PLEASE READ THE FOLLOWING INSTRUCTIONS PRIOR TO COMMENCING TRAINING EXERCISES ON YOUR NEW MANIKIN.

HANDLE YOUR SIMULATOR IN THE SAME MANNER AS YOU WOULD HANDLE YOUR PATIENT.

THE CODE BLUE III SYSTEM IS TO BE USED ONLY AS PART OF AN APPROVED NEONATAL AND INFANT RESUSCITATION TRAINING PROGRAM.

SHOULD YOU HAVE ANY QUESTIONS AFTER READING THIS INSTRUCTIONAL MANUAL, PLEASE CALL GAUMARD AT

800-882-6655 USA, 305-971-3790 WORLDWIDE
OR
E-MAIL US AT: sima@gaumard.com
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SECTION 1   OUTLINE OF FEATURES AND BENEFITS

1. PATIENT CARE SIMULATOR

- Fully articulating 40 week newborn simulator
- Chest “bib” used with Virtual Instruments®
- Intubatable airway with proximity sensor to detect placement of ETT
- Umbilical site, intraosseous site, antecubital site, each with proximity sensors
- Use of Virtual Instruments during Teaching or Testing.
  - ECG
  - BP/PulseOx
  - AED
  - Manually defibrillate
  - Externally pace
2. COMMUNICATIONS INTERFACE MODULE (CIM)

- Links simulator with computer
- Includes custom Virtual Instruments® technology
  - Vital signs monitor with
    a. blood pressure cuff
    b. heart rate
    c. pulse oximeter
  - EKG monitor and three (3) lead electrodes
  - Automatic defibrillator and pads
  - Manual defibrillator and paddles
  - Temporary external pacer and anterior/posterior pads
- Virtual Instruments may be enabled or disabled when using the Code Scenarios in the test section. If disabled the student is not required to use the Virtual Instruments. If enabled, the student must perform each skill in order for the code scenario to continue.
- Connections and cables for:
  - power supply
  - computer interface cable
  - simulator interface cable
  - three (3) lead EKG
  - blood pressure cuff, heart rate and pulse oximeter
  - temporary external pacer
  - CPR tubing (cardiac compression and airway ventilation)
  - automatic external defibrillator
  - manual defibrillator
3. CODE BLUE III SOFTWARE AND LICENSE AGREEMENT

- Interactive Teaching and Testing stations
- Self-guiding "point and click" format
- Teaching Stations each icon shown above includes an interactive learning module
- Testing Stations
  - BLS
  - ALS practice with ten (10) code scenarios
  - CODEMAKER™ permitting the Instructor to create codes quickly and easily
- Virtual Instruments Tutor

4. LAPTOP COMPUTER (SUPPLIED WITH MODEL S300-106)
- Supplied in original carton with Manufacturer Warranty
- Windows XP
- Serial port for attachment to optional large monitor for classroom use
- Parallel port for attachment to optional printer

5. OTHER ACCESSORIES
- Consider using an LCD projector to port the Teaching and Testing modules to a larger screen for group presentations
- Since this software contains audible heart and lung sounds, you may attach multimedia stereo speakers to your computer producing sounds easily heard throughout a classroom.
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SECTION 2 - PATIENT CARE SIMULATOR DESCRIPTION

1. Head and neck

The head and neck contain a realistic mouth and airway. The head and jaw articulate. Intubation and Positive Pressure Ventilation may be conducted in the normal manner. The eyes are designed to be replaced by the customer. Tongues and airways can tear when intubation is attempted without lubrication.

*Remember, when any object is inserted into the simulator, lubricate it!*

Also note that airway ventilation using a positive pressure device such as a BVM is recommended. The use of mouth to mouth resuscitation is NOT recommended, since that may contaminate the airway.
2. Torso and arms

- removable front skin containing the “targets” for the VIRTUAL INSTRUMENTS®
- ribcage; heart; right and left lungs
- right brachial artery
- proximity sensor above the tracheal bifurcation to verify correct ETT placement
- umbilical access site contains a sensing module to verify passage of a catheter
- sensor is also located at the intraosseous site
- sensors automatically activated during the Code Scenarios found in the test section. The user may choose to disable the sensing features before beginning scenarios.
3. Umbilical infusion site

- Venous access of choice in neonate
- Simulated blood can be supplied to umbilicus
- Note metallic tip which activates umbi sensor when placed properly

4. Injection training arm

- The antecubital region has a sensing pad positioned over the veins to detect passage of a metallic needle.
• Use a 22 gauge needle or smaller to extend the life of the skin and veins
• Skin is made of vinyl and the veins beneath are latex which reseal after puncture
• **Do not permit those with latex allergies from removing the vinyl skin.**
• Palpable brachial and radial arteries
• Simulated blood supplied to arm and hand
• Veins stand out or collapse using large syringe provided

5. Arterial system

• Pulse may be determined at the umbilicus, the right radial and brachial, the right femoral, and the left popliteal arteries.
• The umbilical pulse is normally taken during CPR. The femoral arterial site in the right leg may be used to ascertain blood gas levels.
6. Femoral venous access
   • Medial to femoral artery
   • Cannulation not recommended
   • This is the outflow of the tibial bone and continues down the left leg to exit

7. Intraosseous infusion site
   • Tibial bone in right leg
   • Palpable landmarks include tibial tuberosity, tibia, and patella
   • Sixteen (16) interchangeable bones with anatomic landmarks
   • Pressurized system provides realistic “pop” when needle enters marrow cavity
   • Pull fluid through needle, verifying correct position

   • Use 16 guage or smaller two (2) fluted bone aspiration needle
SECTION 3 - COMPUTER INTERFACE MODULE (CIM)

The CIM is used while the student progresses through one of the three (3) tests in the Test Sections. It consists of the following items:

- Electronics to interface between the manikin and the computer
- Virtual Instruments® and connecting cables
- Power cube for connection to wall outlet

- Shown are the power supply, computer interface cable, and simulator interface cable

- Shown are the blood pressure and PulseOx device, and three (3) lead ECG
• Shown are the AED pads and the manual defibrillators

• Shown are the temporary pacer pads which are color coded and labeled.
• Three lead ECG pads are color coded to aid placement using the “white is right and smoke over fire” analogy. When placed the students will see the ECG associated with this scenario.

• The BP cuff as well as the Ox Sat are placed to activate sensors that confirm placement.

• Once placed the student will see the BP and Osat on a Vital Signs Monitor.
- Temporary external pacer with color coded pads
- When properly placed, a Virtual Pacer can be used in the asyn/sych modes

- Color coded AED pads
- When properly placed, a virtual automatic defibrillator can be used to defibrillate
• Virtual manual defibrillator with charge and shock buttons

Each of these Virtual Instruments® are sensor equipped to confirm activation. Failure to firmly apply each item as appropriate during the Code Scenarios will cause a message to appear, delaying progress.

What is not supplied with this system are the following:

• IO needles – two fluted 16 gauge needle or smaller
• IV needle set – 22 gauge or smaller
• Endotracheal tube – a size 2.5 to 3.0 with stylette is recommended
• Laryngoscope - a straight Miller 1 is recommended
SECTION 4 - CODE BLUE III SOFTWARE

1. SOFTWARE TIPS

The CODE BLUE III software uses a "point and click" format which will lead the student through each exercise. Notice that teaching modules precede testing modules. It is suggested that you start at the beginning and proceed at your own pace. Browse the teaching modules as well as other training tools provided before going to the three testing sections discussed below.

2. BLS TESTING

The BLS testing modules is included since BLS is the foundation of neonatal resuscitation. Sharpen your skills and use the printer option to record your results. Make sure you have mastered BLS!

- We have accessed the BLS testing module at the lower left side of the main screen.
- This screen is used for the BLS test and shows whether the airway ventilations and chest compressions are too high, too low or just right.
• When the BLS test session is completed you can view/print the results

• This graph shows the waveforms of the ventilations and compressions
• You may enter student information and save the waveforms electronically
• In the alternative you may print the numerical results
- The Instructor may select the number of Comp/Vent cycles to be monitored

SECTION 5 - NEONATAL PRACTICE TESTING

- This module contains ten (10) scenarios which are graded in difficulty with the most challenging at the end. You may either ENABLE or DISABLE the Virtual Instruments. Disabling allows the student to work through the test scenarios without actually performing functions, such as, intubating the manikin. When enabled, sensors in the manikin detect when activities such as Intubation occur. Therefore, the students working as a CODE TEAM must perform each procedure on the simulator in order to move on to the next step.
Remember these scenarios are timed with a brief log of your activities.

Each scenario requires numerous decisions. At each decision point, you will be required to identify the correct decision or decisions before moving on.

Your log will then identify both the correct and the incorrect decisions as well as the time of your decision. This log will provide a useful basis for the learning process.
SECTION 6 - LEARNING TO USE CODEMAKER™

- Codemaker is an Instructor driven software system. It permits the instructor to create any test protocol deemed appropriate to examine the abilities of a student.

- Go to the “pulldowns” at the top of this screen and note how you can customize Codemaker for your applications.

- Codemaker works best with a second monitor or an LCD projector. The instructor provides input on the computer and controls the LCD projector.
• We have opened the folder at the lower right side of the screen and selected a preprogrammed scenario. The summary is shown in the center panel. That summary may be hidden from view by using the “Preferences” window.

• If an ECG is needed for your scenario it will appear at the top of the screen. A status update is provided at the right side; changes in status flash three times in yellow. At the left is the Vital Signs Monitor.

• Across the bottom of the screen note the Instructor and Student Actions toolbars. These are used to define any number of scenarios and to record who did what and when.

• At the lower right are icons to save, retrieve, print or end a session. Above these icons is a display showing the total time students have required for a scenario. Note each student action is tagged with a thought time and an action time which is used during debriefing to identify areas where students work well or require additional skills.
Based on the information presented, students have decided they want to attach monitoring equipment. Therefore, the 6th icon on the Student Actions toolbar is clicked and the Instructor records what they have done and whether it was done correctly.

Once attached correctly, students see the ECG and the Vital Signs. Observe they have taken far too much time and should have initiated BVM and/or intubation minutes ago!
• In this screen the Instructor has clicked the 6th icon on the Instructor Actions toolbar and has decided to improve the neonate’s condition.

• A minute later, the Instructor has again decided to improve the condition of the neonate.
• The neonate has fully recovered; however, at any point the Instructor could have decided to send the neonate in a more ominous direction as will be shown in the next section.
Codemaker™ was designed to allow the Instructor freedom to create scenarios quickly and easily, save them, and control the condition of the neonate. To create a scenario we have clicked “Preliminary Information”.

- The minimum amount of information one must enter is everything in the patient information screen, one chief complaint, and one element in patient history even if that is "none". Then click accept settings and the information will be displayed as narrative.
The information in the initial screen is presented as narrative in the center panel along with the team members and the Instructor.

Go to the upper left and pull down “Instrumentation”. Note three choices “Enable”, “Disable” and “Check”. The simulator is factory set at “Disable” meaning that students do not have to actually connect the Virtual Instruments™ provided; rather they can indicate their placement. “Enable” activates sensors that detect whether or not the Virtual Instruments have been used; and whether they remain in use throughout the entire scenario. We suggest “Disable” initially.
- The Instructor should open each icon on each toolbar and see how millions of scenario combinations can be created. In this case, the 6th icon was selected and the cardiac rhythm and vital signs were selected. Other icons work the same way. The 7th icons at the right are tablets to enter anything else you may need to leave for the student team.

- Once the Instructor is convinced the students have either attached the instruments correctly, the information the students have decided they need is displayed on one or more of the monitors shown on the screen.
Here students have decided that BVM, intubation, and CPR have not been effective so they are elected to infuse medications through the umbilical vein. Note there are four sites for administration of medications and that both drugs and fluids can be recorded. The Instructor can also record whether they were administered correctly or incorrectly. Each of these events is time stamped for the log used during debriefing.

Despite their efforts the neonate fails to improve, and the student team has decided to attempt external pacing.
• Once the pacing leads are attached to the neonate, this Virtual Pacer appears on the screen and students can select pacing mode, pacing rate, and begin to increase the pacing current.

• Students have selected the mode, rate and current shown above; note the pacing spikes appear in the ECG but have not yet captured the intrinsic rhythm of the heart.
- Students increased the pacing current until it captured the heart.

- The Instructor determines whether the procedure was performed correctly.
• The Instructor improves the other vital signs

• The Instructor opens the text box and writes
Student performance is judged and any comments noted.

At the conclusion of the session, the Instructor has clicked the “X” at the top right side of the screen and returned to the main menu.
SECTION 7 - GENERAL CARE

1. EXTERNAL CLEANING

The skin of the manikin may be cleaned with a mild detergent, or with soap and water. Do not clean with harsh abrasives. Indelible marks made with ballpoint pens, ink, or markers will remain. Do not wrap the manikin in newsprint.

Do not use povidone-iodine on this manikin.

2. INTERNAL CLEANING

To open the simulator, lift the outer skin covering the chest cavity. At this point, the technician can access any of the internal features for cleaning and/or repair.

NOTE: Be sure to reconnect all parts tightly, to prevent fluid leakage and to maintain proper electrical contact between the sensor equipped manikin and the CIM.

3. LUBRICATION

Always use a lubricant when introducing a laryngoscope, an NP tube, an OP tube, an ET tube, or any catheter. The preferred lubricant is water based silicone.
SECTION 8 – APPENDICES

APPENDIX 1 - INTUBATION TRAINING

Your simulator is equipped with a realistic airway having a soft, floppy epiglottis and vocal cords. The student MUST treat the simulator like a REAL PATIENT.

OPENING THE AIRWAY

During your BLS training the ABC’s of resuscitation were emphasized again and again. Recall the "A" stands for airway and "B" stands for breathing. Therefore, the mechanics of properly opening the airway are essential.

Remember the following during neonatal intubation:

- Neonates require more oxygen per amount of body weight than adults.
- The airway of a typical newborn child is only 3 millimeters in diameter at its narrowest point, located below the vocal cords. An adult’s airway may be 20 millimeters in diameter.
- The tongue occupies a relatively larger portion of the mouth.
- A towel placed under the shoulders is essential to extend the infant’s neck.

Intubation may be indicated in the unconscious patient or when the patient is not breathing properly. Successful intubation provides:

- Means for oxygen and positive pressure ventilation
- Alternative route for providing certain medications if IV is not available
- Access for suctioning the trachea and bronchi

The KEYS to successful intubation are:

- Ventilation before intubation
- Patient position
- Use the laryngoscope to visualize the vocal cords
- Pass the endotracheal tube between vocal cords
VENTILATION BEFORE INTUBATION

During intubation attempts, the patient will NOT receive adequate oxygen. Therefore, the rescuer must provide 100% oxygen before attempting intubation, AND MUST VENTILATE BETWEEN EACH ATTEMPT.

PATIENT POSITION

The objective is to position the patient so that the rescuer will have the BEST VIEW OF THE VOCAL CORDS. Inserting an endotracheal tube (ET tube) much be a well-rehearsed procedure. Each CORRECT step makes the NEXT STEP that much easier.

Remember to ventilate the patient BEFORE and BETWEEN each intubation attempt.

Place the patient on his back. Use the "SNIFFING POSITION" or JAW THRUST shown below. A towel must be placed under the infant's shoulders. This places the patient in the so called "SNIFFING" position. This provides the rescuer with the BEST VIEW of the vocal cords. HEAD TILT/CHIN LIFT is to be avoided in the newborn.

VISUALIZING THE VOCAL CORDS

The rescuer is normally positioned above and behind the head of the patient so that the line of sight is across the forehead, over the nose and along the axis of the patient’s airway. The laryngoscope is used to lift the tongue and epiglottis out of the line of sight so that the vocal cords may be CLEARLY seen.

The laryngoscope may be fitted with two types of blades: the straight Miller or the curved Macintosh. The Miller traps the top edge of the epiglottis against the tongue while the Macintosh lifts the epiglottis by lifting the tongue at the vallecula. The straight blade is widely preferred for neonatal intubation.

SELLICK MANEUVER

In the event that you can still not see the vocal cords, use the Sellick maneuver as follows:

Have an associate depress the crico cartilage - this forces the airway posteriorly, providing a better view of the vocal cords

Locate the cricoid by finding the "Adam’s Apple" or thyroid cartilage.

Move the hand lower and feel the crico-thyroid membrane; move further below and locate the cricoid cartilage
POSITIONING THE ENDOTRACHEAL TUBE

With the patient in the sniffing position, and the rescuer behind the patient, place an uncuffed ET tube approximately 3.0 mm I.D. by 10-12 centimeters in length as follows:

1. Use the left hand to insert the blade along the right side of the mouth, sweeping the tongue to the LEFT until the blade is midline.
2. Lift the tongue and the epiglottis up and away.
3. Keep low behind the patient and observe the vocal cords.
4. It is a good idea to have 2 ET tubes ready for use; one with a guidewire in place and the other without the guidewire.
5. Use the Sellick maneuver and/or guidewire if necessary.
6. Slide ET tube along the right side of the blade and between the vocal cords.
7. Position the tip of the ET tube midway between the vocal cords and carina.
8. Carefully withdraw the guidewire as the ET tube moves through the trachea.
9. Carefully withdraw the laryngoscope blade.
10. Attach oxygen supply and check for bilateral lung expansion.

CONFIRMING CORRECT PLACEMENT

- Look, listen, and feel for bilateral lung expansion.
- In a patient:
  - Auscultate for chest sounds and air entry.
  - Observe ET tube - note fogging of the expelled air - you should NOT see the gastric contents.
- Secure the ET tube and VENTILATE.
- Check the patient:
  - for COLOR
  - for the EFFORT of breathing
  - is the RESPIRATION RATE reasonable?
  - for BLOOD PRESSURE and HEART RATE.

FOR ADDED REALISM:

- Gastric contents and other fluids may be added to the stomach.
- Suctioning may be practiced in either/or the esophagus/trachea.
- Placement of the ET tube should also be attempted while fluids are present in the vicinity of the vocal folds.
- Placement of the ET tube using the naso-tracheal route should also be demonstrated using an ET tube several centimeters longer.
APPENDIX 2 - INTRAOSSEOUS INFUSION/ INJECTION TRAINING

The Intraosseous Trainer may be an effective tool for instruction in intraosseous infusion. This model also contains a simulated femoral artery and vein in the upper thigh so that the student can appreciate both a femoral entry and the intraosseous entry into the venous system. This dual system design is useful since the intraosseous entry is recommended after two quick unsuccessful attempts at peripheral venous cannulation. This simulator is to be used only as a part of an approved program for the care of neonatal patients. The Intraosseous Trainer includes a set of sixteen (16) modified tibial bones, a fluid dispensing syringe, synthetic blood concentrate, and two (2) spare skin covers.

INSTRUCTIONS FOR USE

**CAUTION:** The tibia bones supplied with your simulator are made from hard plastic that can be pierced by the intraosseous needle. Once holes have been made in the tibia it can leak. We have minimized leakage by controlling fluid pressure in the bone using inlet and drain valves. Proceed as follows:

1. Fill tank with water, open the inlet and drain valves and allow water to flow through the system into a catch basin.
2. Once water is seen draining, close the inlet valve.
3. After about 10-20 sticks you may need to add water to the tibia bone. To do so, open the inlet valve for a few seconds and reclose the valve.
4. Continue your IO exercises.
5. To change the tibia bones, first open the outlet and drain the fluid, remove the skin cover and remove the bone. Either use one end of the used bone or insert and reattach the skin. Return to step 2.
6. When the training session is completed, open the outlet and drain the fluid.
7. Remove the syringe and drain the fluid.
8. Replace the bones and dry them for next session.
9. The Instructor may seal the holes in the bone(s) that are made by the IO needle with "SuperGlue".

INTRAOSSEOUS ACCESS

Intraosseous infusion is the infusion of fluids, blood, and/or drugs directly into the bone marrow of the tibia or other large bones. It is a quick, simple solution to venous access in neonates when the umbilicus is not patent. Contraindications to intraosseous access include bone disorders, infected burns, cellulitis, or recent fractures.

Setting up an intraosseous access line is an invasive procedure requiring an aseptic technique. The site most recommended for the tibia is the anterior medial aspect of the tibia. Although any portion of the tibia can be used, the preferred site for properly locating the point of insertion of the needle is two (2) to thee (3) centimeters below, and one (1) centimeter medial to the tibial tuberosity (the tibial tuberosity is the bump below the kneecap). Note that each tibial bone provided is modified, having a tibial tuberosity at the top and bottom of the tibial bone. This allows the bone to be rotated after
repeated needle sticks. You may wish to apply conventional "SuperGlue" or PVC sealant to the holes created by the needle sticks to prevent fluid leakage from the needle sticks.

Locate the tibial site and clean the area with alcohol. Avoid the use of povidone-iodine, as this will discolor the simulator. Simulate anesthetization of the area if needed. The needle recommended for this procedure is a 16 gauge disposable bone marrow aspiration needle.

Caution must be used when inserting the needle. Once the insertion point is located, insert the needle and cannula by applying downwards pressure while rotating the needle back and forth until the bony cortex has been penetrated. A "pop" or sudden decrease in resistance signal entrance into the cavity. Now remove the central needle, leaving the cannula in place. If the needle/cannula has been properly inserted, fluid may be withdrawn using a standard syringe. In the event "blood" return is not observed, the student may not have penetrated the bone marrow cavity. The intraosseous access is only marginally stable and is easily dislodged from the pediatric patient. Once stabilized, the student should practice stabilizing the needle, using for example, a hemostat clamped to the needle hub and taped to the leg of the patient.

Once stabilized, the intraosseous access may be used to infuse fluids, drugs, and blood products. Be sure to flush the cannula with saline after each use.

It is recommended in the literature that the intraosseous infusion be conducted for the briefest amount of time, usually an hour or two, until a more secure intravenous line has been established.

**APPENDIX 3 - FEMORAL VENOUS ACCESS**

During CPR, the preferred access site is the largest and most accessible site that does not interrupt resuscitation of the victim. Venous access can be obtained through the umbilicus, the intraosseous route discussed previously, or the femoral, internal jugular, external jugular, or subclavian veins. Of the latter four sites, the femoral is preferred because, like the intraosseous site, it provides less interference with the resuscitation efforts. To cannulate the femoral vein a suggested procedure is shown below:

**Accessing the femoral vein:**

1. Restrain the right leg with a slight external rotation
2. Identify the femoral artery by palpation or, if pulsations are absent, by finding the midpoint between the anterior superior ilian spine and the symphysis pubis.
3. Scrub the area thoroughly with an antiseptic solution.
4. Wash hands and wear sterile gloves.
5. Anesthetize the skin with 1% lidocaine.
6. Puncture the skin with a hollow needle one finger's breadth below the inguinal ligament, and just medial to the femoral artery. During chest compressions, pulsations in the femoral area are as likely to originate from the femoral vein as from the artery, and needle puncture should be attempted at the point of pulsation. Direct the needle toward the head at a 45° angle and advance it
slowly until a free flow of blood is obtained. Insert the through-the-needle catheter or catheter-introducing sheath. Remove the needle, or guide wire and dilator and secure.

**APPENDIX 4 - UMBILICAL CATHETERIZATION**

At birth and for only a few hours thereafter, the umbilicus can be used for intravenous access, and for measuring arterial blood gasses/pressure. This simulator features umbilical venous access.

You may access this using an appropriately-sized umbilical catheter. Lubricate the distal tip and insert the tip JUST BELOW the level of the skin. Infusion exercises may then be practiced. A reservoir within the simulator collects the fluid, which can be drained via a port on the torso.

**APPENDIX 5 - ARTERIAL SYSTEM**

Once spontaneous circulation is restored, arterial access may be used to monitor blood gasses, chiefly $\text{pH}$, $\text{pO}_2$, $\text{CO}_2$. Indwelling arterial catheters can be placed in the radial, femoral, or posterior tibial arteries.

As supplied, the arterial system in this simulator was designed for pulse detection only, using the standard squeeze bulb technique. However, the instructor may wish to connect the line leading to the squeeze bulb to the blood bag instead. The arterial system will now fill with blood and arterial sticks can be practiced. Remember to flush the system with water and purge the system of air when arterial exercises are complete.

**APPENDIX 6 - NEONATAL INJECTION TRAINING ARM**

The training arm simulates the arm of a newborn. It is an effective training tool for intravenous and certain arterial exercises. It is only to be used as part of an approved program for patient care.

The Training Arm includes a blood dispensing syringe, synthetic blood concentrate, and a spare arm skin. The training arm contains anatomically located venous and arterial grooves which are fitted with soft latex tubes closely simulating the consistency of the veins. A translucent, pliable skin, which is removable and washable, is stretched over the training arm.

The Training Arm provides:

1. A medial venous antecubital vein for IV exercises
2. Radial and brachial arteries
3. Two veins in the dorsum of the hand for additional intravenous training techniques.

Applying pressure via the syringe permits the veins to stand out, simulating a clenched fist or a tourniquet situation. Release of the pressure simulates collapsed veins. Use of the syringe permits
the palpability of the veins to be varied as seen in routine hospital or emergency situations.

**INTRAVENTOUS EXERCISES**

Setting up an IV line is an invasive procedure requiring an aseptic technique. The normal procedure for setting up an IV line using the simulator is as follows:

1. Apply desired pressure to the veins via the syringe.
2. Squeeze the appropriate vein site and clean the skin with alcohol. Avoid use of povidone-iodine, as this will cause the latex skin to become discolored and brittle.
3. Omit tourniquet use if possible. If required, apply the tourniquet a few inches above the selected site.
4. Simulate anesthetization of the skin if needed.
5. Select a 22 gauge cannula and 23 gauge needle. Larger needles will damage the veins.
6. Apply finger pressure to the vein distal to the puncture site.
7. Puncture the skin and the underlying vein with the needle. The bevel of the needle should be up and the needle should be angled at a 20 - 30 degree angle. You can feel a "pop" as the needle enters the veins and you can note the blood return.
8. Stabilize the entry site as desired. Apply ointment and dressing, and remove tourniquet.

**APPENDIX 7     SUGGESTED REFERENCES**

1. Neonatal Resuscitation, American Academy of Pediatrics and American Heart Association
4. Primary Care of the Newborn, Seidel et. al., Mosby Publishers

SHOULD YOU HAVE ANY QUESTIONS AFTER READING THIS INSTRUCTION MANUAL, PLEASE CONTACT OUR CUSTOMER SERVICE DEPARTMENT FOR FURTHER ASSISTANCE:

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