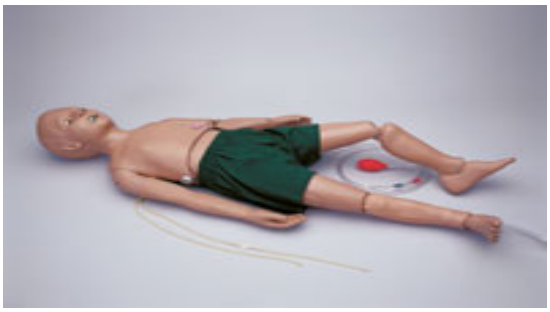
INSTRUCTION MANUAL



S157 FIVE YEAR PEDI PALS SIMULATOR FOR ADVANCED PATIENT CARE

Gaumard® Scientific
14700 SW 136 St.
Miami, FL 33196-5691
e-mail: sima@gaumard.com

Patented Revised: November 2006

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 – WITH CARE AND CONSIDERATION.

SHOULD YOU HAVE ANY QUESTIONS AFTER READING THIS INSTRUCTIONAL MANUAL, PLEASE CONTACT GAUMARD CUSTOMER SERVICE.

USA Tollfree 800-882-6655

Or

sima@gaumard.com

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[1] available option

SECTION I - FEATURES AND BENEFITS

The size of this model is designed to simulate a five (5) year old child. It may be an effective training tool for CPR, trauma care and advanced life support exercises. It is to be used only as part of an approved training program for pediatric emergency and trauma care.

The simulator features the following:

- Realistic intubatable airway.
- Arterial sites.
- Venipuncture locations.
- Intraosseous infusion sites.
- Custom carrying bag.

The available essential features of this acute care model are:

INTUBATION AND CPR

- Realistic mouth, airway, and upper torso.
- Fully articulated head and jaw.
- Crico prominence facilitates Sellick maneuver.
- Chest compliance achieved through realistic heart, lung, and ribcage.
- Easily accessible chest cavity.
- Realistic chest cavity.
- Endoscopically examine airway to level of bronchi.
- Head and upper torso may be easily disassembled.
- **Code Blue Life Monitor[1]** provides correct cadence and monitors level of ventilation and compression.

INTRAOSSEOUS INFUSION (I/O)

- Venous access of choice in trauma care of children.
- Tibial bone in right leg.
- Left humerus bone in left arm may also be configured to contain intraosseous infusion site.
- Sixteen (16) interchangeable bones with anatomic landmarks.
- Realistic "pop" when needle enters bone marrow cavity.
- Pull fluid through needle verifying correct position.

ARTERIAL SYSTEM

- Pulse may be determined at the left or right carotid or at the right femoral artery.
- The carotid pulse is normally taken during CPR. The available femoral arterial site in the right leg may be cannulated to ascertain blood gas levels without interfering with the CPR effort.

VENOUS SYSTEM

- Simulated blood can be supplied in the right femoral vein.
- The right femoral vein may be infused, since it is relatively easy to cannulate with interfering with the CPR effort.
- Two quick venous "sticks" are recommended prior to attempting intraosseous techniques. Therefore, both intravenous and intraosseous techniques can be practiced.

INJECTION TRAINING ARM

- Attaches to right side of the simulator.
- Simulated blood supplied to arm and hand.
- Practice intravenous, subcutaneous, and intramuscular exercises.

PATIENT CARE

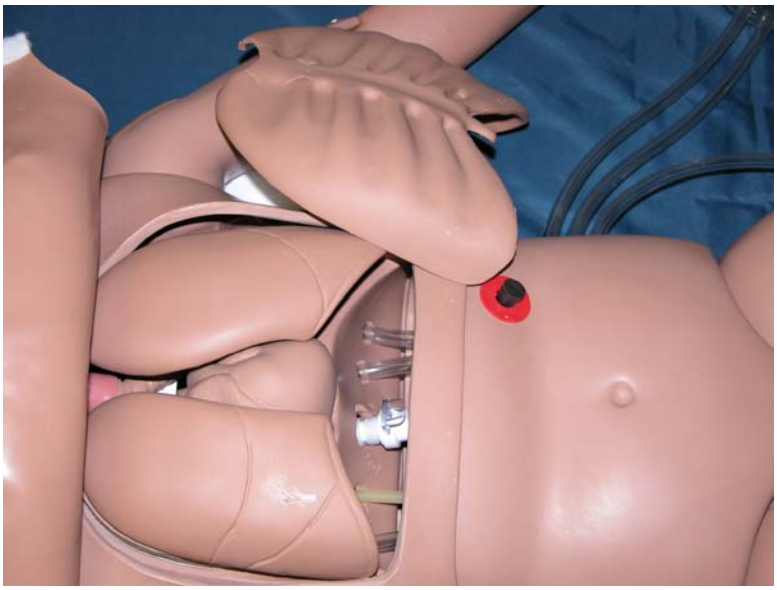
- Bandaging
- Eyes and ophthalmologic exercises
- Nasogastric and orogastric exercises
- Enema administration

[1] optional feature available at additional cost

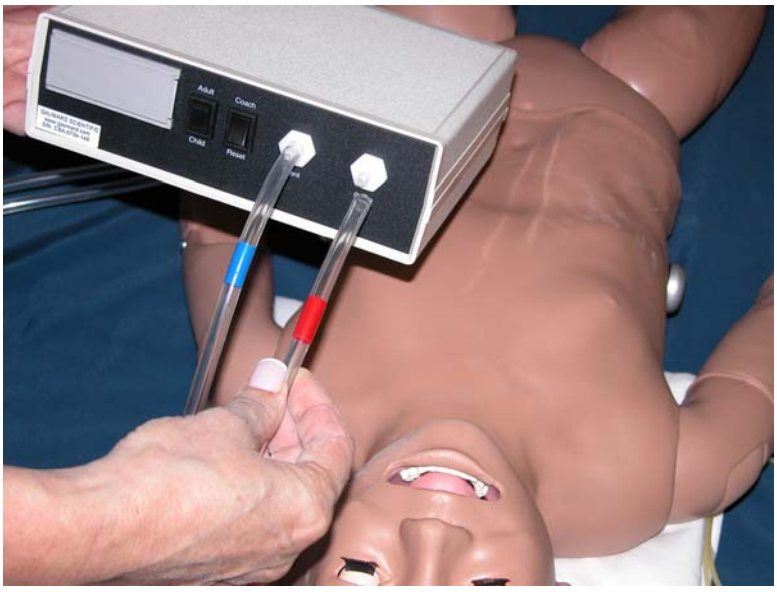
SECTION II - INTUBATION AND CPR

1. Respiratory and Cardiovascular System

The torso of the **S 157** Pediatric simulator contains a realistic thoracic assembly, including a ribcage, heart, left and right lungs and a realistic, intubatable airway.



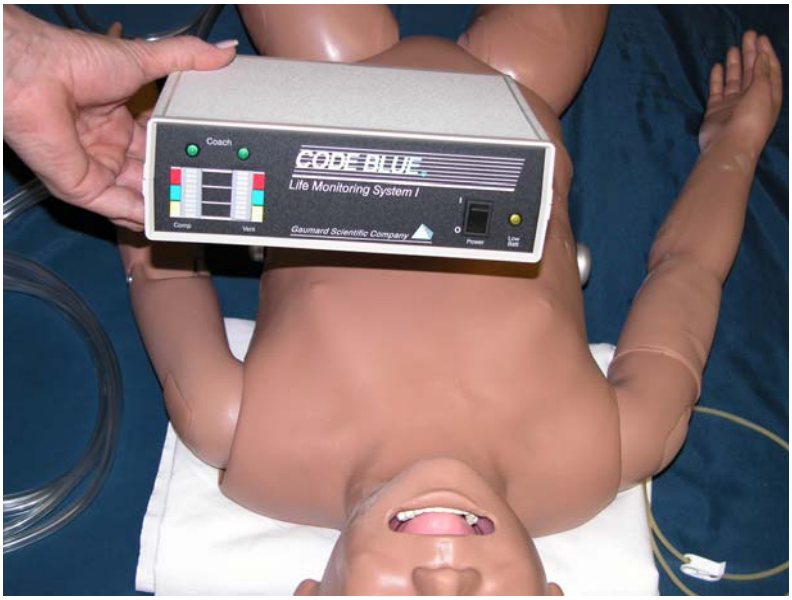
The degree of pulmonary ventilation and cardiac compression achieved by the trainee can be judged by connecting the **CODE BLUE® LIFE MONITORING SYSTEM**. Attach the blue tube from the lungs to the **ventilation** port at the near of the monitor. Attach the red tube from the heart to the **compression** port at the rear of the monitor. Both tubes are located at the left side of the upper torso.



2. CODE BLUE LIFE MONITORING SYSTEM

The **CODE BLUE LIFE MONITORING SYSTEM** is to be used with the S 157. It was designed to help teach CPR simply and effectively. It coaches the student through CPR training. A manual from the American Heart Association is provided by Gaumard with your CPR Simulator. This system is to be used as part of an approved CPR training program.

Connect the color-coded red and blue tubes to the compression and ventilation ports on the rear of the monitor. Select the Child mode, set the Coach/Reset switch to Coach, and turn on the monitor. The student will immediately see coaching lights and hear pitched tones. The pitched tones and lights are synchronized. The low tones indicate timing of ventilations; the higher tones indicate the timing of chest compressions. The sequence is consistent with recommendations provided by the American Heart Association and the Red Cross for child CPR.



Once in the Child mode, the student will observe the following:

a. 1-2 second pause
b. 2 low tones followed by 30 higher tones

Again, the low tones indicate lung ventilation. The higher tones indicate chest compression.
NOTE: The timing of CPR for children is very different from the adult sequence.

Once the student is familiar with the Child Timing sequence, the instructor should teach the proper amount of lung inflation and chest compression.

Proper ventilation will produce a visible chest rise. If you are not using the Code Blue Monitor make sure the red and blue tubes from the heart and lungs are plugged.

Ask the student to ventilate the lungs using a child bag-valve-mask (BVM). Note that too little ventilation will cause the bar graph to illuminate only the yellow range. Correct ventilation is in the green range. Too much ventilation is in the red range. Now, ask the student to compress the chest. Insufficient chest compression will cause the bar graph to illuminate only in the yellow range. correct compression is in the green range. Too much compression is in the red range, and may damage the patient's ribs. Stay in the green range for both ventilations and compressions. Depending upon the mode selected, the monitor will adjust for the differences in both the timing cycle and the amount of ventilation/compression required.

NOTES:

A. The **CODE BLUE LIFE MONITORING SYSTEM** available with this simulator may be used for both child and adult modes. For the 5 year-old, normally select the CHILD setting. When changing modes, always switch from Coach to Reset and back to Coach. This resets the electronics and starts the timing sequence.

B. While teaching the correct amount of lung inflation or chest compression, the instructor may elect to turn off the Tone and Light Option by switching to Reset. In this mode, the student can practice proper ventilation or chest compression by monitoring progress on the bar graph. Remember to stay in the green range.

C. The **CODE BLUE LIFE MONITORING SYSTEM** is powered by a conventional 9-volt battery. The low battery indicator is next to the Power switch.

3. **Intubation**

Intubate using a MAC 3 blade and an uncuffed ET tube having an ID of 5.5 mm. Always lubricate the distal end of the ETT using silicone spray prior to insertion.

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 pediatric intubation:

- Children require more oxygen per amount of body weight than adults.
- The airway of a typical five (5) year-old child is only 9-10 millimeters in diameter. 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 may be needed to properly extend the child'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:

- Bag- mask ventilation.
- Patient position.
- Using laryngoscope to visualize the vocal cords.
- Passing the endotracheal tube between vocal cords.
- Practice, practice, practice!

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) must 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 HEAD TILT/CHIN LIFT or JAW THRUST shown below. A towel should be placed under the child's shoulders. This places the patient in the so-called "SNIFFING" position. This provides the rescuer with the BEST VIEW of the vocal cords.

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 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 pediatric intubation.

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

a. Have an associate depress the crico cartilage - this forces the airway posteriorly, providing a better view of the vocal cords.
b . Locate the cricoid by finding the "Adam's Apple" or thyroid cartilage.
c. Move the hand lower and feel the crico-thyroid membrane.
d. 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 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. Use Sellick maneuver if necessary.
5. Slide ET tube along the right side of the blade and between the vocal cords.
6. Position the tip of the ET tube midway between the vocal cords and carina.
7. Carefully withdraw the laryngoscope blade.
8. Attach oxygen supply.

CONFIRMING CORRECT PLACEMENT

- Look, listen and feel for bilateral lung expansion.
- In a patient:

  auscultate for chest sounds and air entry.
  observe ET tube - not fogging of the expelled air.
  you should NOT see the gastric contents.

- Secure the ET tube and ventilate.
- Check the patient for:

  color
  effort of breathing
  is the respiration rate reasonable
  blood pressure and heart rate

SECTION III - TRAUMA CARE

1. Intraosseous Infusion and Injection Simulator

The Intraosseous Trainer 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.

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 the pediatric patients. The Intraosseous Trainer includes a set of sixteen (16) modified tibial bones, a fluid dispensing syringe, synthetic blood concentrate, and one (1) spare skin cover.

CAUTION: The tibia bones supplied with your simulator are made from hard plastic that can be pierced by 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.

- Fill syringe with water, open the drain valve and allow water to flow thru the system.
- Once water is draining, close the outlet valve.
- After about 10-20 sticks you may need to add water to the tibia bone
- Continue IO exercises.
- 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 re-attach the skin.
- When the training session is completed, open the outlet and drain the fluid.
- Replace the bones and dry them for next session.
- Instructor may seal the holes in the bone(s) that are made by the 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 bone. It is a quick, simple solution to venous access in children when the alternate peripheral veins are barely visible or palpable. 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 medical 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 three (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 needleback 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. Therefore 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.

2. Venous System

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 intraosseous route discussed previously, or the femoral, internal jugular, external jugular, or the 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 described below:

Accessing the femoral vein:

1. Restrain the right leg with slight external rotation.
2. Identify the femoral artery by palpation, or if pulsations are absent, by finding the midpoint between the anterior superior iliac 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 breath 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.

3. Arterial System

Once spontaneous circulation is restored, arterial access may be used to monitor blood gasses, chiefly pH, pO_2, pCO_2. Indwelling arterial catheters can be placed in the radial, femoral, or posterior tibial arteries. In the young pediatric patient, the radial artery is difficult to cannulate, and the line is subject to clot formation. Accordingly, this simulator contains only the larger right femoral arterial site.

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 using the techniques described below. Remember to flush the system with water and purge the system of air when arterial exercises are complete.

SECTION IV - OTHER CAPABILITIES

1. Bandaging
The fingers and toes of this simulator are separated to permit bandaging exercises. The surface of the manikin is smooth and resistant to water, oil, and liniments.

2. Eyes/Ophthalmologic Exercises
The head has separately inset eyes which will open and close permitting:

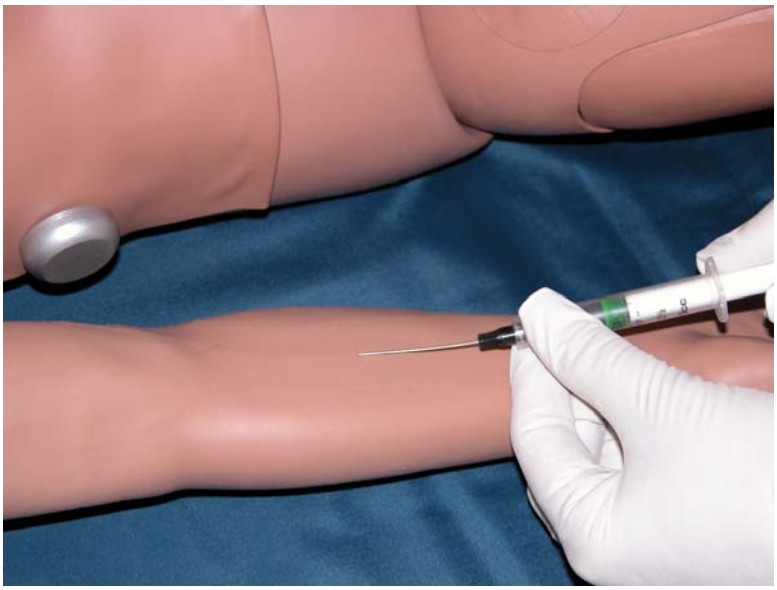
- Administration of orbital medicines, including instillation of drops or ointment into the conjunctival sac.
- Removal of foreign bodies.
- Eye irrigation.

3. Teeth and Tongue
The simulator is supplied with upper and lower teth and a tongue which can be moved from side to side.

4. Hygienic Care
The head has molded hair for cleanliness. The manifin surface is water resistant so that bathing exercises may be practiced.

5. Range of Movement
The joints are strong, and their movements are lifelike and realistic. The manikin bends at the waist. The head and jaw are fully articulated.

6. Pediatric Injection Training Arm/Leg
The Pediatric Training Arm/Leg simulates a five (5) year old child for intravenous, intramuscular, and subcutaneous injection training exercises.



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

The Pediatric Training Arm is also equipped with (1) subcutaneous injection areas on the volar side of the forearm and the lateral side of the upper arm; (2)an intramuscular injection site in the deltoid area; (3) two veins in the dorsum of the hand for additional intravenous training techniques.

In addition, the training arm contains simulated /Cephalic, Basilic, Antecubital, Radial and Ulnar veins. Simulated blood may be added to the dispensing bag, which is equipped with a squeeze bulb.

Applying pressure via the squeeze bulb permits the veins to stand out, simulating a clenched fist or a tourniquet situation. Release of the pressure simulated collapsed veins.

Use of the squeeze bulb permits the palpability of the veins to be varied as seen in routine hospital or emergency situations.

Injection training arm instructions

- Place the simulator on a level surface - raise the vinyl bag into position.
- Open the inlet "click valve" between the bag and arm - close the outlet - fill the system - use water initially, once familiar with the system, mix the blood concentrate.
- Open the outlet - allow air bubbles to escape.
- Close both the outlet and the inlet.
- Perform appropriate exercises - see detailed instructions.
- When training session is completed, open the outlet and drain fluid.
- Remove the vinyl bag and drain the fluid.

Intravenous 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:

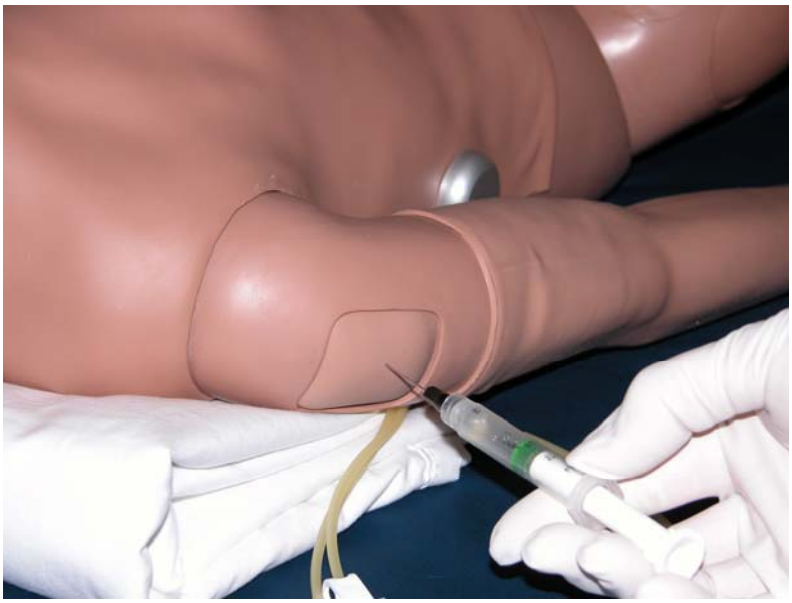
- Apply desired pressure to the veins via the squeeze bulb.
- Squeeze appropriate vein site and clean skin with alcohol - avoid use of povidone-iodine as this will cause the latex skin to become discolored and brittle.
- Omit tourniquet use if possible - if required, apply tourniquet a few inches above selected site.
- Simulate anesthetization of skin if needed.
- Select a 22 gauge cannula and 23 gauge needle - larger needles will damage the veins.
- Apply finger pressure to vein distal to puncture site.
- Puncture skin and underlying vein with needle - bevel of 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.
- Stabilize entry site as desired.
- Apply ointment and dressing - remove tourniquet is used.

7. Other injection sites

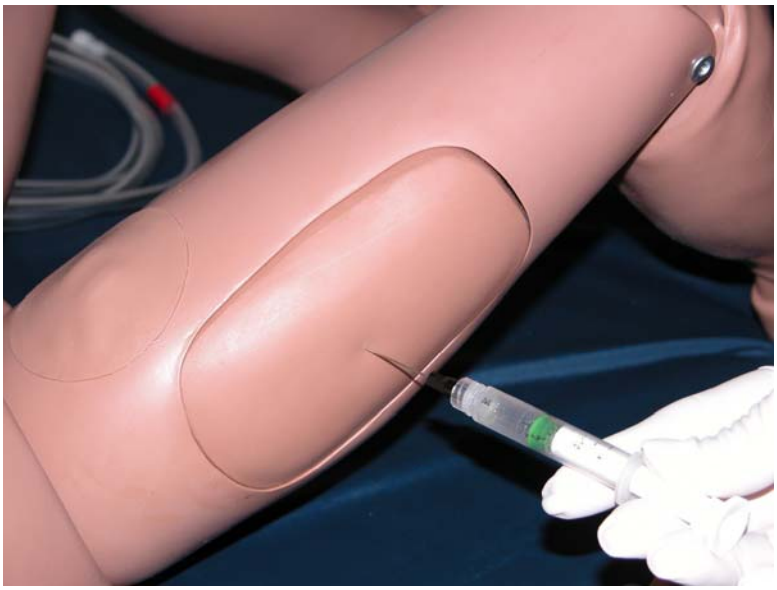
Subcutaneous and intramuscular

An injection is an invasive procedure requiring an aseptic technique. Absorption of drugs is somewhat slower in subcutaneous injections as compared with intramuscular injections. The needle size for subcutaneous injection is usually 25 - 27 gauge and ½ to 7/8 inches long. For intramuscular injections, the needle size is 20 - 23 gauge and is usually 5/8 to 1 ½ inches long.

- Select injection site.
- Palpate for tenderness, masses or edema.
- Clean site with antiseptic.
- For subcutaneous injections, spread/stretch skin across site or pinch skin - inject needle quickly at a 45º angle - release skin.
- After injection, withdraw needle quickly and swab with antiseptic.



IM sites are located on the left and right arms. After injections you may want to remove the site, remove the sponge and dry it.



IM sites are also located on the left and right legs. After injections you may want to remove the sites, remove the sponge and dry it.

8. Nasogastric and Orogastric Exercises

Nasal and oral openings are connected to the stomach reservoir, so that an appropriately sized catheter may be used to demonstrate tube feeding and gastric suction. The stomach is provided with an opening for gastrostomy. **ALWAYS USE A LUBRICANT WHEN INTRODUCING ANY CATHETER.**

9. Ears, Nose and Throat

Ear – The left ear contains a simulated ear canal, allowing simulated temperature measurement, or syringing exercises.

Nose/Throat – Both the nasal and oral openings are connected to the stomach tank.

10. Enema Administration

Administration of an enema may be performed. The simulator should be placed on its side, and the enema introduced with an anal nozzle of small diameter. Please note that a non-return valve is built into the anal passage to prevent fluid spillage during instillation.

11. Urinary System

The urethral passage and the bladder are connected by a double-diaphragm valve to make catheterization more lifelike. Fluid may be withdrawn from the bladder after the insertion of an appropriately sized catheter.

12. Male and Female Organs

Both are molded of soft vinyl. The male organ attachment simulates the external genetalia, complete with scrotum. The vaginal passage is closed at the introitus. Both male and female catheterization can be practiced.

SECTION V – GENERAL NOTES

1. **Disassembly**

To open the simulator (ie separate the upper torso from the lower torso), unscrew the know at waist level on each side of the simulator - remove the treaded rod - the upper and lower torso may now be gently eased apart - to remove the skull, open the skin covering at the back of the simulator and remove - pull either the pin at the base of the neck or the base of the skull.

2. Lubrication

Use a lubricant such as:

- water based silicone spray
- a drop of soap with water
- "Pam" corn oil

when introducing any invasive device

3. Cleaning

- The skin of the manikin may be cleaned with mild detergent, or soap and water.
- Indelible marks made with ballpoint pens, ink or magic markers will remain.
- Do not wrap this or any **GAUMARD** simulator in newsprint.
- Do not use povidone-iodine on the simulator.
- Improper storage may damage the manikin – keep the manikin stored in the box provided.
- Do not stack or keep heavy materials on top of the box.
- Keep the manikin in a cool area.

4. Catheters – Troubleshooting

There may not be an outflow of water on introduction of the catheter, especially if catheterization is performed with the manikin in the supine position. Should an airlock/blockage occur, simply inject air through the catheter. This should cause the reservoir to function normally.

5. Emptying the Reservoir System

To remove the remaining fluid from the bladder reservoir after catheterization exercises are complete, sit the model up over a bedpan with the catheter in place. Purge the system by squeezing out the fluid.

6. Filling the Bladder

The bladder should be filled through the suprapubic opening. This may be done in one of two ways:

a. Installation of water through introduction of a funnel at the suprapubic site
b. Using a catheter with a large syringe.

7. Internal Cleaning

Internal reservoirs may be removed for cleaning by GENTLY disengaging each tank using the "click" fittings. Use a drop of silicone lubricant when reattaching.

Should you have any questions after reading this instruction manual, please contact our Customer Service Department for further assistance:

800.882.6655 (Toll Free USA)
305.971.3790 (Worldwide)
www.gaumard.com