

# SimMan ALS

## User Guide





SimMan ALS is a realistic interactive Training Simulator for simulating a wide range of advanced life saving skills in pre-hospital emergencies. It is tetherless, Wifi operated, with a flexible control solution (SimPad PLUS or Laerdal Learning Application (LLEAP)) depending on training needs. The simulator responds to clinical intervention, instructor control, and pre-programmed scenarios for effective practice of diagnostic skills and patient treatment.

With spontaneous breathing, airway control, voice, sounds, ECG and many other clinical features, the SimMan ALS is the fully functional pre-hospital simulator.



### Caution

*The following techniques should not be performed on this simulator due to the inability to properly sanitize the airway if they are performed:*

- *Mouth-to-mouth/Mouth-to-mask ventilation*
- *Insertion of simulated vomit for suctioning*

For information on how to connect to SimPad PLUS or LLEAP refer to the Quick Set Up Guide.

Read the enclosed Important Product Information booklet before use.

Refer to the Laerdal Global Warranty for terms and conditions. For more information visit [www.laerdal.com](http://www.laerdal.com).

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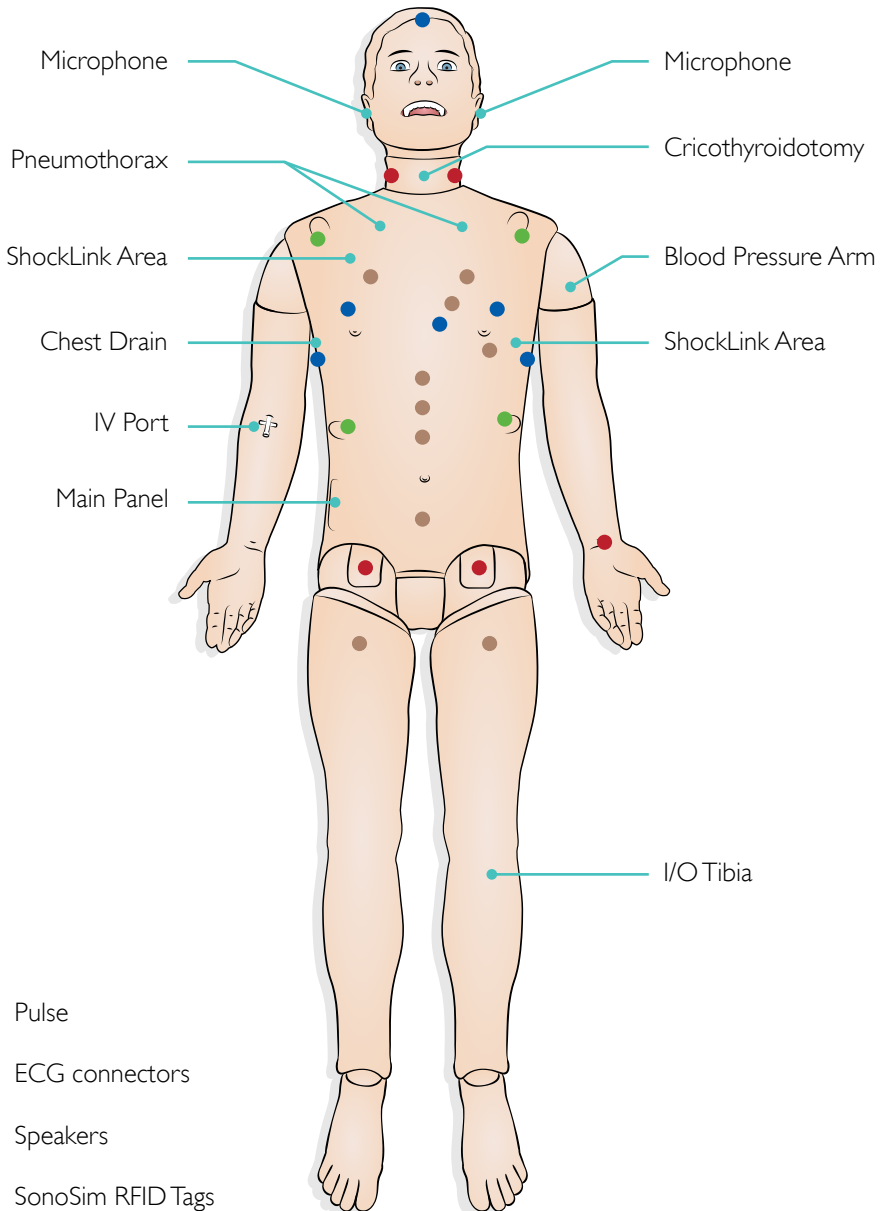
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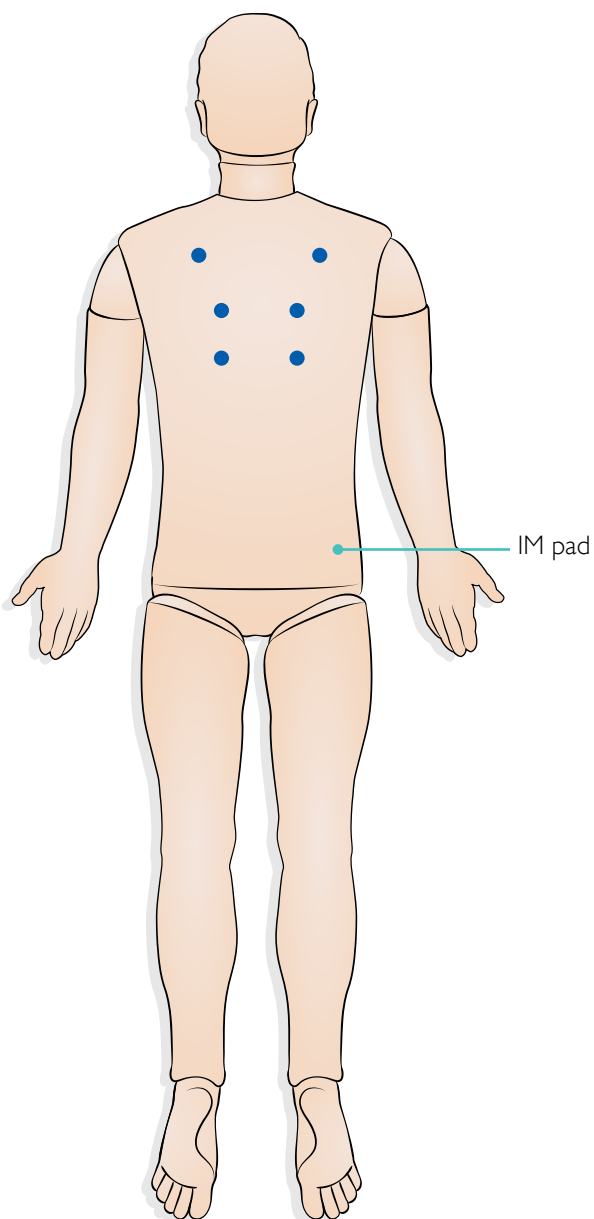


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# Overview

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# The SimMan ALS System Overview

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## Airway and Breathing Features

- Position the head to simulate opening the airway (neck tilt, jaw thrust)
- Practice Bag Valve Mask (BVM) Ventilation
- Identify spontaneous breathing (visible chest rise)
- Identify unilateral chest rise
- Perform Endotracheal (ET) Tube intubation
- Visualize Right Main stem Intubation
- Use supraglottic devices like Laryngeal Mask Airway (LMA), King Laryngeal Tube (LT) and Combitube
- Insert an Oropharyngeal Airway (OPA) and Nasopharyngeal Airway (NPA)
- Identify a tongue oedema
- Identify cyanosis (linked to SPO2)
- Nasal Cannulation
- Perform chest (bi-lateral) needle decompression
- Perform bi-lateral chest drainage
- Perform needle and surgical cricothyroidotomy
- Identify stomach distension
- Perform the Sellick Maneuver
- Auscultate the lungs (anterior/posterior)
- Break the teeth by wrong intubation techniques using a laryngoscope



## Cardiac Features

- Perform manual chest compression following the latest ILCOR guidelines
- Use an extensive ECG library
- Perform defibrillation using ShockLink technology (sternum/apex)
- Perform external pacing
- Auscultate the Korotkoff sounds



## Circulation Features

- Auscultate the heart sounds (anterior)
- Use the Patient Monitor with presentation of cardiac rhythms via 3-lead, 5-lead and 12-lead ECG monitoring
- View the SPO2 via Simulated Monitor
- View the Blood Pressure via Simulated Monitor
- Auscultate the blood pressure via the BP cuff
- Palpate the systolic blood pressure using the BP cuff
- View the heart rate via Simulated Monitor
- Palpate the left radial, carotid (bi-lateral) and femoral (bi-lateral) pulses



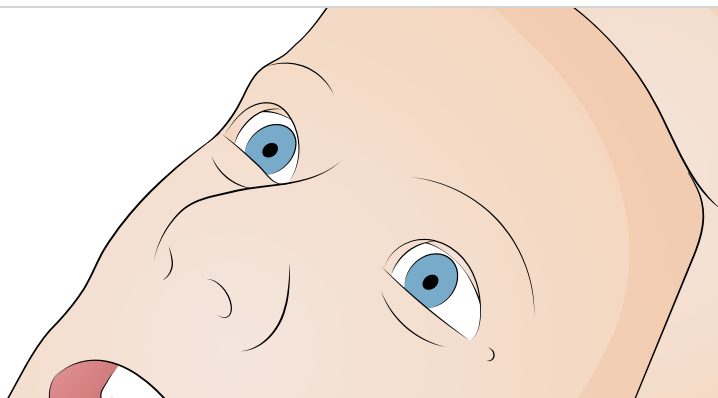
## Vascular Features

- Use a pre-ported IV access in the right antecubital fossa
- Insert an IO in the left tibia
- Administer IM injections in the right musculus gluteus maximus

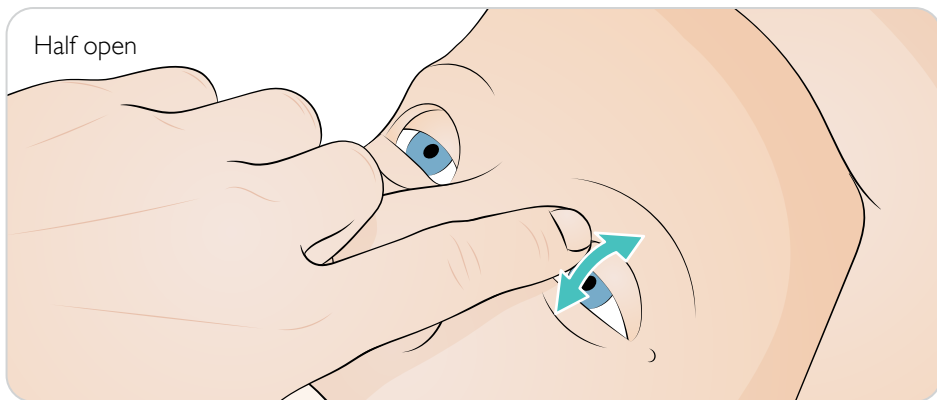
## Eyelid setting

The eyelids can be manually set to the following positions:

Open



Half open

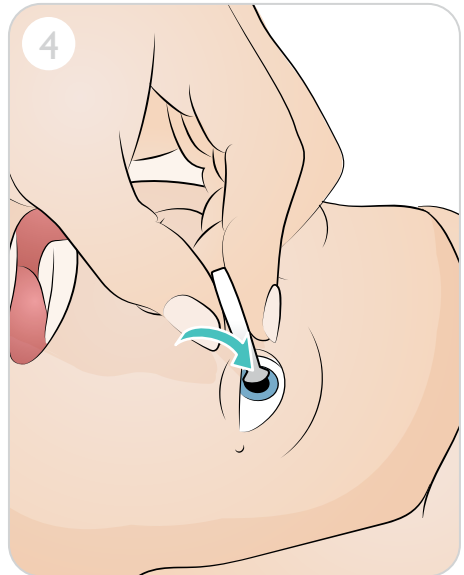
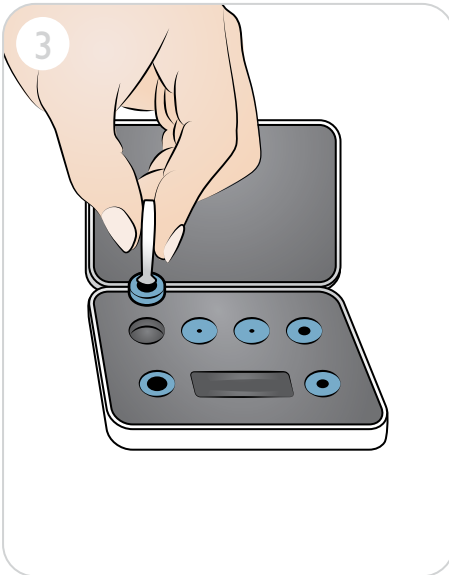
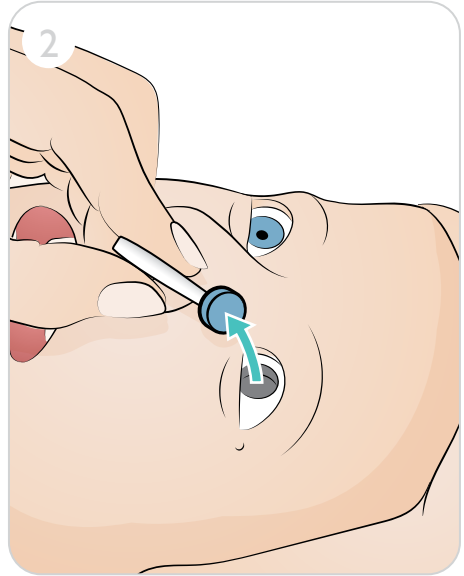


Closed



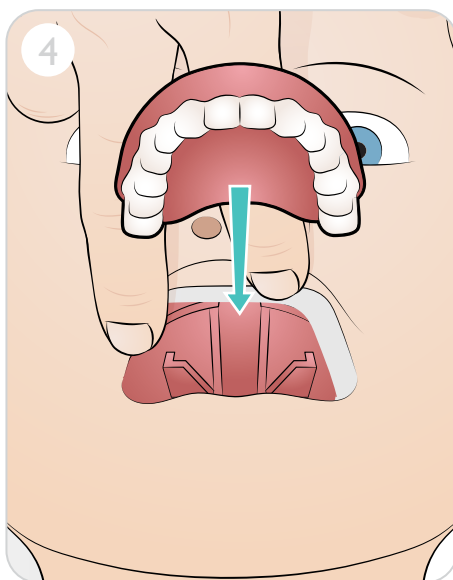
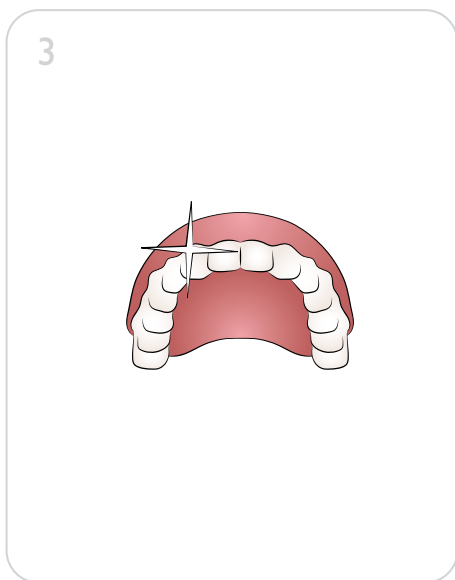
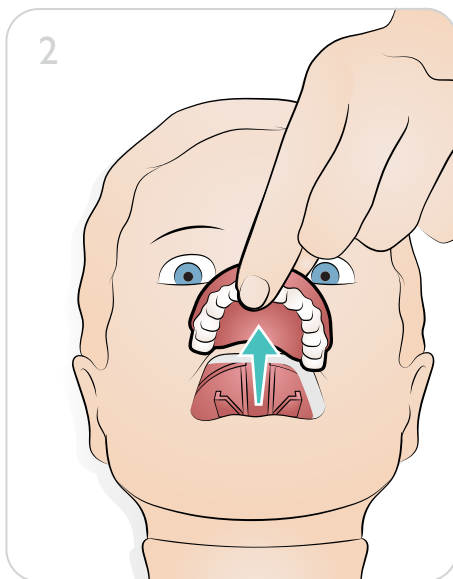
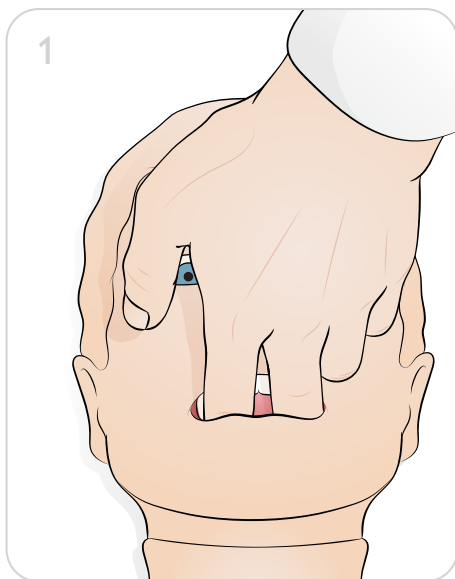
## Pupil Replacement

SimMan ALS is supplied with a set of normal pupils mounted in the head. A separate case contains 3 sets of plastic pupil inserts (normal, constricted and dilated pupils) for use in simulating other conditions.



## Changing the Upper Dentures

SimMan ALS comes with a set of soft upper teeth as default. The soft set may be replaced with a hard set of teeth for enhanced realism while practicing intubations.



## Airway Management

The airway is anatomically modeled as far as the bronchia and can be manipulated by a learner:

- Head tilt/Chin lift
- Jaw thrust w/articulated jaw
- Cricoid pressure and manipulation
- Simulated suctioning (oral & nasopharyngeal)

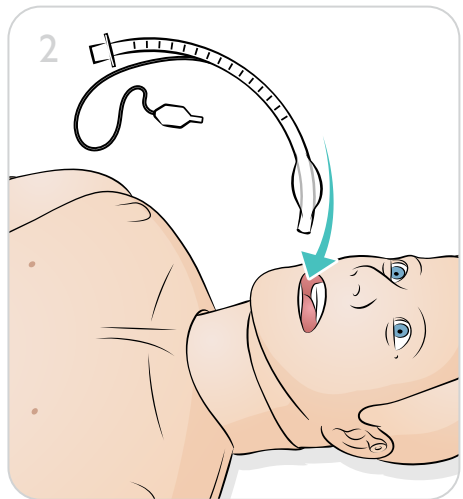
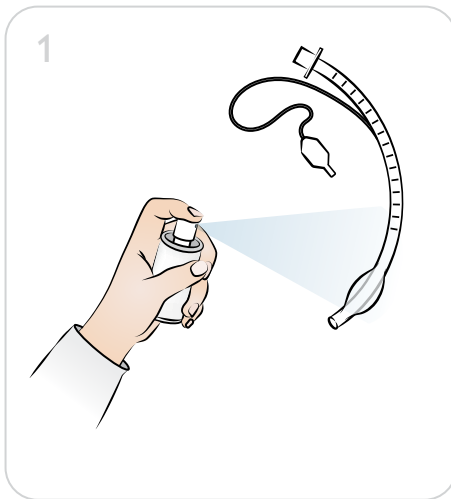
If the tongue fallback feature is enabled, head tilt is required to open the airway. Once initiated the simulator will begin to spontaneously breathe.

Artificial respiration of the SimMan ALS can be achieved by the following methods:

- Bag-mask ventilation
- Orotracheal intubation
- Nasotracheal intubation
- Transtracheal intubation

Recommended tube compatibility:

- ET Combitube (size small adult is suitable)
- Laryngeal mask airways: Size 4 and 5
- Endotracheal tube intubation: Size ID 7.5 - 8.5



### Notes

- Do not spray lubricant directly into the airway.
- Use of smaller tube-type devices reduces wear of the Patient Simulator's airways.
- Incorrect positioning will pass air through oesophagus, causing distention of the abdomen.



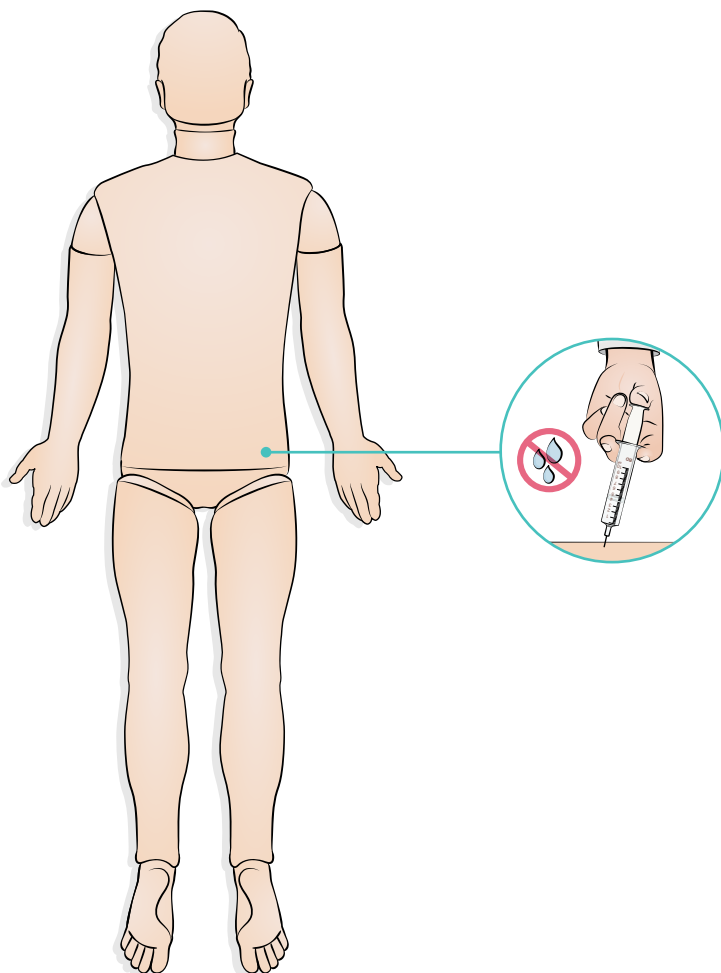
## Intramuscular Injections

Simulated medications can be administered via intramuscular injections in the right musculus galeus maximus.



### Note

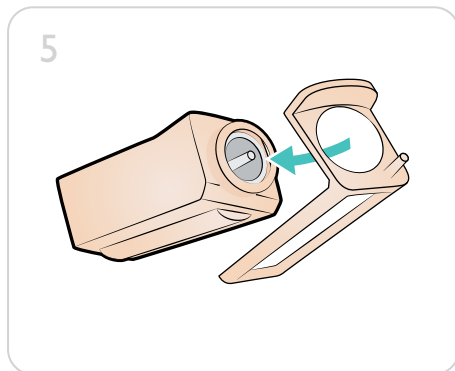
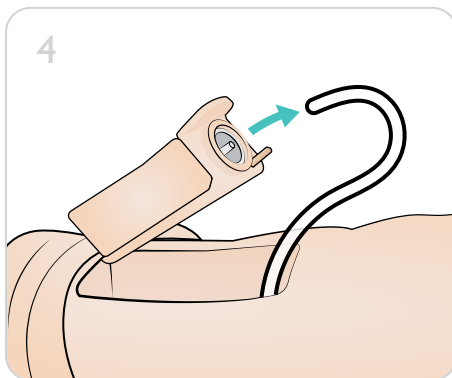
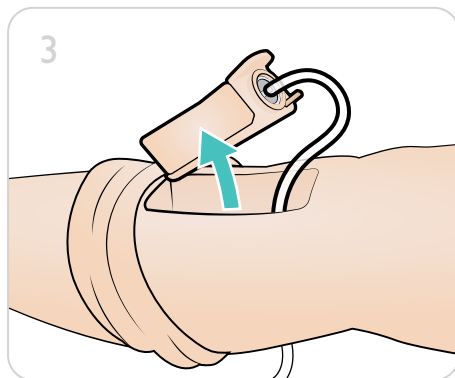
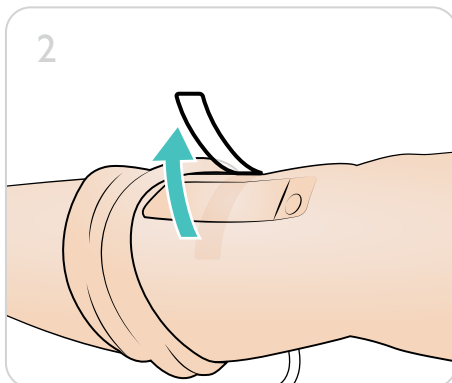
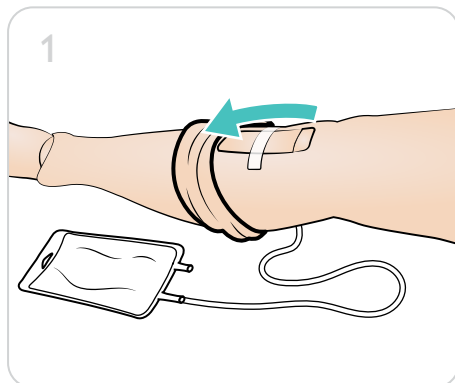
*Simulated medications may be administered via local protocol. All precautions and safety measures must be followed during training.*



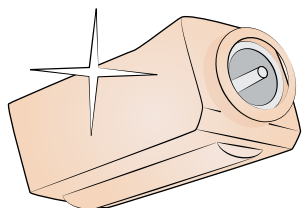
## Use

### Tibial IO

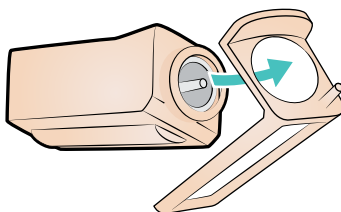
Intraosseous access with needle insertion is possible through the left tibia. The IO pads may be punctured numerous times before being replaced.



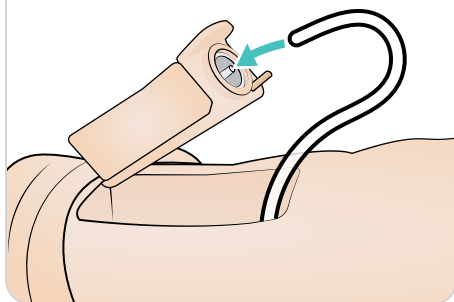
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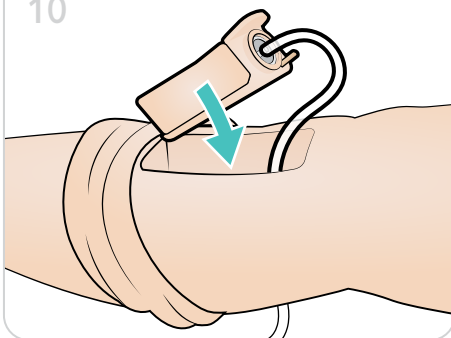
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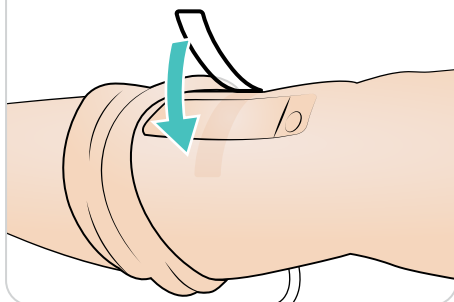
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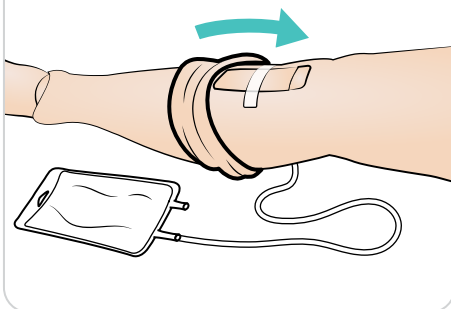
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## IV Cannulation

The right IV arm comes with a US catheter (4A) type as default. This can be replaced with an international catheter type (4B) with an extra flush port.

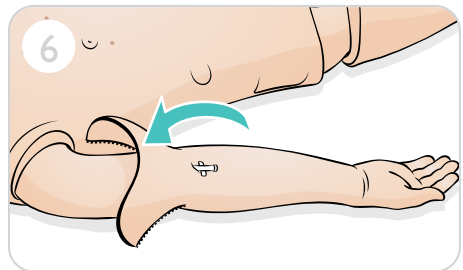
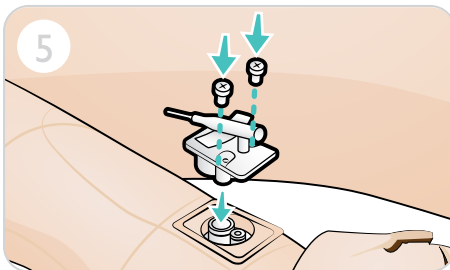
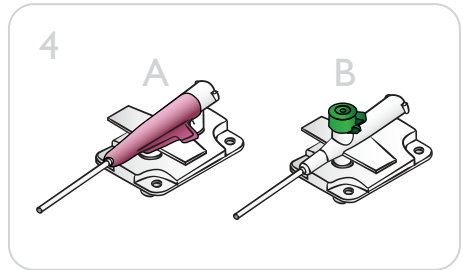
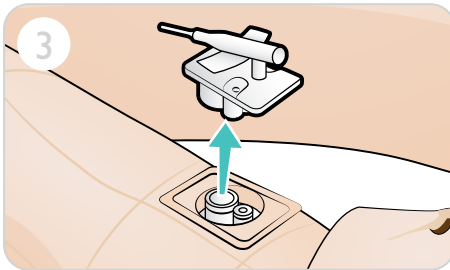
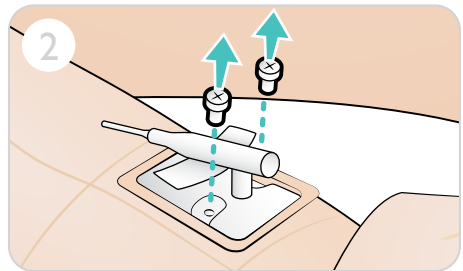
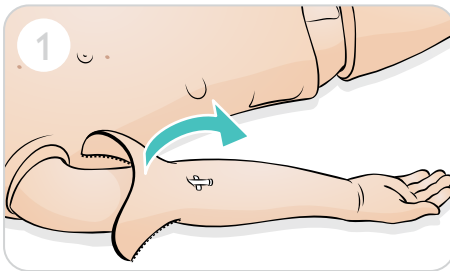
Prime the IV arm before each session to prevent backflow. Inject purified water in a continuous stream into the IV system. Major movement of the Patient Simulator can result in air pockets in the IV system and may require additional priming.



### Notes

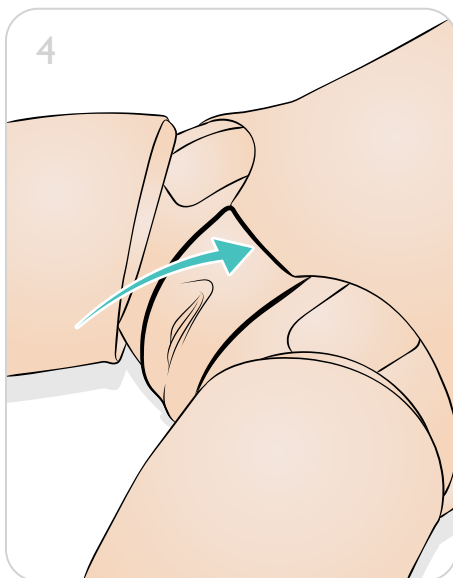
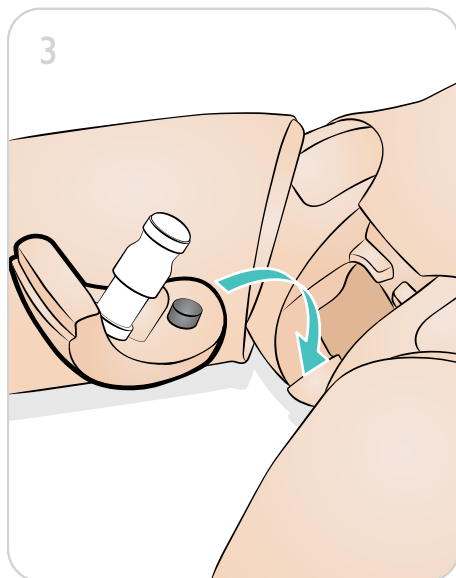
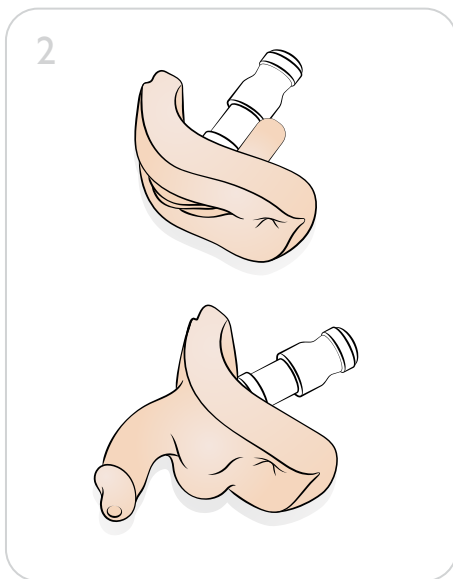
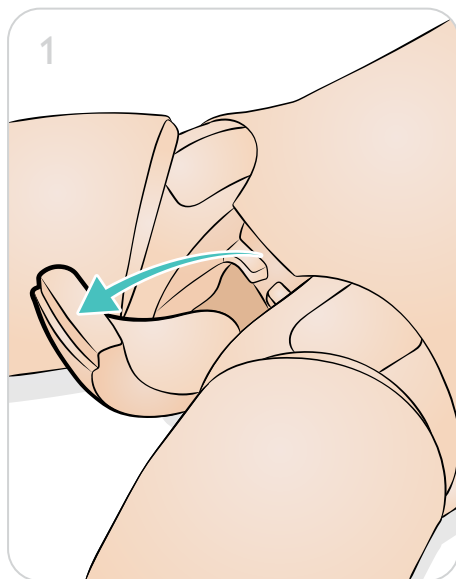
- Do not apply force when administering simulated drugs to the IV arm.
- To prevent clogging of the IV system, use only purified water (distilled or de-ionized) to simulate IV drugs.

## Changing IV Catheters



## Urinary Catheterization

SimMan ALS is fitted with neutral genitalia. It can be replaced by the supplied male or female genitalia to simulate catheterization.



## Cardiac Related Skills

SimMan ALS, when used with SimPad or a LLEAP PC, features an extensive library of ECG variations. See SimPad PLUS User Guide or LLEAP Help Files.

### Defibrillation - SimMan ALS and ShockLink

SimMan ALS comes ShockLink prepared. ShockLink allows connection with a live defibrillator allowing the following procedures to be performed:

- Defibrillation
- Synchronised cardioversion
- External pacing with or without capture

The torso skin on the Patient Simulator is fitted with internal apex and sternum ShockLink electrodes. Refer to the ShockLink User Guide for information on how to connect and use ShockLink.



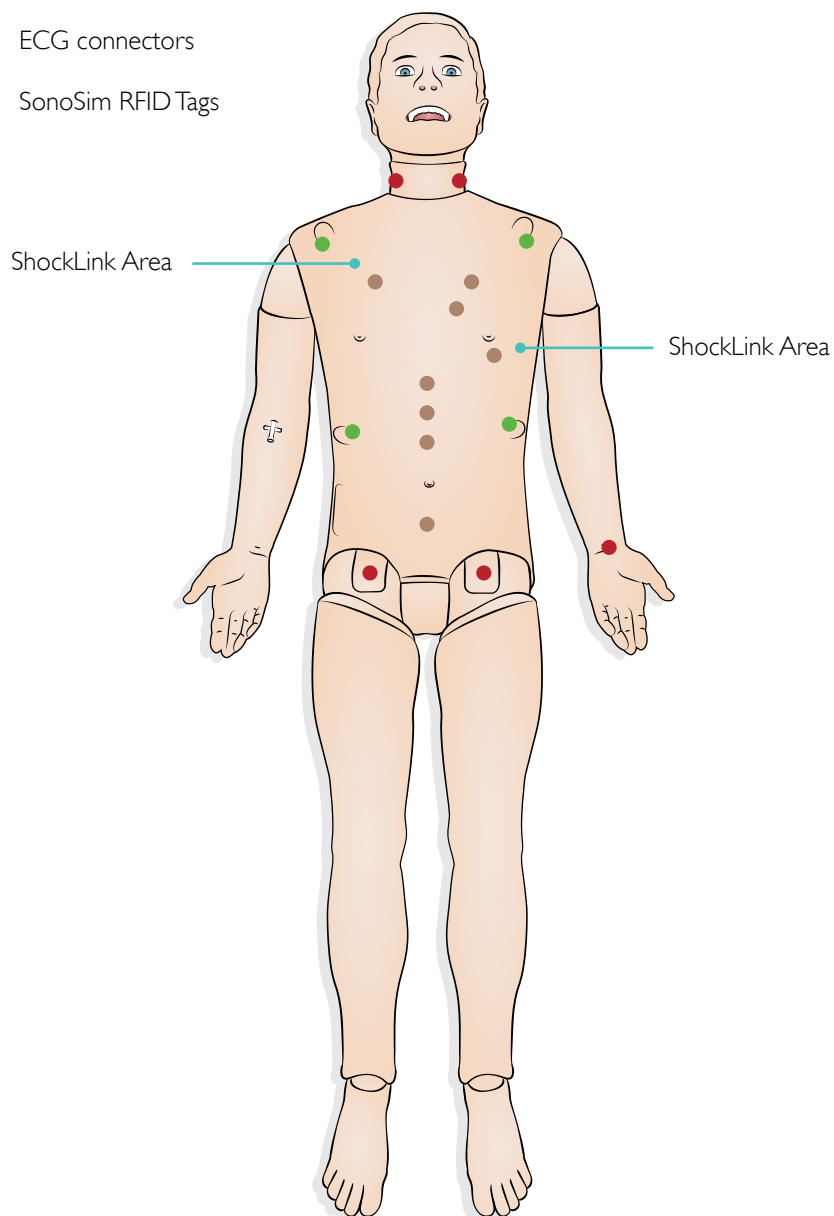
#### Note

*Only use ShockLink to perform defibrillation simulation on SimMan ALS.*

### QCPR and SimMan ALS

- Compliant with the latest 2015 ILCOR guidelines
- Compressions generate palpable pulses, blood pressure wave form and ECG artifacts
- Realistic compression depth and resistance
- Detection of depth, release and frequency of compressions
- QCPR is monitored with feedback via LLEAP

- Pulse
- ECG connectors
- SonoSim RFID Tags



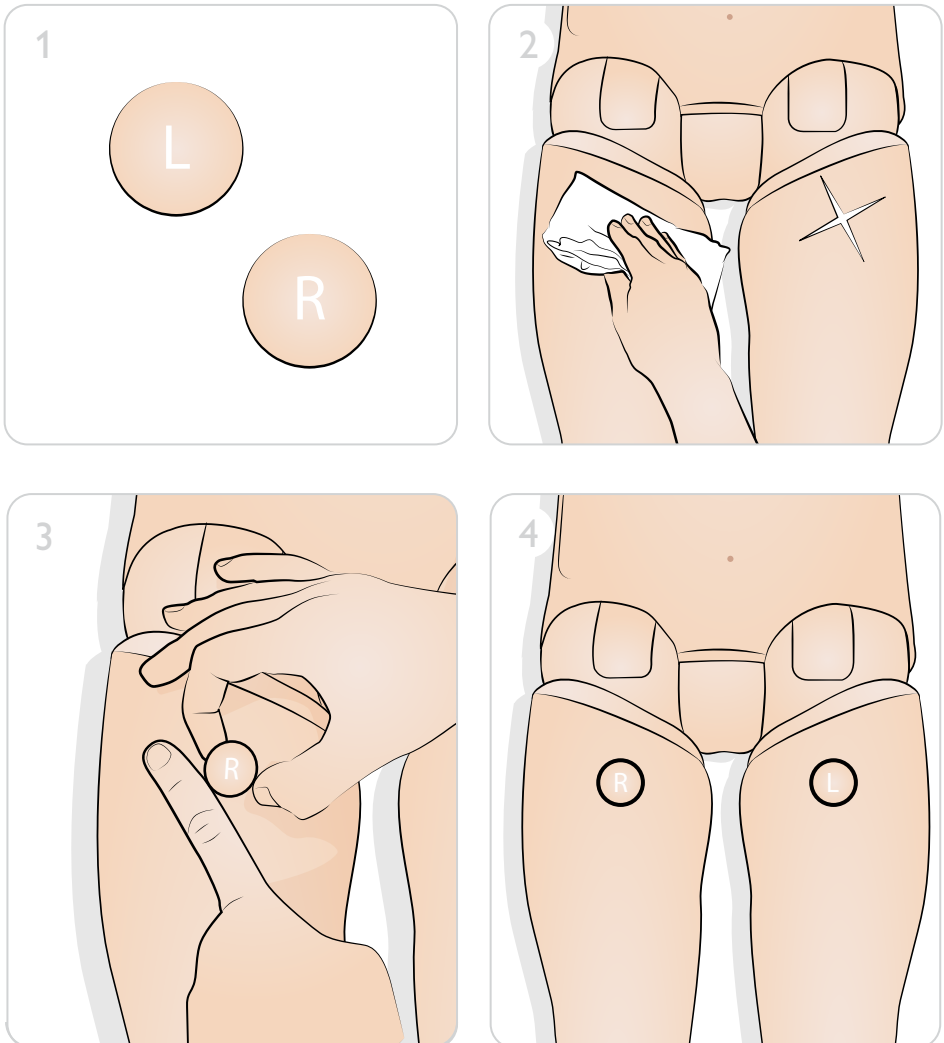
# Use

## Laerdal-SonoSim

SimMan ALS is ultrasound ready and fitted with 3G Torso Skin with Ultrasound Live Scan (LS) tags that is used in conjunction with the Laerdal-Sonosim Ultrasound Solution (available separately). The simulator comes with two additional LS groin tags that need to be applied to the groin.

Refer to Laerdal SonoSim Ultrasound solution user guide.

### Apply LS Groin tags





## Blood Pressure (BP) Arm

The simulator is packaged with the left BP Arm attached and is designed to rotate approximately  $220^{\circ}$ . The specially adjusted blood pressure cuff measures BP manually by auscultation of Korotkoff sounds.



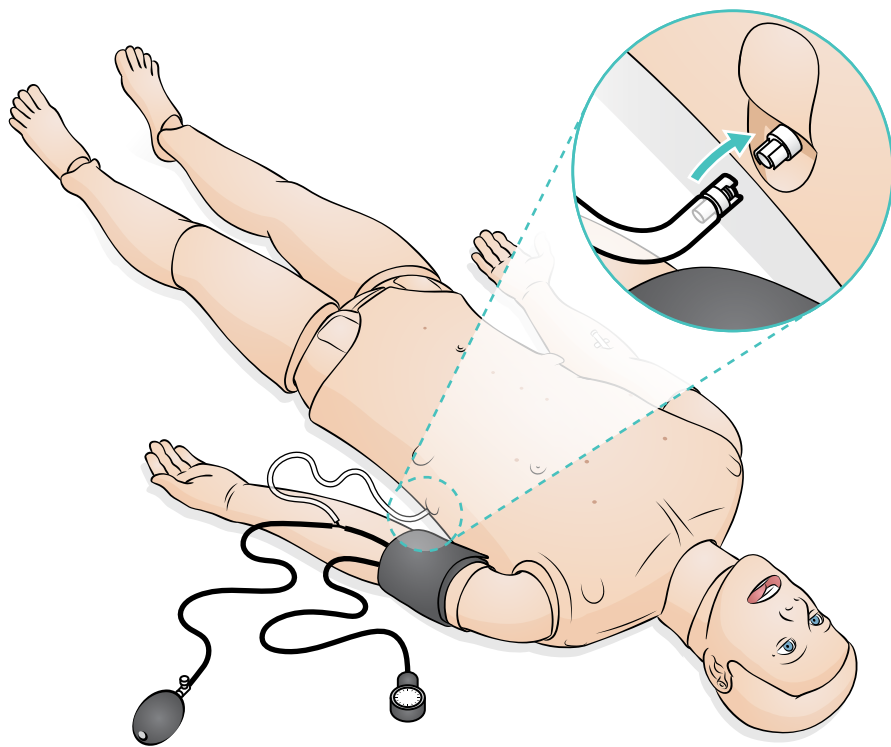
### Note

*Only use the Blood Pressure Cuff supplied with SimMan ALS.*



### Caution

*To prevent damage, do not over rotate the left BP Arm.*



## Heart, Breath and Vocal Sounds

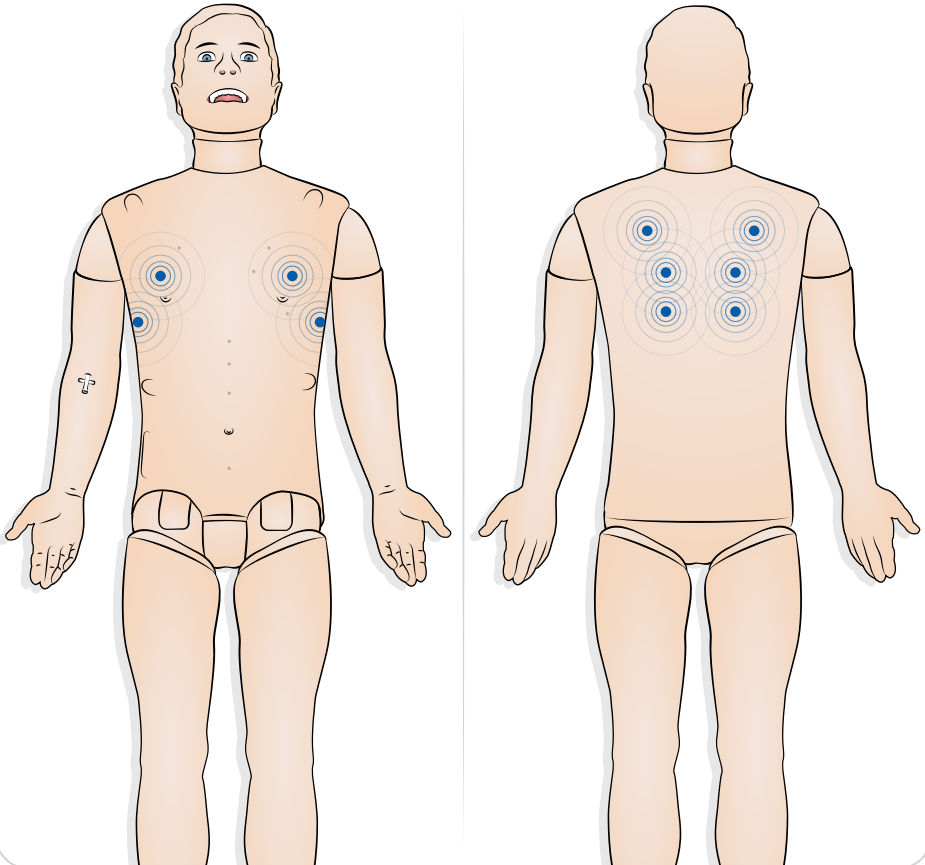
SimMan ALS has heart, breath and vocal sounds which are determined by the scenario used and controlled by the instructor.



### Note

See *SimPad PLUS User Guide* or *LLEAP Help* files for complete heart and breath sound auscultation, speech functionality and operating information.

- Auscultation areas with speakers for lung sounds



## Spontaneous Breathing and Airway Closures

The SimMan ALS has spontaneous breathing (visible chest rise and fall) with variable breathing rate.

The left lung and right lung can be closed independently or together to create a partial or complete airway obstruction.



### Note

See *SimPad PLUS User Guide* or *LLEAP Help Files* for complete breathing and airway blockage functionality and operating information.

## Tension Pneumothorax Decompression

Tension pneumothorax with needle decompression can be performed at bilateral mid clavicle line, 2nd intercostal space. The pneumothorax bladders may be pierced +/-10 times. The pressure inside the bladder will drop after repeated puncturing. A 22 (or smaller) gauge needle is recommended for decompression of the chest.



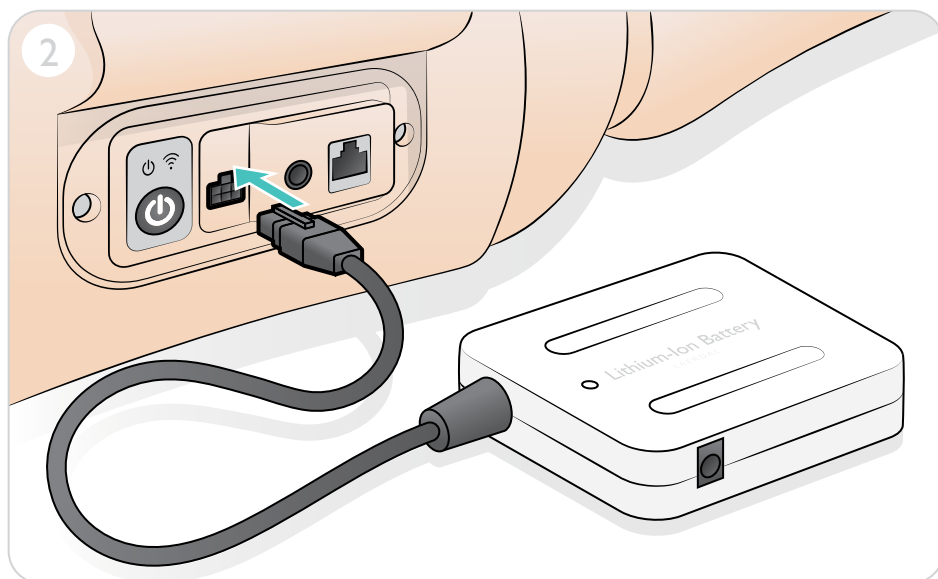
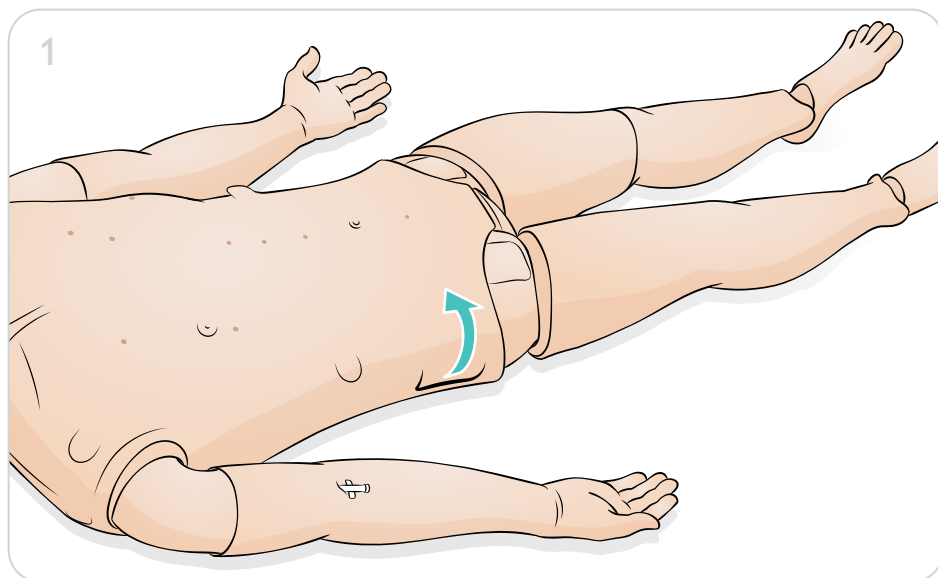
### Notes

- *Using a smaller gauge needle increases the longevity of the chest skin and bladders.*
- *After multiple pneumothorax decompressions, the bladders may need replacement. They should be replaced if inflation can no longer be detected under the skin or deflation is not heard when pierced.*
- *Refer to Maintenance section for information on how to replace the bladders.*

## Use

### Attaching an additional external battery

If required an additional battery can be added externally to increase operating time if required for long simulations.



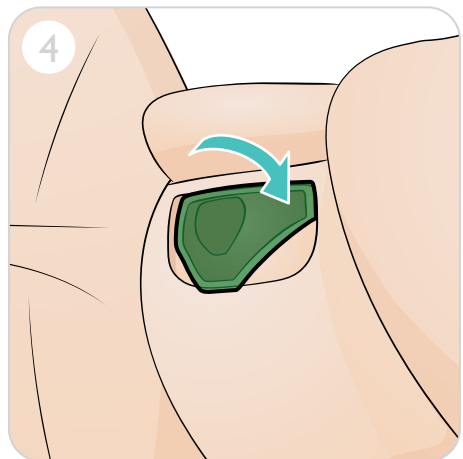
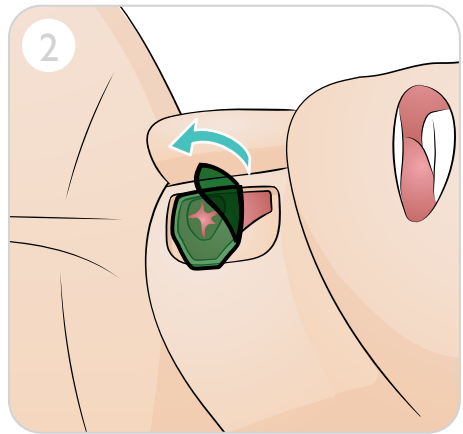
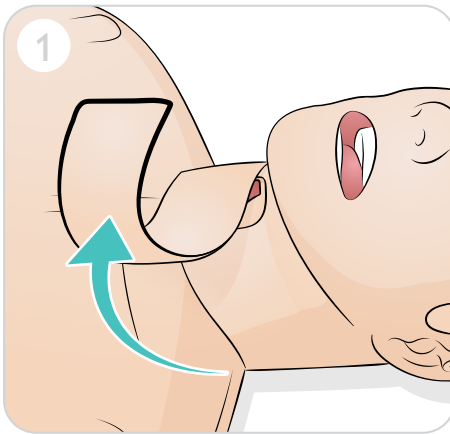
## Cricothyroid Membrane/Neck Skin

After creating an emergency airway through the cricothyroid membrane, replace the perforated membrane before starting a new simulation session.



### Notes

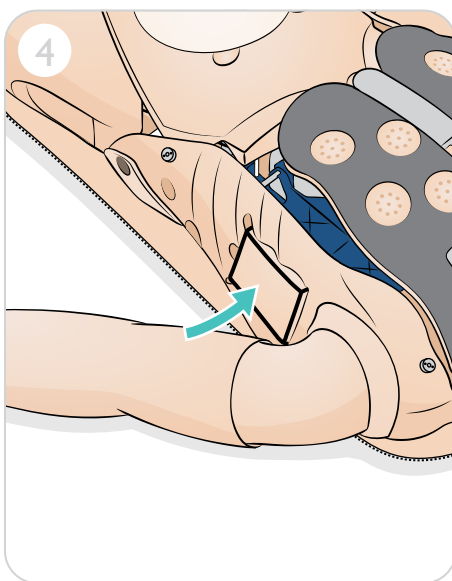
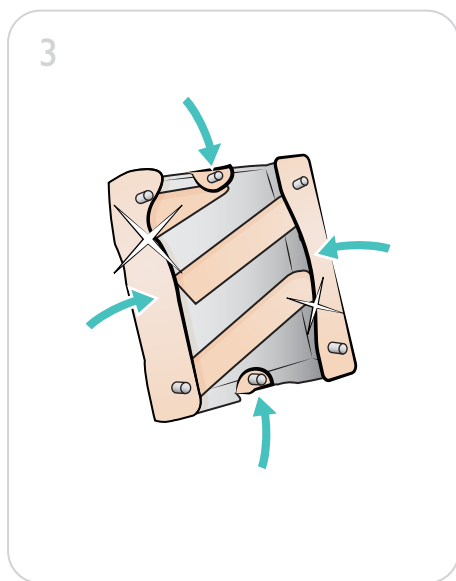
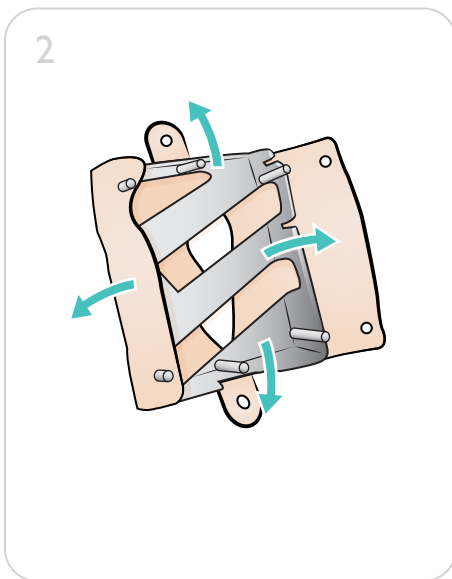
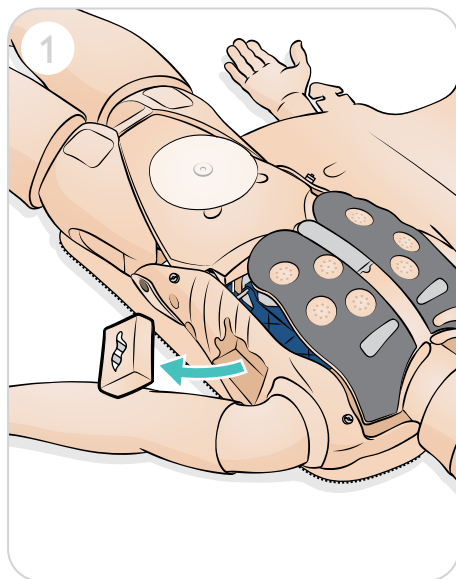
- Replace the neck skin when necessary.
- If the used neck skin is in good condition, slide the skin along to position a new section over the cricothyroid membrane.
- Ensure Cricothyroid Tape completely covers and seals the opening to prevent leakage while ventilating the Patient Simulator.



## Maintenance

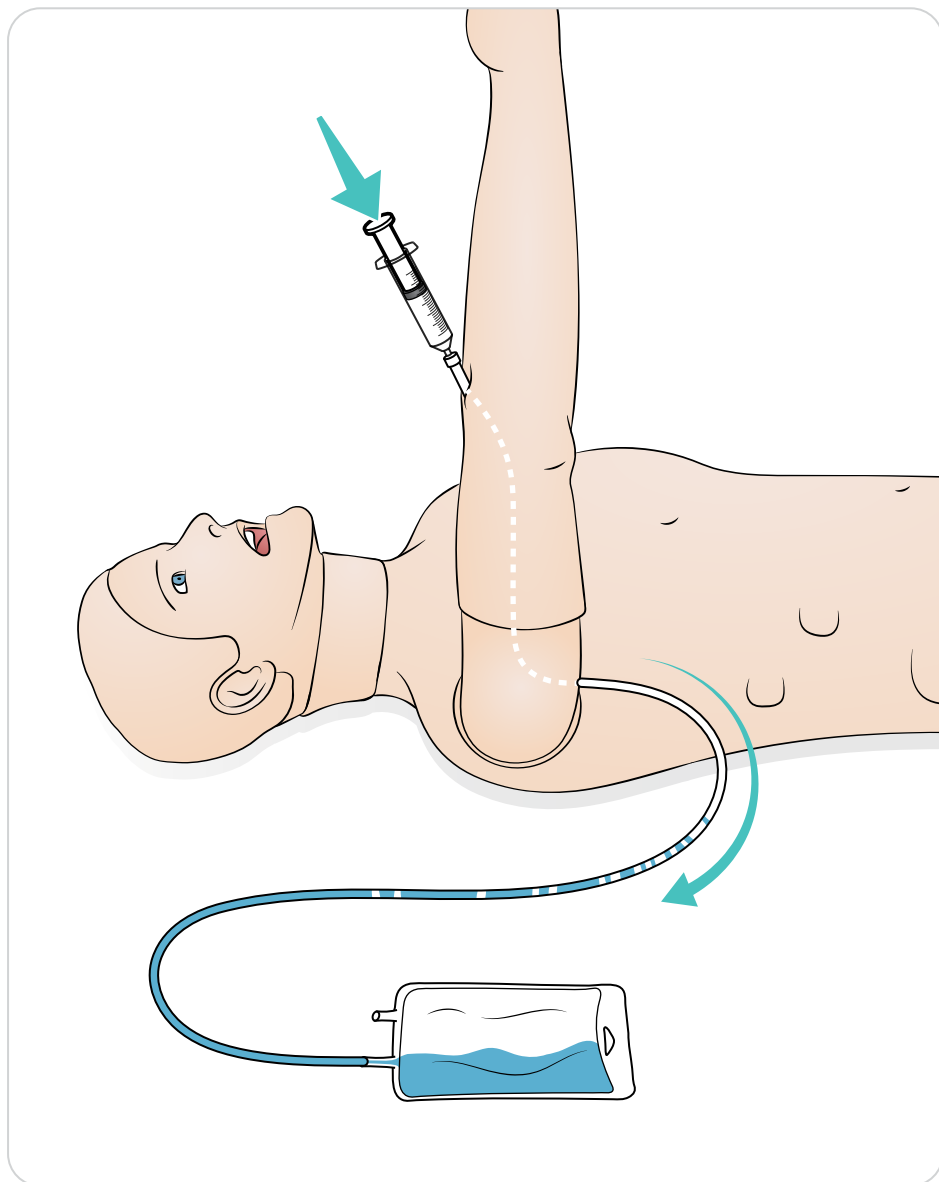
### Chest Drain

The chest drain module's pleura skin should be replaced after each use.



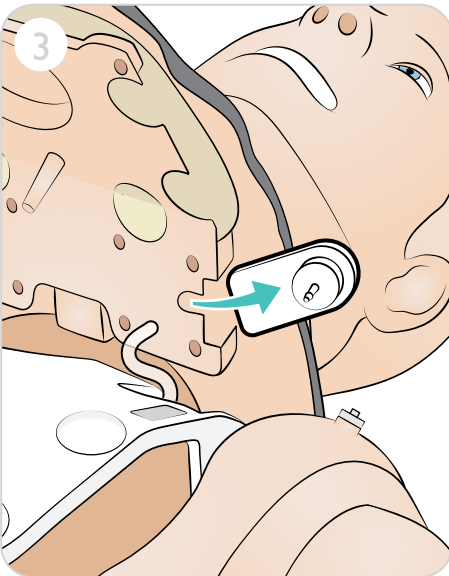
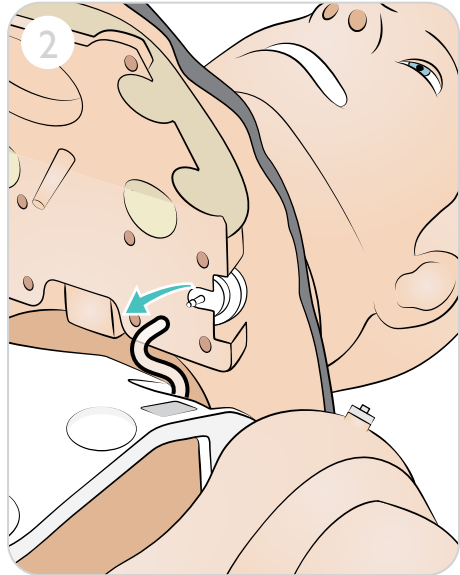
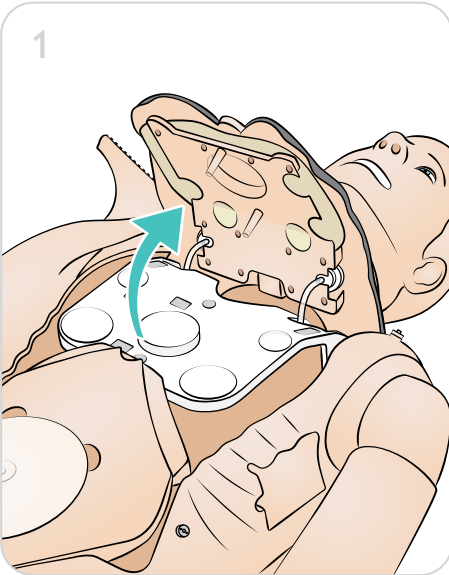
## IV Arm

After intravascular injection is complete, use a syringe to remove any remaining fluid in the tubing/components from the IV arm before storage.



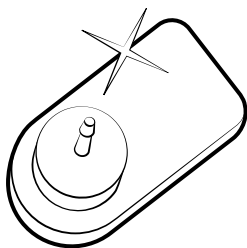
# Maintenance

## Replacing Pneumothorax Bladders

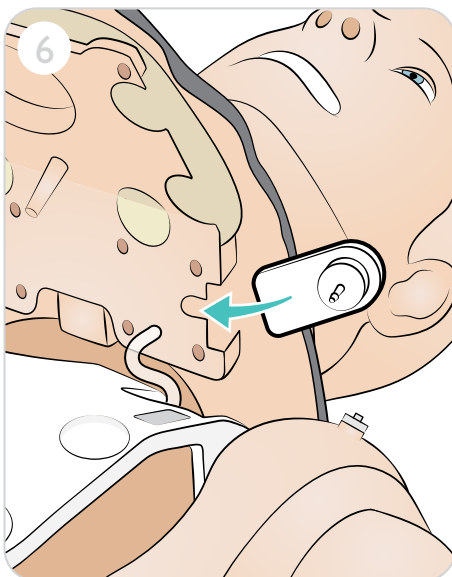




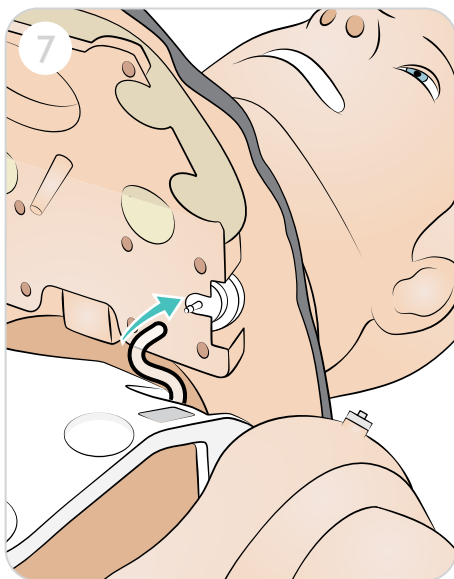
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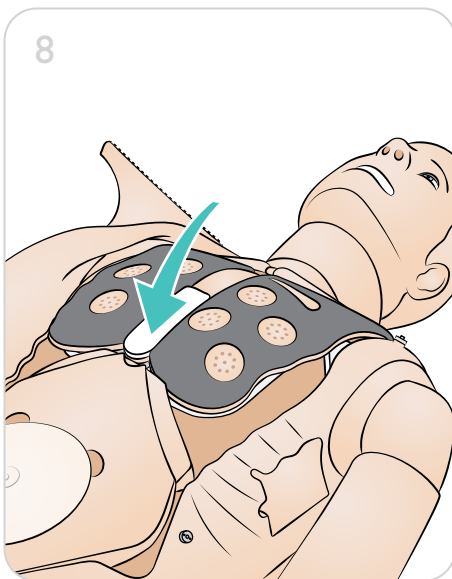
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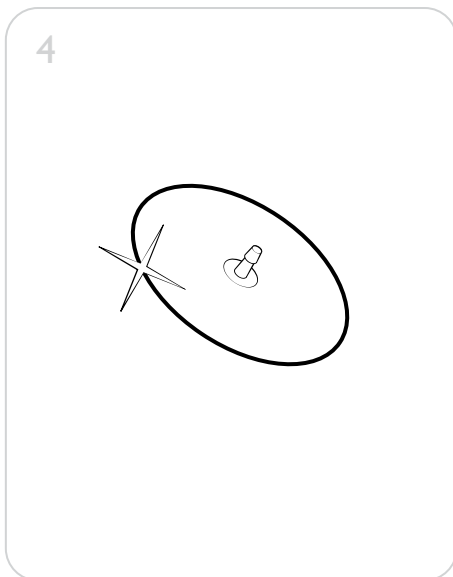
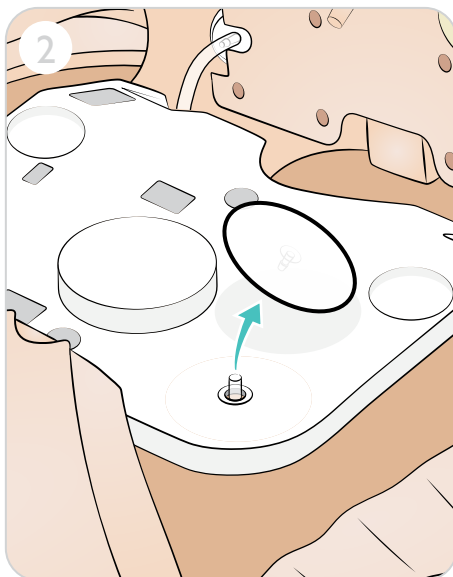
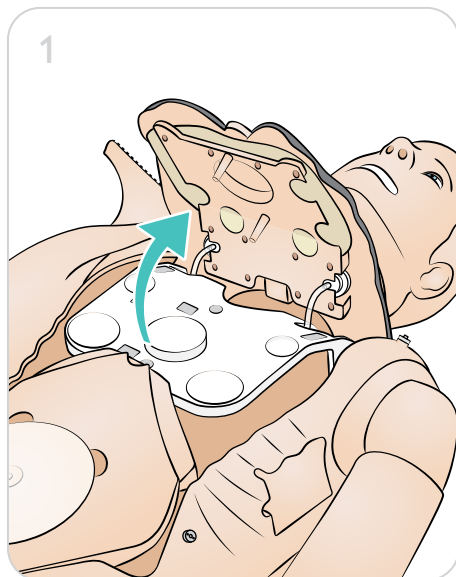
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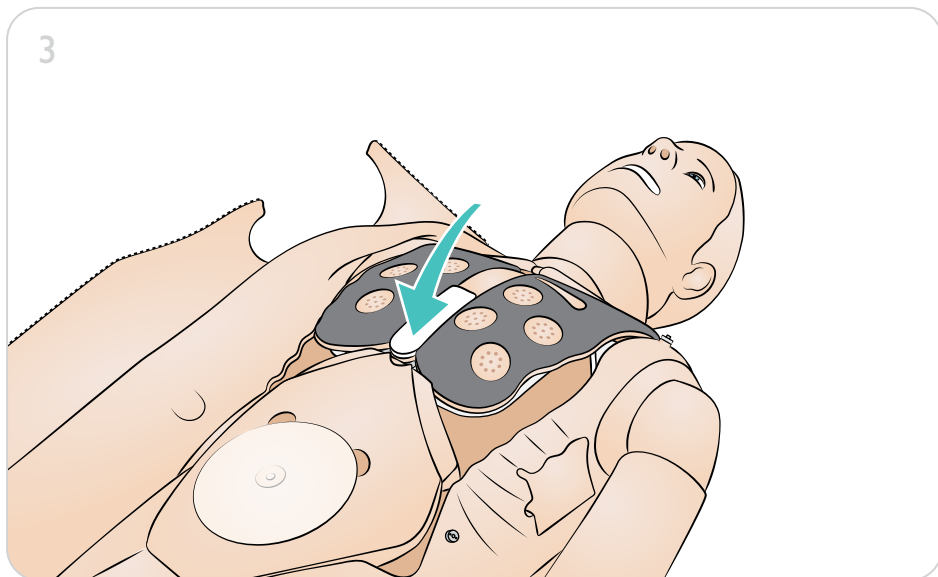
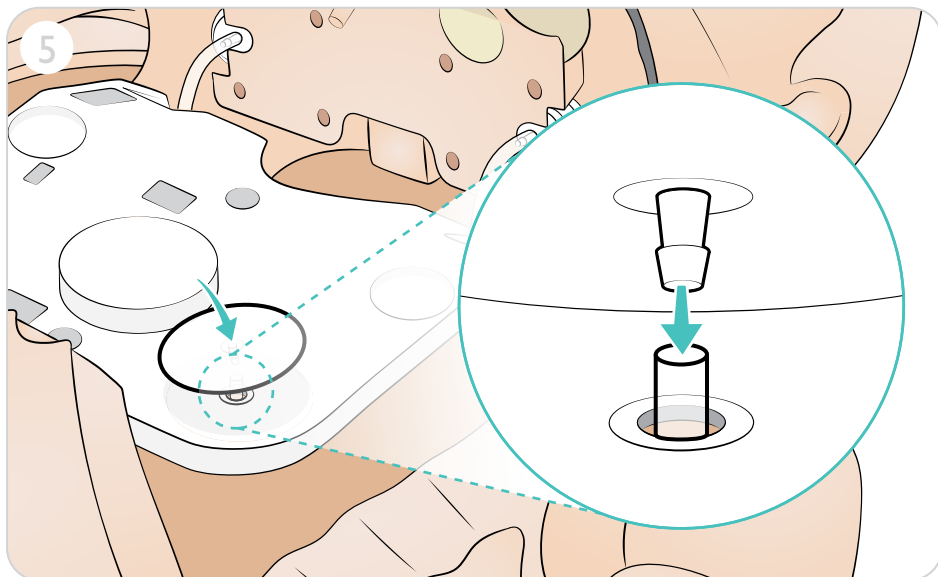
Be careful not to squeeze the small tube when closing the chest plate.

## Maintenance

### Replacing the Chest Rise Bladders

Replace the chest rise bladders if they leak or are damaged.

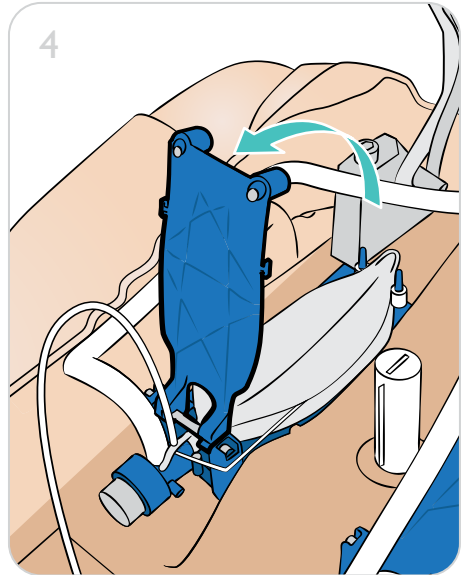
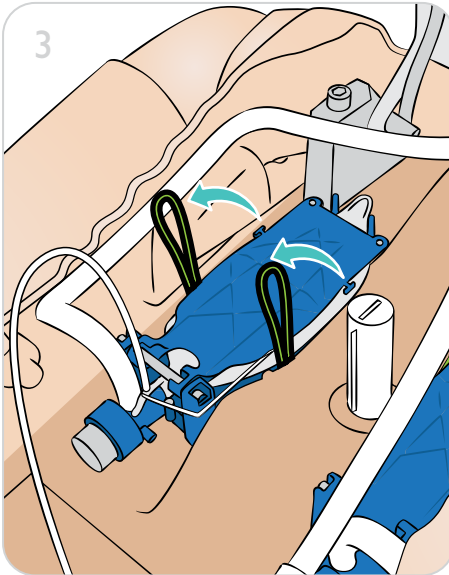
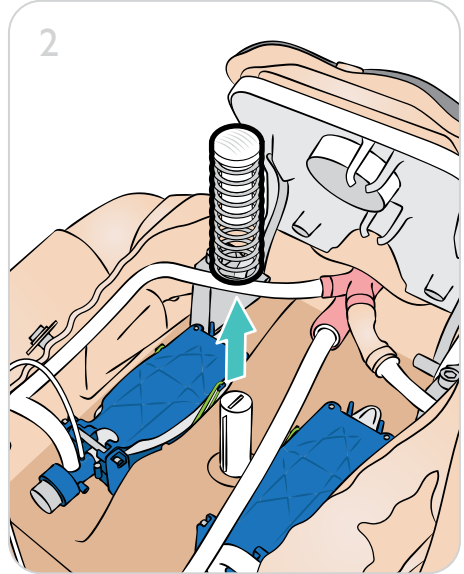
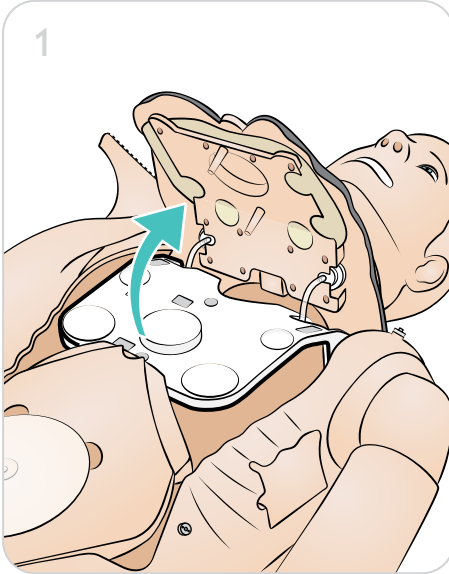


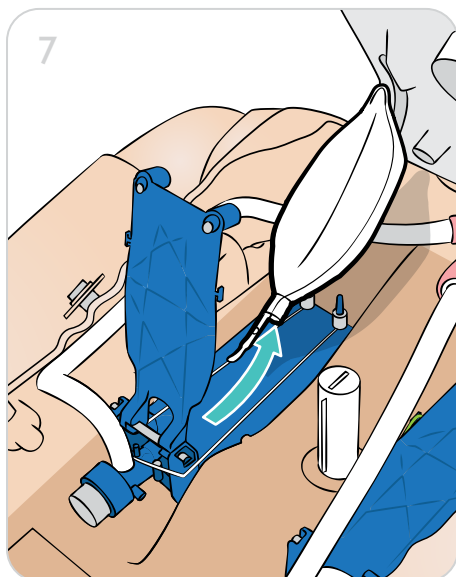
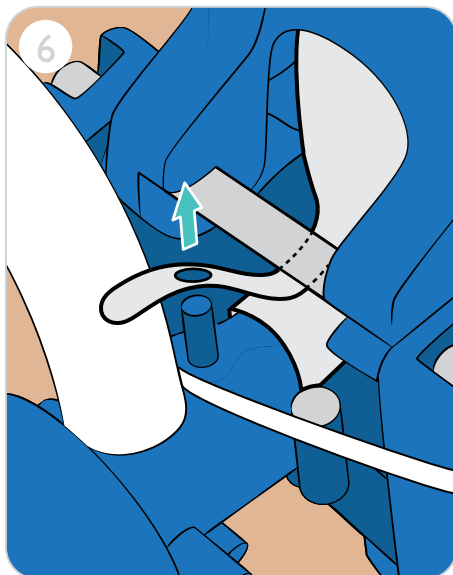
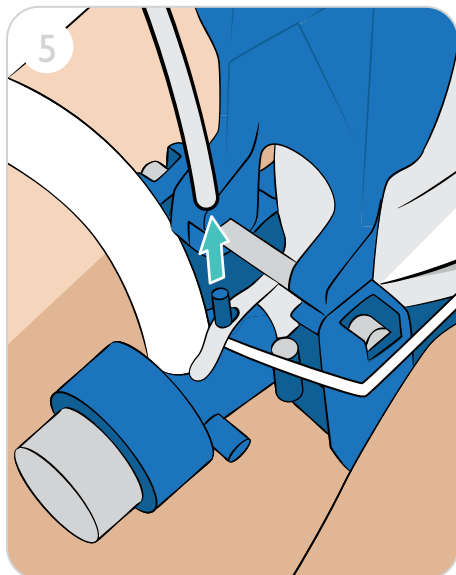


# Maintenance

## Removing the Lung

If leaking occurs, the lung bladders should be replaced.

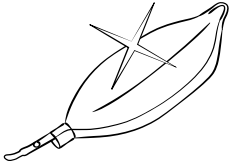




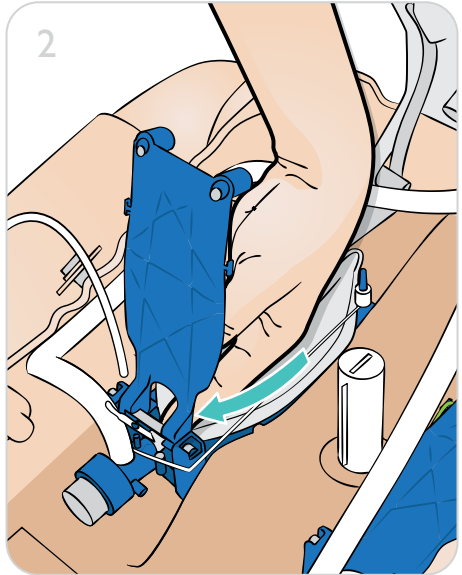
# Maintenance

## Replacing the Lung

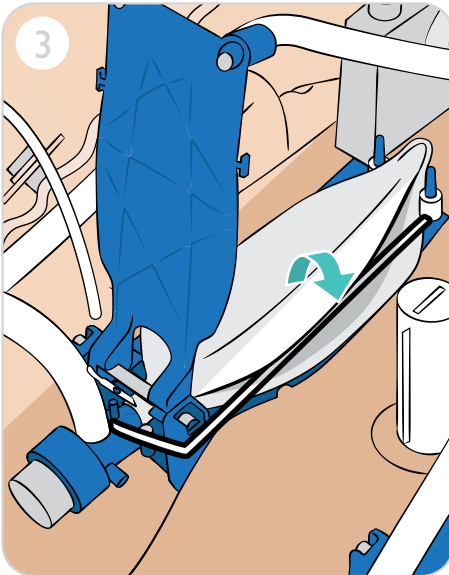
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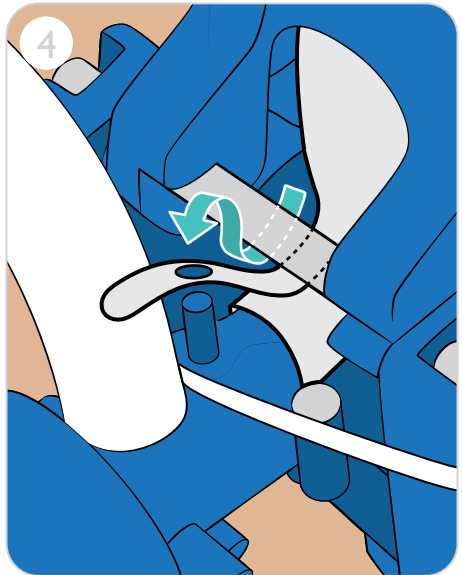
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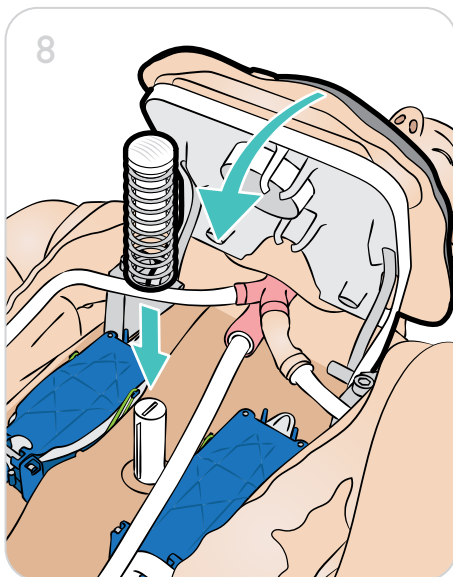
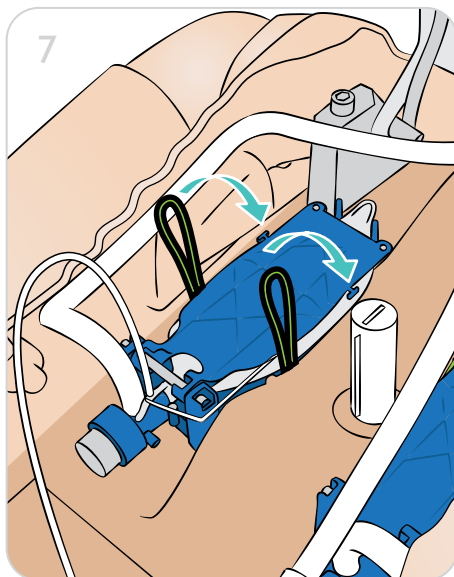
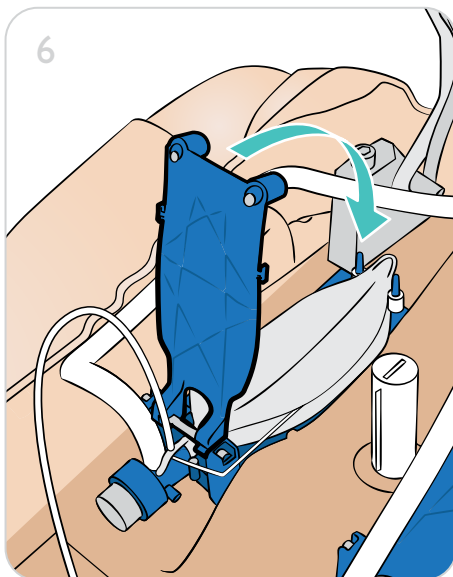
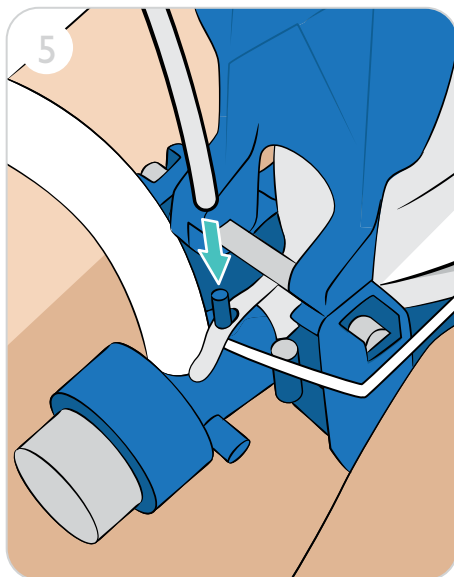


3



4

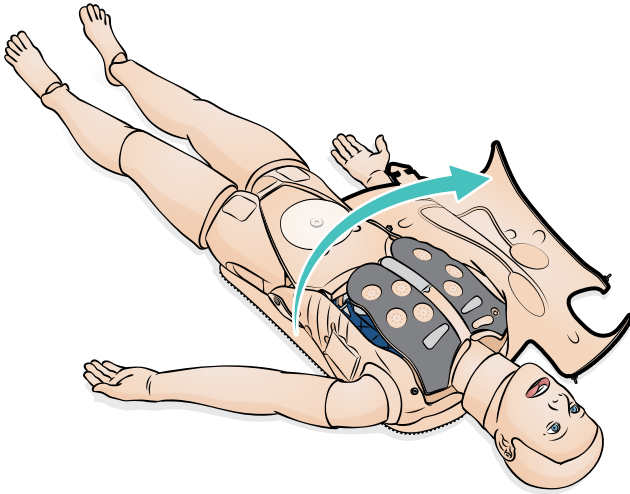




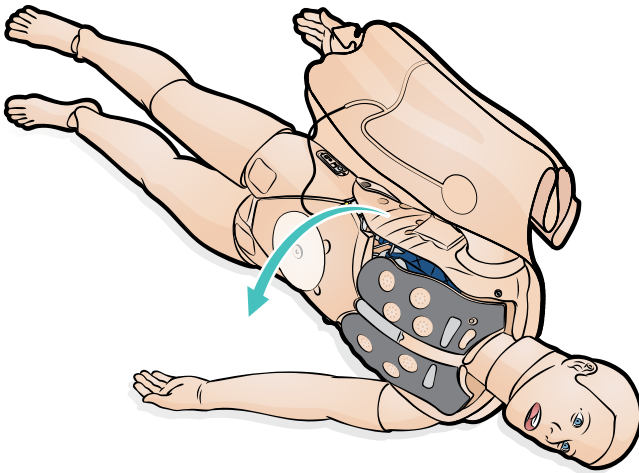
# Maintenance

## Removing the Torso Skin

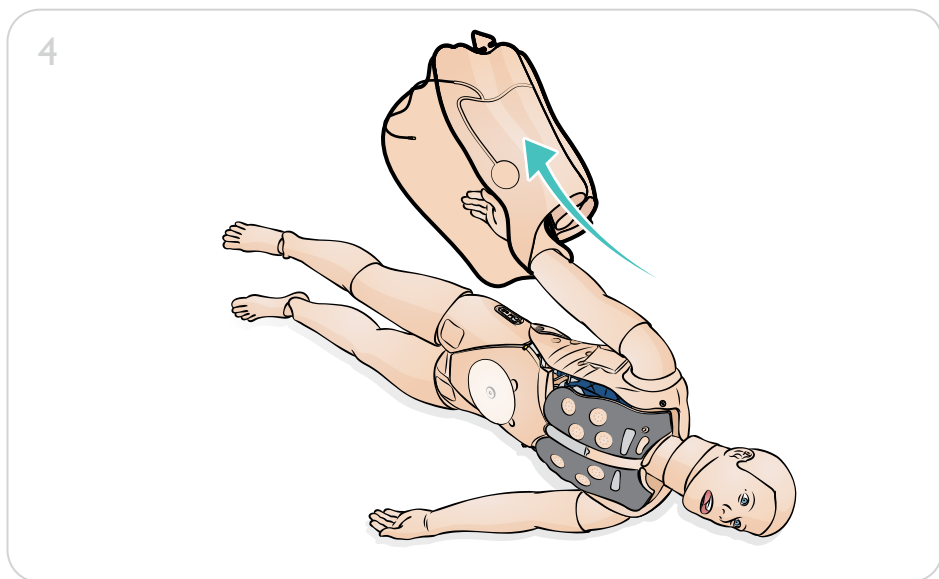
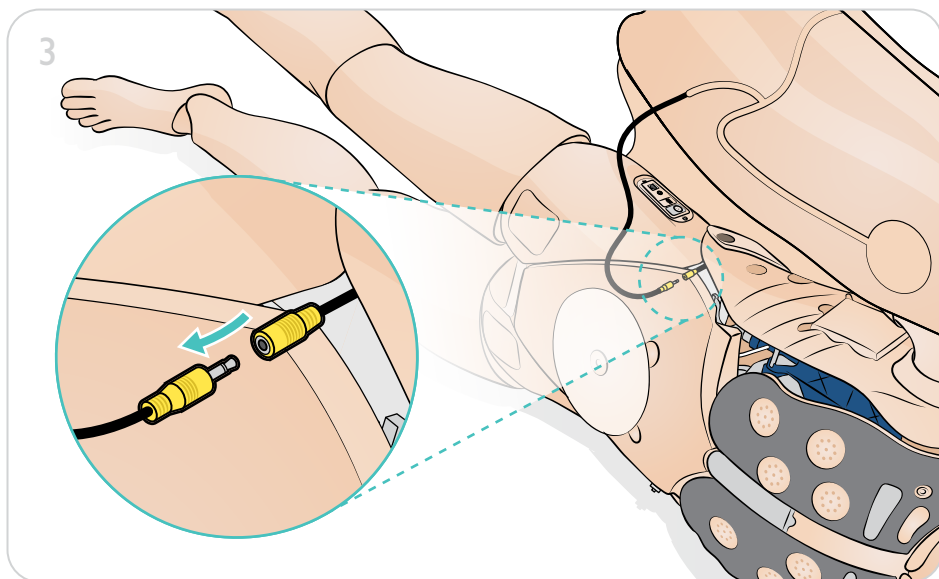
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2



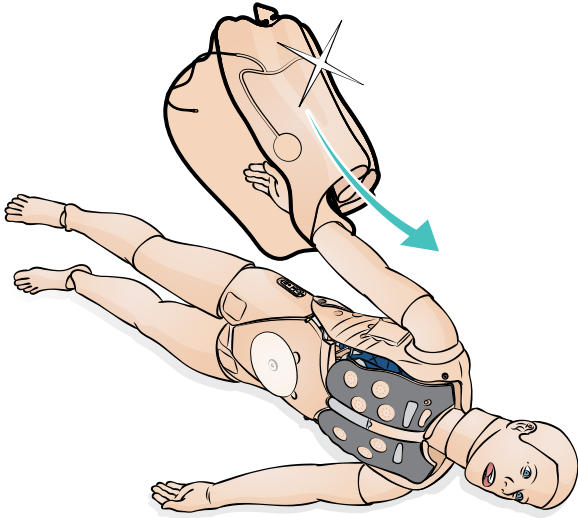




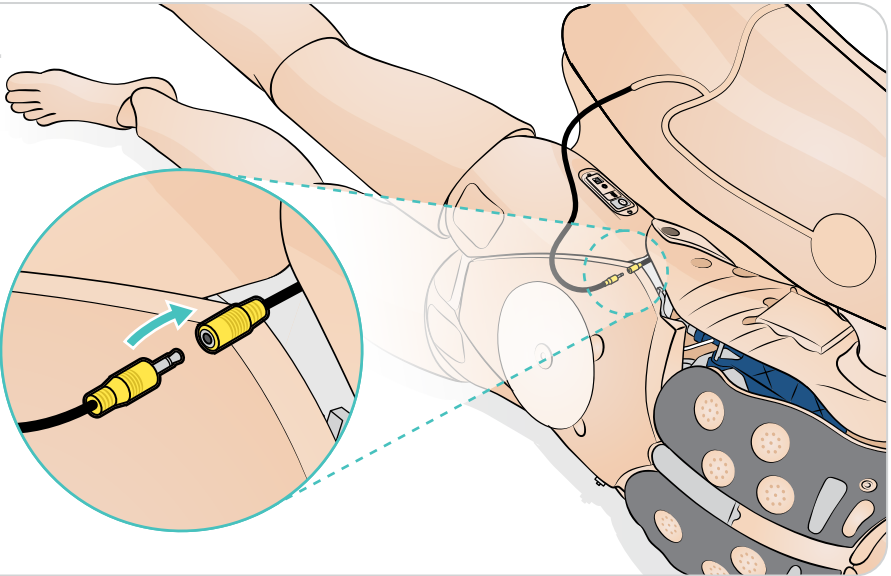
# Maintenance

## Replacing the Torso Skin

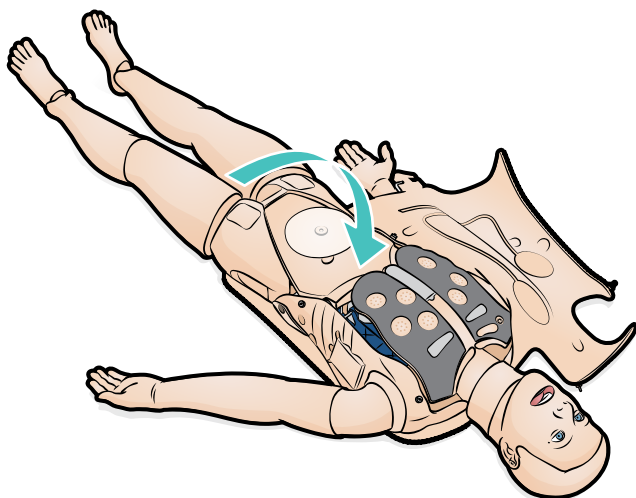
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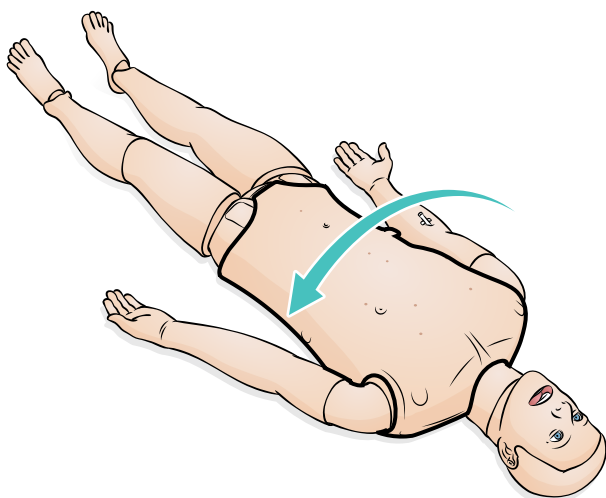
2



3



4



# Cleaning

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## Cleaning Simulator

1. Clean with mild soap and water; do not submerge the simulator or parts in cleaning fluids or water.
2. Use only on clean surface. Avoid felt tipped markers, ink pens, acetone, iodine or other staining products and avoid placing the simulator on newsprint or inked lines of any kind.
3. To ensure longevity, each simulator should be cleaned after each training session and a general inspection should be conducted regularly.
4. Modules and all other parts should be drained and air-dried thoroughly before storage and disinfected when needed. After use of injection pads (use water only), accumulated water should be squeezed out.

### SimMan ALS Software Compatibilities

SimMan ALS is operated and controlled by Laerdal Learning Application (LLEAP) and SimPad PLUS.

#### LLEAP

LLEAP is the instructor's application from where the simulation session is run, controlled, and monitored. LLEAP can be operated in Automatic or Manual mode. Automatic mode is used for pre-programmed scenarios while Manual mode allows the instructor full manual control over the simulation session. Running simulations in Manual mode generally requires some medical expertise to create clinically sound simulations.

#### SimPad PLUS

SimPad PLUS is a wireless handset that performs relevant medical simulation training, including debriefing, in various user settings.

There are two ways to control simulations, Automatic Mode and Manual Mode allowing customized simulations to meet specific needs.

#### Simulation Software

If you have purchased relevant licenses, you will have access to a number of PC applications that facilitate your simulation. To run a simulation, LLEAP (Laerdal Learning Application) must be started from Laerdal Simulation Home on the Instructor PC.

#### Laerdal Simulation Home

Laerdal Simulation Home is an application from where LLEAP and other Laerdal programs related to patient simulation can be found and started. The help files are also opened from here.. Laerdal Simulation Home is located in the Laerdal Medical folder under the Windows start menu (Windows 7) and can be launched using the desktop shortcut on Windows 8.

# Software Applications

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## LLEAP Only:

### Voice Conference Application (VCA)

The VCA software transmits all vocal sounds used during simulation. It enables the instructor to communicate through the simulator during the session. With VCA, instructors can communicate with other instructors on a network and create separate channels that only members can talk and listen to.

## LLEAP and SimPad PLUS:

### Patient Monitor

The Patient Monitor application emulates a typical hospital patient monitor. It is the learner's console and can be set up and controlled by the instructor, as well as by the learner, through on-screen touch menus.

### Session Viewer, SimView Server and SimView Mobile

Session Viewer, SimView Server and SimView Mobile are applications that record video and patient monitor screen captures during simulation, in addition to providing an interface to debrief your session. After a session is ended, log files generated in LLEAP and on the SimPad PLUS are transferred and merged with the video files in Session Viewer, SimView Server and SimView Mobile for the debrief.

## Other Applications

The following applications are available in conjunction with the simulation sessions:

- License Manager for handling program licenses
- Simulator Firmware & Network Wizard for updating the firmware of the simulators or troubleshooting network problems
- SimDesigner for configuring your own pre-programmed scenarios. It can also be used to analyze and print out a graphical representation of a scenario. SimDesigner must be installed to allow conversion of legacy instructor application files to LLEAP compatible file formats.
- Network Selector in Laerdal Simulation Home helps users connect LLEAP and Patient monitor to a wireless network and even host a network (Windows Hosted Network).
- Theme editor allows creation of themes for the SimPad system when operating using Manual Mode

For a full overview of all applications and their help files, start LLEAP Home.

## Web Downloads

Visit [www.laerdal.com](http://www.laerdal.com) to download the latest User Guide, Software and Troubleshooting Guide.



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