressure (Sellick Maneuver), until intubation is successfully completed.
7. Perform direct laryngoscopy and place ET tube per above procedure
   a) If first attempt is unsuccessful, ventilate with BVM for 30-60 seconds
   b) If relaxation is inadequate,
      1) Administer a second dose of **Succinylcholine, 1.0 mg/kg** slow IV push.
8. If repeated intubation attempts fail, ventilate with BVM until spontaneous respirations return. Consider **King Airway**
   a) If further intubation attempts fail, and patient cannot be ventilated per BVM Perform needle cricothyroidotomy per protocol.
9. If bradycardia occurs during the intubation attempt Cease intubation attempts and ventilate per BVM with supplemental O2.

**(End)**

## RESTRAINTS AGGRESSIVE, VIOLENT PATIENTS

The use of physical restraints for patients who pose a threat to themselves or others is indicated only as a last resort. If restraints are used, care must be taken to protect the patient from possible injury.

1. Request assistance from law enforcement.
2. If available let them restrain patient.
3. A minimum of four people, one per extremity, must be available to assist.
4. Each member is assigned a specific limb.
5. On command from the team leader, the patient's limbs and head are immobilized in one coordinated effort.
6. Each extremity is restrained in the following manner (use soft restraints)
   A) SUPINE
   B) Secure one arm above the head and the other arm at waist level
   C) Secure the head
   D) Secure the feet
   E) May apply a hepa, TB or NRB O2 mask with oxygen attached on the patient to avoid fluid contact. Regardless maintain airway patency.
   F) Secure all seatbelts
7. Never leave the patient in restraints alone.
8. Carefully monitor the patient in the event of vomiting to prevent aspiration

**(End)**

## STROKE SCALE: CINCINNATI PREHOSPITAL

**Clinical Indications:**
Suspected Stroke Patient
**Procedure:**
1. Assess and treat suspected stroke patients as per protocol.
2. The Cincinnati Pre-hospital Stroke Scale or FAST Exam (Facial, Arm, Speech, Time)
    **Facial** Droop (have patient show teeth or smile)
        Normal – both sides of the face move equally
        Abnormal- one side of the face does not move as well as the other side
    **Arm** drift (patient closes eyes and holds both are straight out for 10 seconds)
        Normal both arms move the same or both arms do not move at all (other findings such as pronator drift may be helpful)
        Abnormal – one arm does not move, or one arm drifts down compared with the other.
    Abnormal **Speech** (Have the patient say "you can't teach an old dog new tricks")
        Normal Patient uses correct words with no slurring
        Abnormal- patient slurs words, uses the wrong words, or is unable to speak

Interpretation: If any one of these three signs is abnormal, probability of a stroke is 72%
3. If any one of the three signs is abnormal it's **Time** to transport, the stroke scale is positive.
4. The results of the Cincinnati Prehospital Stroke Scale should be documented in the PCR.

**(End)**

# VACCUUM MATTRESS

**Vacuum Mattress**

The Adult/Peds Vacuum Mattress is, the gold standard, and primary full spine/body immobilization transportation device for multi-trauma patients with suspected spinal injuries. It is also excellent as a transportation splinting device for patients with pelvic or hip injuries, extremity fractures.

Indications:

1. Patients who are suspected, due either to mechanism of injury or clinical assessment, to have a spinal injury.
2. Patients, such as pelvic fractures, who will benefit from full-body immobilization

Precautions:

1. While a vacuum mattress gives excellent lateral body immobilization, a vacuum mattress does not provide the same longitudinal immobilization that is found with a Long Spine Board or a Scoop Stretcher. It is therefore required for any patient who is suspected to have a spinal injury and who is to be moved or carried any great distance in a vacuum mattress that the vacuum mattress must be secured on a Long Spine Board or Scoop Stretcher.


Technique:

1. Place the Vacuum Mattress on the ambulance stretcher or on flat surface. If placing on the ground, be sure to protect the mattress from potential punctures by placing a blanket under it. Unclip the buckles on one side of the mattress and lay off to the side. Ensure the internal beads are spread out evenly throughout the mattress.
2. Place a blanket or sheet down the full length of the vacuum mattress. This will ease removing the patient off the vacuum mattress in the ED, and helps prevent sweating and heat loss when lying on the mattress.
3. Place the patient onto the mattress using a Long Spine Board or Scoop Stretcher. With adequate personnel (3), the patient can also be log rolled onto the mattress. Position the patient ensuring that the top of the patient's shoulders are level with the shoulder line marking. Once the shoulders are correctly positioned, remove the Long Spine Board or Scoop Stretcher. In a suspected spinal injury, one person should also continue holding the

head to maintain proper head alignment (with a C-Collar in place) until the head is immobilized in the mattress (see below).

4. Gently attach and snug up the straps. The straps should be tightened with a 'feed and pull' method to prevent twisting of the patient. While tightening straps, have a rescuer gently push laterally inwards on the sides of the mattress. This will assist in tightening the straps.
5. Once the patient's body is secured properly to the mattress, only then is the patient's head secured to the mattress. Ensure the correct amount of padding. Using the thighs of the provider cradle the head of patient, with the material of the mattress. This will aide in a soft, contoured area of the head. In understanding not all equipment fits every patient this can be performed with/or without the C-Collar.

6. Ensure all strapping is complete and snug. Attach the hand pump to either the foot end or head end port. Maintaining gentle lateral pressure to head, pelvic, and lower extremity sections of mattress, evacuate all the air out of the mattress until it feels solid.
7. Re-adjust straps following evacuation of the air.

**Vacuum Mattress**

On arrival at the ED, ask the staff whether they wish the vacuum mattress removed from the patient. Inform them that this item is CT-Scan and C-Ray compatible. If they do (and time permits), assist them in transferring the patient onto a bed or another immobilization device.

Notes

A Vacuum Mattress is of most benefit where the patient will require immobilization for greater than 15 minutes, and/or where the patient cannot lay flat on a Long Spine Board or Scoop Stretcher.

**(End)**

## VENIPUNCTURE

PURPOSE:
IV therapy will be started on adult and pediatric (12 years old and under) patients where a rapid infusion of fluid would be beneficial and would outweigh the delay of starting the IV in the field. A saline lock may be attempted on all adult patients requiring transport but not requiring immediate fluid therapy.

INDICATIONS FOR INTRAVENOUS INFUSION:

1. Hypotension with systolic blood pressure of less than 90.
2. Significant potential for shock, i.e., major trauma or GI bleeding.
3. Potential hypoglycemic coma / insulin shock.
4. Coma.
5. Cardiac arrest, when there is no significant delay in transport.
6. When the above indications are met, the IV will be started in the most successful location (usually the antecubital vein).
   A) 14 - 24 gauge IV needle will be used (**most common is 18 gauge**).
   B) If indicated, i.e., severe shock, a second IV can be started.
7. In all HYPOTENSIVE, CARDIAC ARREST AND CARDIAC RELATED patients, Normal Saline will be the fluid administered.
8. With INSULIN SHOCK, SUSPECTED HYPOGLYCEMIC COMA or other COMA, patients will be given $D_5W$. or Normal Saline.
9. In all COMATOSE patient's blood will be drawn and placed in lavender and red top tubes. Fill lavender first and shake, then fill red.
10. During transport the patient will be monitored for potential complications of IV/IO therapy such as fluid overload, with special concern for the pediatric patient. IV rate will be dependent upon the clinical situation and will be decreased as the patient responds or if potential complications are occurring.

**Pearls**

- In the setting of cardiac arrest, any preexisting dialysis shunt or external central venous catheters may be used.
- Any prehospital fluids or medications approved for IV use may be given through an intraosseous (IO) infusion.
- All IV rates should be a TKO (minimal rate **to keep** the vein **open**) unless administering a fluid bolus.
- External jugular and IO lines may be attempted initially in life-threatening events where no obvious peripheral sites are noted.
- Any venous catheter that has already been accessed prior to EMS arrival may be used.
- Upper extremity IV sites are preferable to lower extremity sites.
- Lower extremity IV sites are discouraged in patients with vascular disease or diabetes.
- In post-mastectomy patients, avoid IV initiations, blood draws and injections or taking a blood pressure in the arm on the affected side.

**Performance Improvement Suggestions**

- Number of vascular access attempts and success rate

**(End)**