

Thoracic Trauma Trainer

LM-093

Instruction Manual

Thank you for purchasing the LM-093 Thoracic Trauma Trainer.

Please read this instruction manual carefully to ensure correct use of the product, and store it in a safe place for easy access.

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Handling and Safety Precautions

These precautions should be strictly observed in order to ensure safe, long-term use of the product.

The following precautions should be observed particularly strictly:

1. The model has a realistic feel. Careless handling may cause damage.
2. When handling the model (preparation, replacing puncture sites, cleaning, etc.), the simulated blood may soil operators or the nearby area. When preparing the model, replacing the puncture sites, cleaning, or carrying out other tasks, prepare tissues or similar supplies ahead of time, and frequently wipe up simulated blood on connectors and injection syringes.
3. Please do not place objects on the model. This may cause deformation of the skin.
4. To clean the model, wipe with gauze that has been soaked with water or a neutral detergent diluted with water. Do not use solvents such as thinner or benzene, as these will cause damage.
5. Do not use oil-based inks or paints. They can soak into the model and may be impossible to remove.
6. In the event that pericardiocentesis site or skin fails to cause leakage of fluid, but fluid does leak gradually after multiple punctures in the same site, replace with a new part.
7. Use of wider needles shortens the life of pericardiocentesis sites, thoracentesis sites, and various types of skin.
8. Choose a storage location where the model will not be exposed to direct sunlight. High temperatures may cause deformation, discoloration, and malfunction.
9. Remove the head model from the main body when storing unused for over one month.
10. This product is intended for use in standard operating environments. Do not use it in heavy industrial settings.
11. This model uses urethane foam for some of its parts, and may be susceptible to damage from pests that are attracted to urethane foam (such as insects in the ant family).
When storing this model, ensure that thorough measures are taken to prevent pest damage before storing. The company will not be involved with or held liable for pest damage that occurs during storage.
12. Attached batteries are for the usage of operation check. There is a possibility that battery life is short.

Caring for the simulator after use

Because the simulated blood may solidify when the model is stored for long periods, remove blood from the pericardiocentesis site, the simulated blood pathway, and the simulated blood tank.

1. The contents of this instruction manual are subject to change without notice.
2. This operation manual cannot be reproduced in whole or in part without permission.
3. Please notify us in the event that you find any errors or omissions in the contents of this operation manual.
4. Please use the product according to the instructions in this operation manual. In particular, refrain from use contrary to the methods given in the precautions.

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1. Outline and Features

Outline

High-energy trauma often consists of multiple injuries, and thoracic trauma can be considered key when determining priority in treatment. This thoracic trauma trainer is a model that combines practice in surgically securing the airway with practice in the treatment of obstructive shock.

Additionally, this single model can be used to practice five different techniques: Puncture of the Cricothyroid Ligament, Cricothyroid Ligament Incision, Thoracentesis (Left and Right), Thoracic drainage (Left and Right), and Pericardiocentesis.

Features

a. Puncture and Incision of the Cricothyroid Ligament

- The puncture/incision site includes the airway, cricoid cartilage, and thyroid cartilage.
- Attach your own surgical tape (paper) to simulate the cricothyroid ligament.
- The cricoid cartilage and thyroid cartilage are structured so that they can be opened as a procedure for widening the incision.
- The skin is made with silicone, giving it an appearance and texture similar to real skin, making training more realistic.

b. Thoracentesis (Left and Right)

- Air can be injected to create swelling of the left or right side of the chest (tension pneumothorax, subcutaneous emphysema).
- Distension of the jugular vein can be simulated in conjunction with swelling of the chest.
- The sternal angle and second intercostal space are present for use as landmarks for the puncture site.
- Upon puncture, the air flows out, and the swelling of the chest and distension of the jugular vein subside.
- When there is a syringe attached to the puncture needle, air pressure will lift the plunger.
- The skin is made with silicone, giving it an appearance and texture similar to real skin, making training more realistic.

*Use a needle smaller than 18G.

c. Thoracic Drainage (Left and Right)

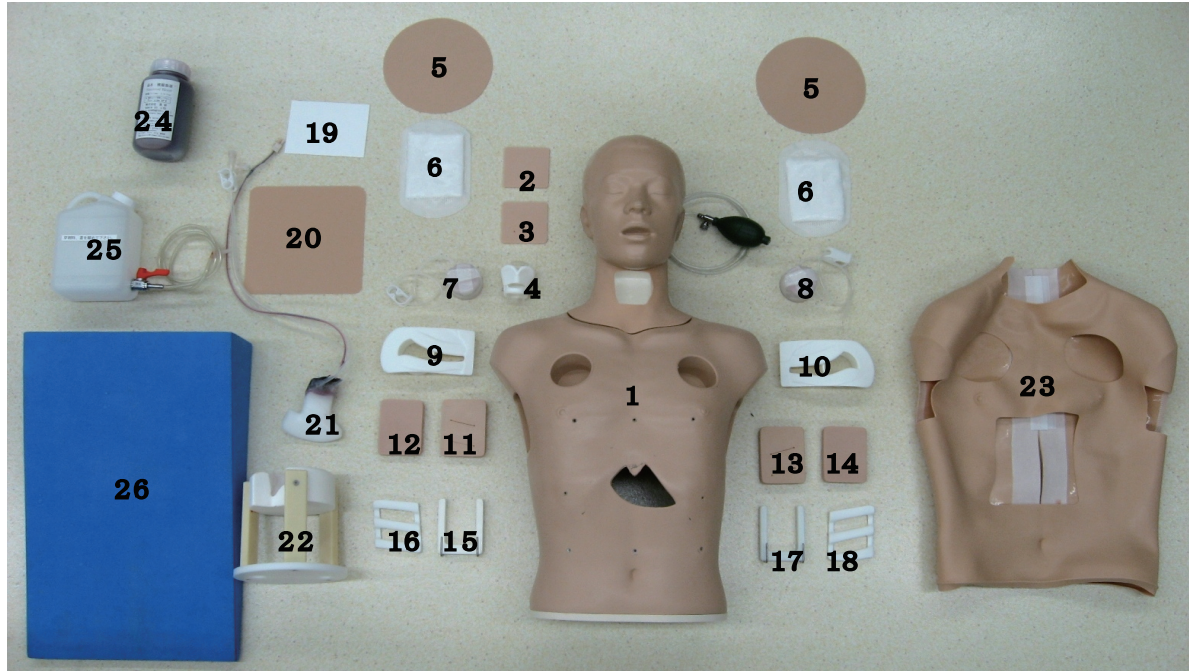
- Two types of sites are available (one that is uncut, so that an actual incision can be made, and one that is precut for repeated use), and procedures can be carried out on both the left and right sides.
- Actual insertion of drainage tubes (trocar catheters, etc.) is possible.
- The fifth and sixth intercostal spaces are present for use as landmarks for the insertion site.
- Attach your own surgical tape (paper) to simulate the pleura.
- The skin is made with silicone, giving it an appearance and texture similar to real skin, making training more realistic.

d. Pericardiocentesis

- A framework (xiphisternum and costal arch) for identifying the pericardiocentesis site is present.
- Simulated blood can be drawn when a puncture with the correct angle and depth has been made.
- An error alarm will sound when the angle is incorrect or the puncture is too deep.
- Distention of the jugular vein can be simulated. (Manual type)
- The skin is made with silicone, giving it an appearance and texture similar to real skin, making training more realistic.

*Use a needle smaller than 18G.

2. Configuration



	Product name	Quantity		Product name	Quantity
1	MainBody of the Thoracic Trauma Trainer (Including Head)	1	15	Thoracic Drainage Base (Right)	1
2	Cricothyroid Cartilage Skin (No Cut)	1	16	Thoracic Drainage Framework (Right)	1
3	Cricothyroid Cartilage Skin (With Cut)	1	17	Thoracic Drainage Base (Left)	1
4	Cricothyroid Cartilage Part	1	18	Thoracic Drainage Framework (Left)	1
5	Thoracentesis Skin	2	19	Pericardiocentesis Site Sponge Sheet	1
6	Simulated Subcutaneous Emphysema Part	2	20	Pericardiocentesis Site Skin	1
7	Thoracentesis Site (Right)	1	21	Pericardiocentesis Site for Thoracic Trauma	1
8	Thoracentesis Site (Left)	1	22	Mount for Pericardiocentesis Site for Thoracic Trauma	1
9	Thoracentesis Framework (Right)	1	23	Main Body Skin for Thoracic Trauma	1
10	Thoracentesis Framework (Left)	1	24	Simulated Blood (Dark Type) 500 mL	1
11	Thoracic Drainage Site (Right): With Cut	1	25	Pericardiocentesis Simulated Blood Tank for Thoracic Trauma	1
12	Thoracic Drainage Site (Right): No Cut	1	26	Pericardiocentesis Sponge Stand for Thoracic Trauma	1
13	Thoracic Drainage Site (Left): With Cut	1		Stand	1
14	Thoracic Drainage Site (Left): No Cut	1		AA Batteries	4
				Soft Case	1

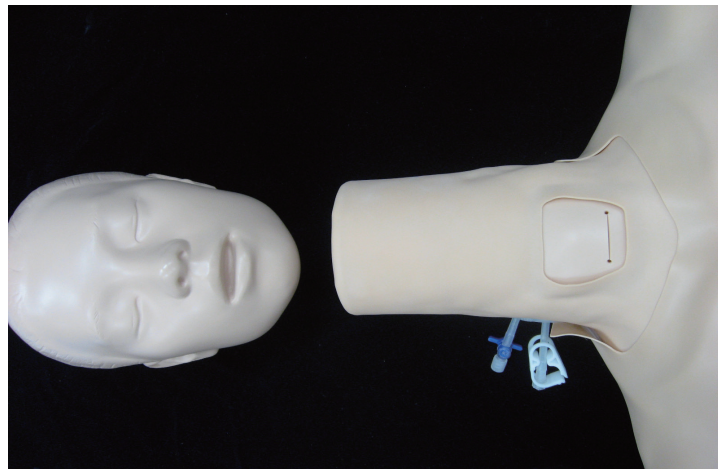
3. Handling the model

3-1 Preparation for use

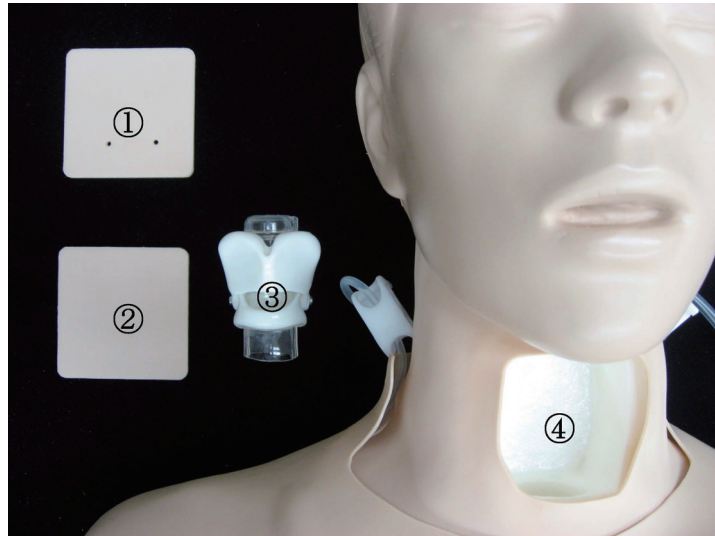
The main body and the head model are stored separately in the storage bag.



Before using, insert the head model into the neck of the main body.



3-2 Puncture and Incision of the Cricothyroid Ligament Configuration and Names

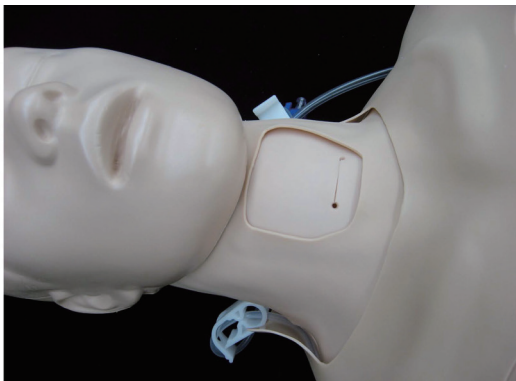


(1) Cricothyroid Cartilage Skin (With Cut)
(3) Cricothyroid Cartilage Part

(2) Cricothyroid Cartilage Skin (No Cut)
(4) Housing for Cricothyroid Cartilage Part

Instructions for Use

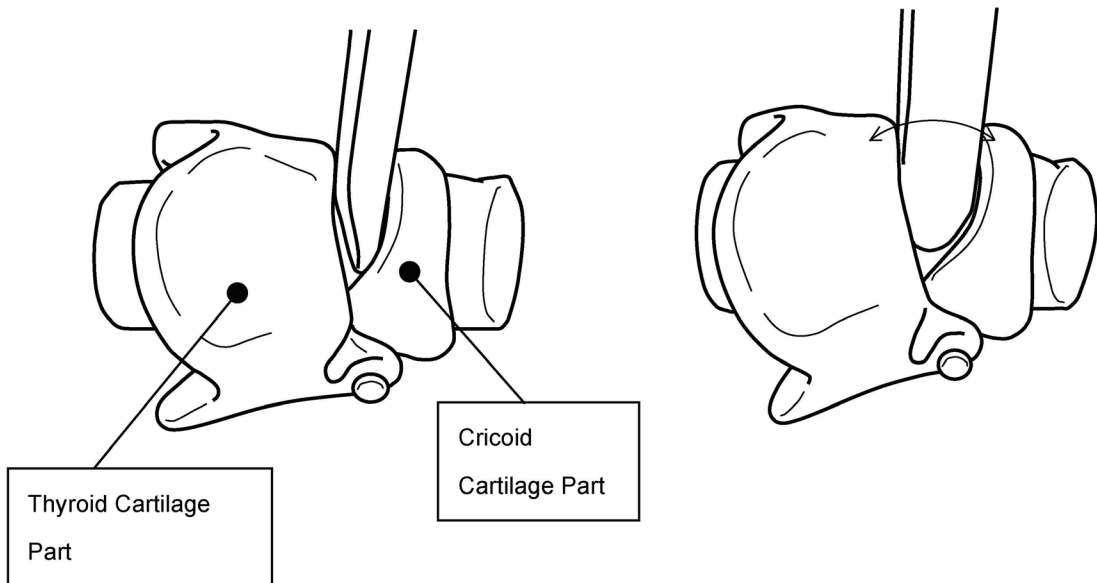
Remove the cricothyroid cartilage skin (1) or (2) and take out the cricothyroid cartilage part.





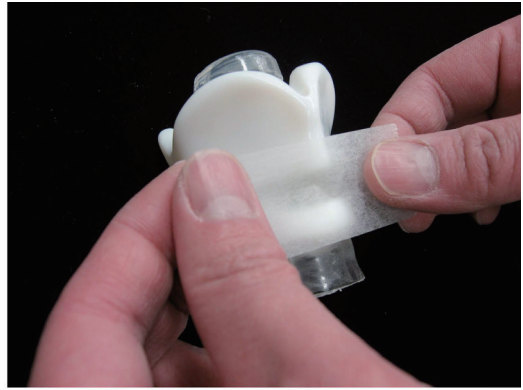
The space between the cricoid cartilage and thyroid cartilage parts of the cricothyroid cartilage part can be expanded from 6 mm to 15 mm.

Do not expand beyond 15 mm. Excessive expansion may cause breakage.

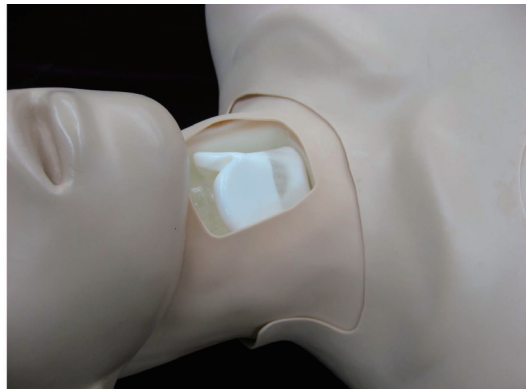


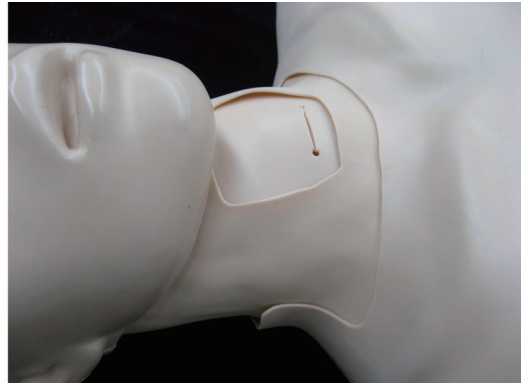
To simulate the ligament in the cricothyroid cartilage part, attach surgical tape to the space between the cricoid and thyroid cartilage parts while it is closed.

Please use your own surgical tape. Because the resistance and feeling when puncturing or making an incision in the cricothyroid ligament will differ based on the tape, adjust it by changing the number of pieces used.



Place the cricothyroid cartilage part in its housing in the main body of the model.
Attach the cricothyroid cartilage skin (with or without a cut).





Preparations for puncture or incision of the cricothyroid ligament are complete.

Injecting too much air may cause the balloon that simulates distension of the jugular vein to burst. Please do not squeeze the bulb once you begin to feel resistance.



Distension of the jugular vein is simulated on both sides, regardless of whether pneumothorax is simulated on the left or right side.

As more punctures are made, the amount of air leaking from the thoracentesis site increases, and the plunger of the injection syringe may not rise at the time of puncture. When this is the case, repeat the injection of air with the rubber bulb immediately before puncture.



Before injection of Air



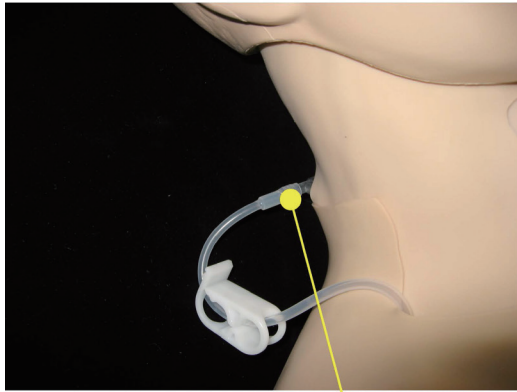
After injection of Air

Preparations for thoracentesis are complete.

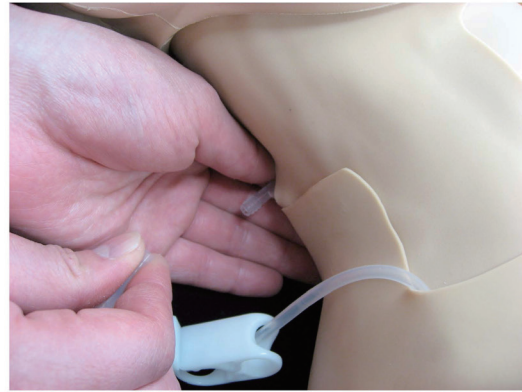
When there is no swelling of the chest even when air is injected to the thoracentesis site using the rubber bulb, replace the thoracentesis site with a new one according to page 13, "Replacement of the Thoracentesis Site".

Replacement of the Thoracentesis Site

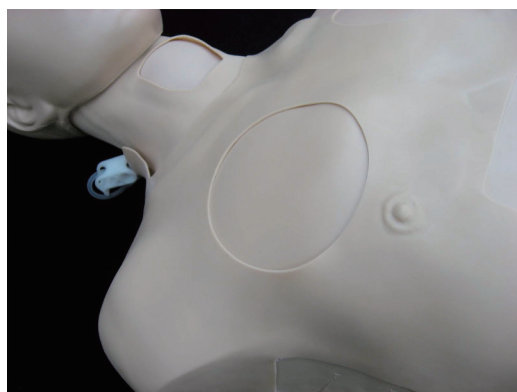
Remove the tube from the connector on the back of the neck.



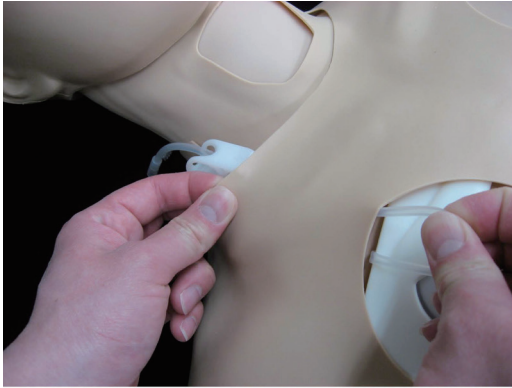
Connector



Remove the thoracentesis site skin and the simulated subcutaneous emphysema part from the main body of the model.



Remove the tube and connector of the thoracentesis site, passing them behind the skin of the main body. Lightly pull the skin back, and remove the thoracentesis framework and thoracentesis site from the main body.



Remove the thoracentesis site from its framework.

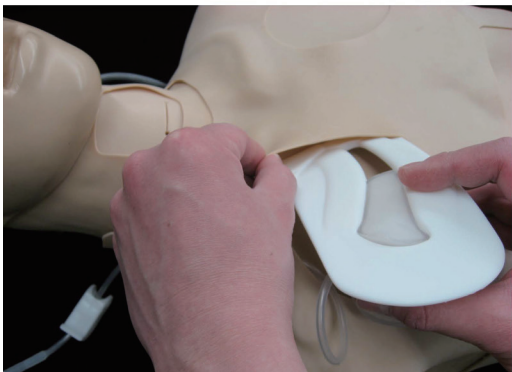
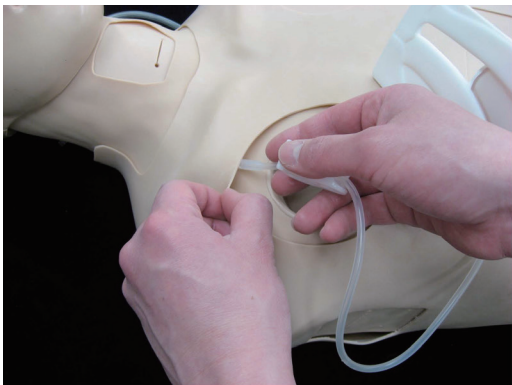


Fit the surface of the new thoracentesis site and the gap in the thoracentesis framework together and insert.



The left and right thoracentesis sites differ in shape.
Pay attention to the shape when attaching.

Pass the tube and connector of the thoracentesis site behind the skin of the main body towards the neck. Lightly pull the skin back and insert the thoracentesis framework and the thoracentesis site into the main body.



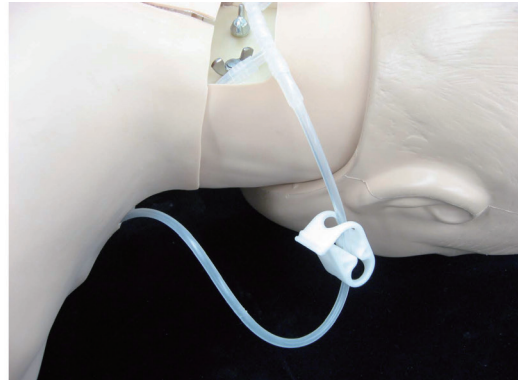
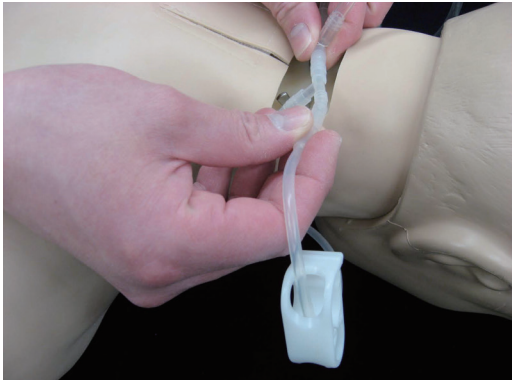
Insert the simulated subcutaneous emphysema part between the skin of the main body and the thoracentesis framework.



Insert the thoracentesis site skin between the skin of the main body and the simulated subcutaneous emphysema part.

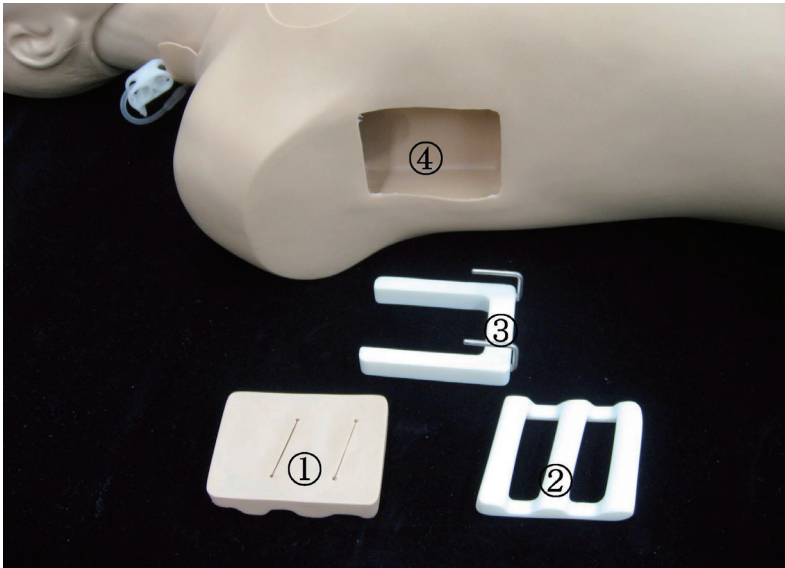


Connect the tube of the thoracentesis site to the connector in the back of the neck.



Replacement of the thoracentesis site is complete.

3-4 Thoracic Drainage Configuration and Names



- (1) Thoracic Drainage Site (2) Thoracic Drainage Framework
(3) Thoracic Drainage Base (4) Thoracic Drainage Site Housing

* There is one set of parts for each side (left and right)

Thoracic drainage sites consist of those without cuts (which are actually cut during use) and those with cuts (which can be used repeatedly).



Without Cut



With Cut

The type without cuts is useful in identifying the site where the incision is actually made.

The type with cuts is useful when training will be repeated by multiple trainees.

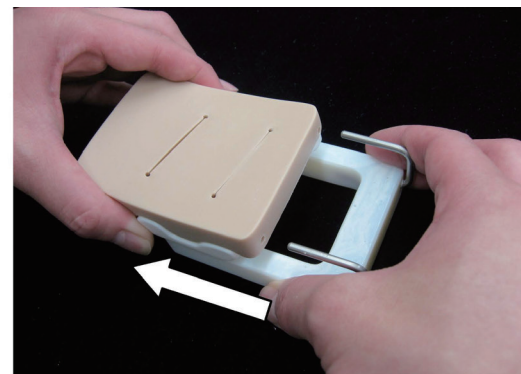
When training will be carried out repeatedly, we recommend that powder be applied to the thoracic drainage site beforehand.

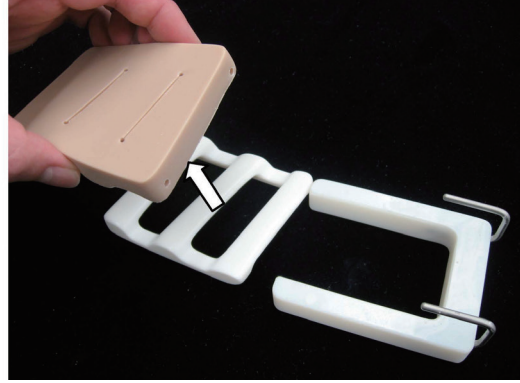
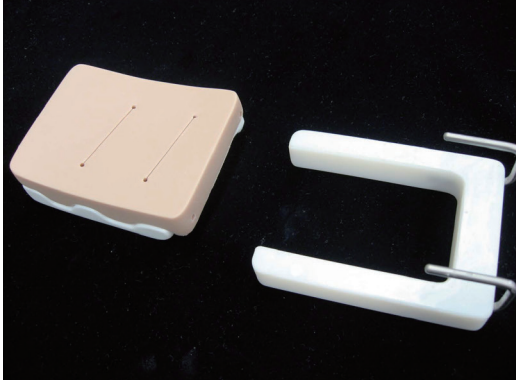
Instructions for Use

Insert a finger into the thoracic drainage site from the head side, and remove the thoracic drainage site, framework, and base from the main body.



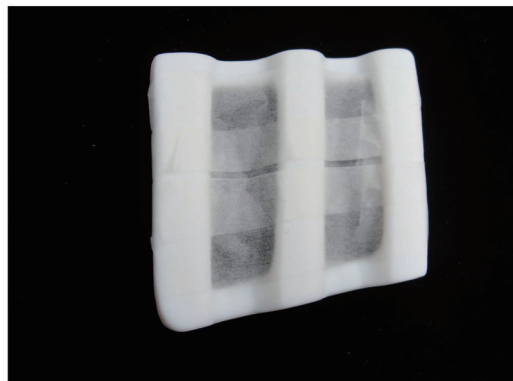
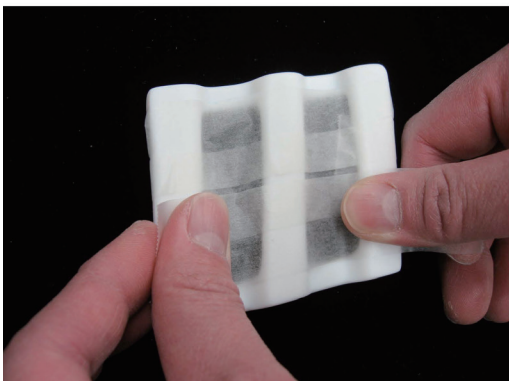
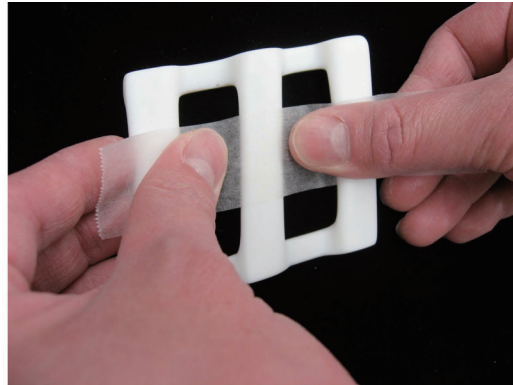
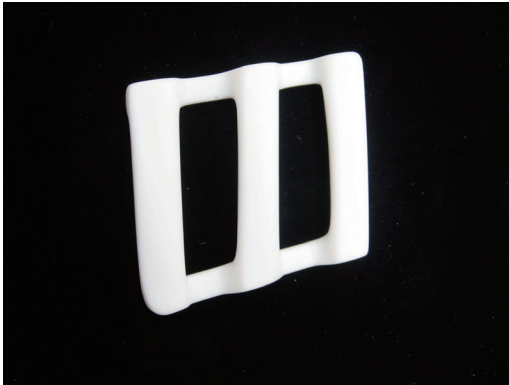
Slide the thoracic drainage site and framework off their base. After removing them, remove the thoracic drainage site.



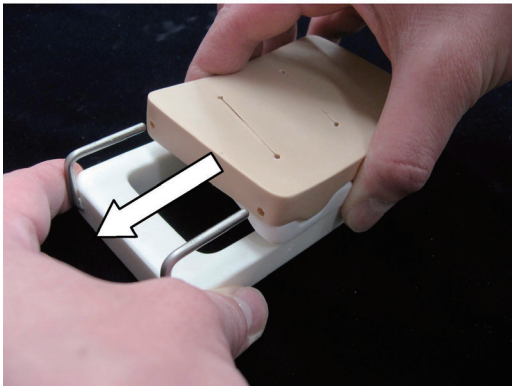
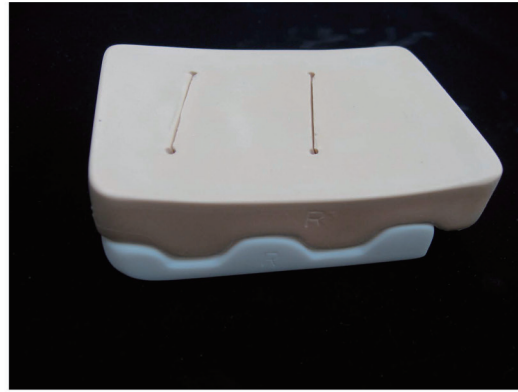
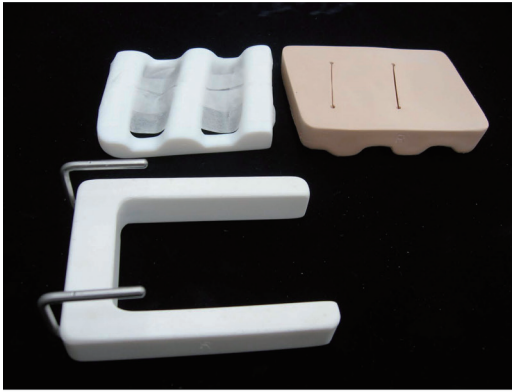


Attach surgical tape to the thoracic drainage framework in order to simulate the pleura.

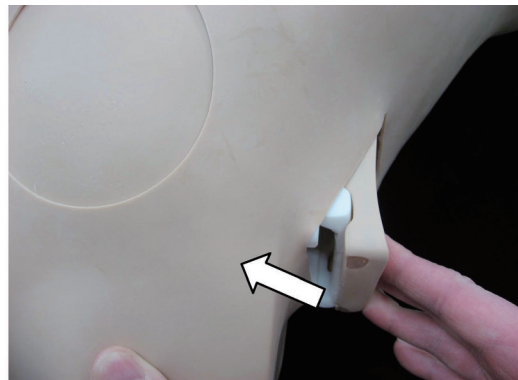
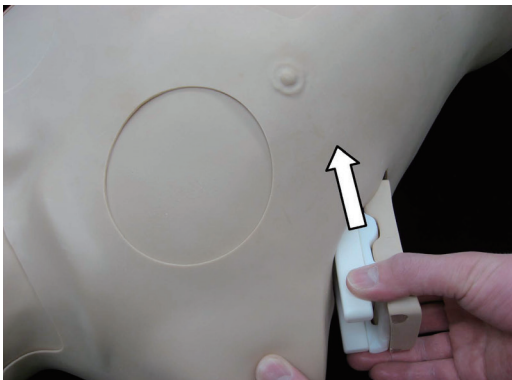
Please use your own surgical tape. Because the resistance and feeling when puncturing or making an incision in the pleura will differ based on the tape, adjust it by changing the number of pieces used.

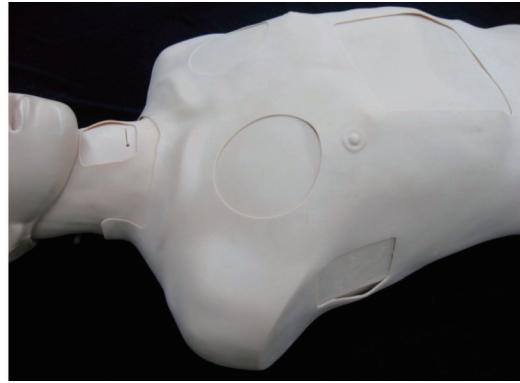


Line up the directions of the letters that are stamped on the side of each part (R for right and L for left), place the thoracic drainage site on the thoracic drainage framework, and then slide onto the thoracic drainage base to insert.



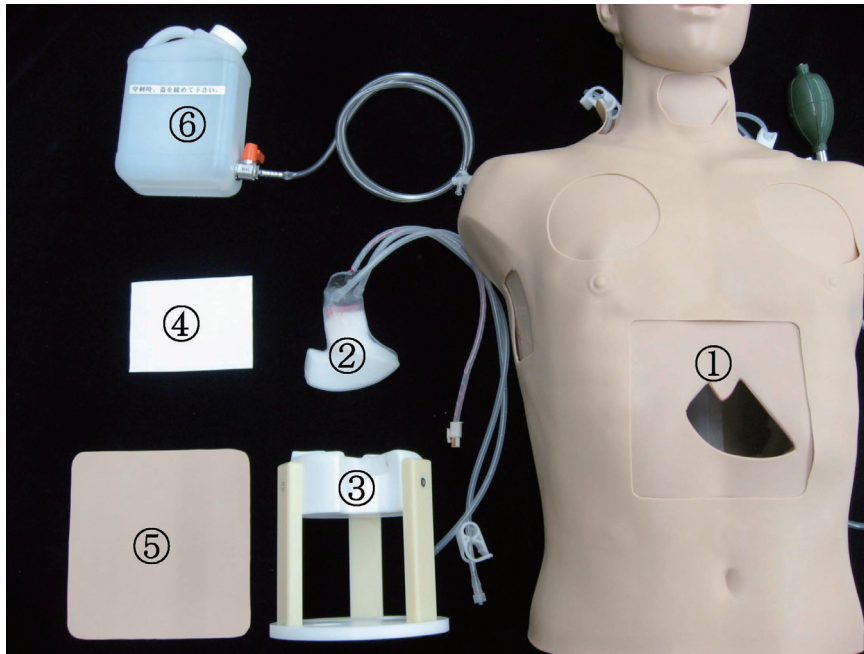
Insert into the main body from the abdominal side, and push in the side that is in the direction of the head.





Preparation for thoracic drainage is complete.

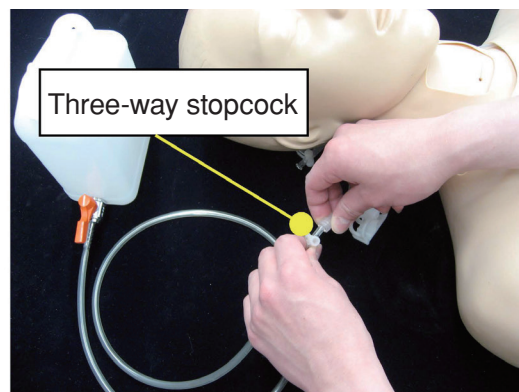
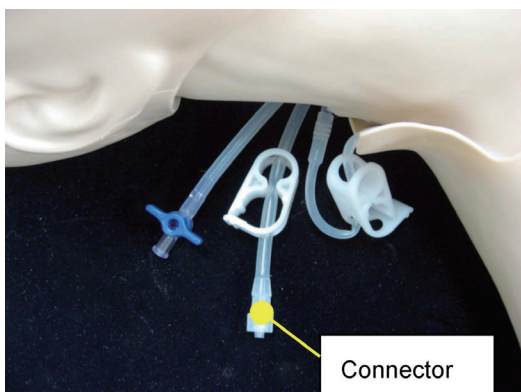
3-5 Pericardiocentesis Configuration and Names



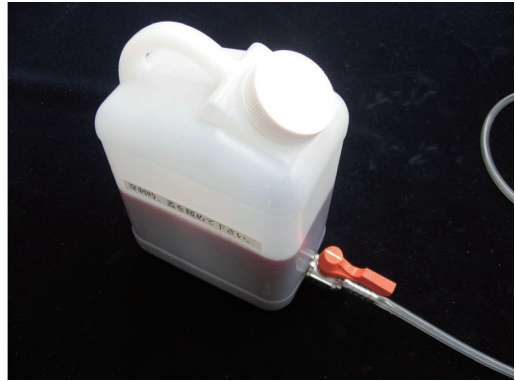
- (1) Main body of the Thoracic Trauma Trainer
- (2) Pericardiocentesis Site
- (3) Mount for Pericardiocentesis Site
- (4) Sponge Sheet for Pericardiocentesis Site
- (5) Pericardiocentesis Site Skin
- (6) Simulated Blood Tank

Instructions for Use

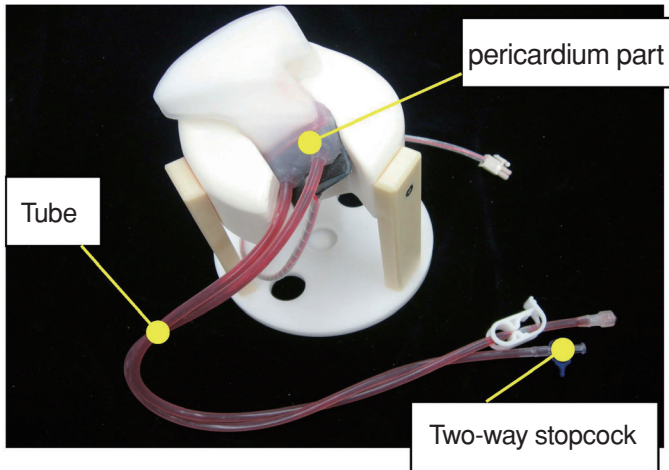
In its open position, connect the three-way stopcock of the simulated blood tank to the connector in the back of the main body's neck.



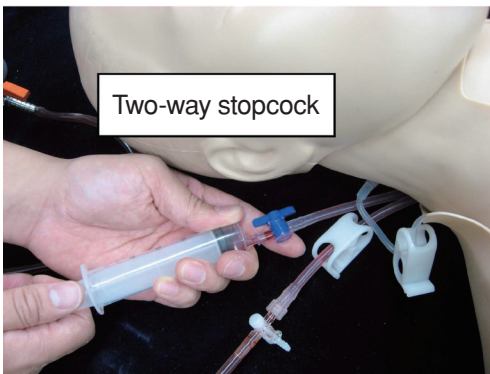
Pour the simulated blood into the tank and open the stopcock.



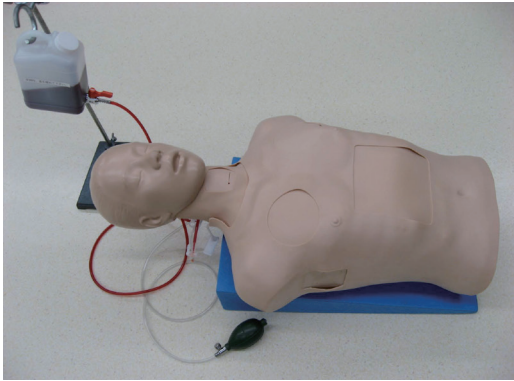
The parts in the figure below are set up in the main body of the model.



Use an injection syringe to remove the air in the pericardium part of the pericardiocentesis site and the tube through the two-way stopcock.



Place the main body of the model on top of the sponge stand for pericardiocentesis. Hang the simulated blood tank on the stand and loosen the cap.



When the cap of the simulated blood tank has not been loosened, there will be negative pressure in the simulated blood pathway, making it impossible to withdraw the simulated blood, even when pericardiocentesis has been carried out correctly.

The panel that is located on the abdominal side of the main body of the model will emit an error alarm when the puncture needle has gone too deep during pericardiocentesis.

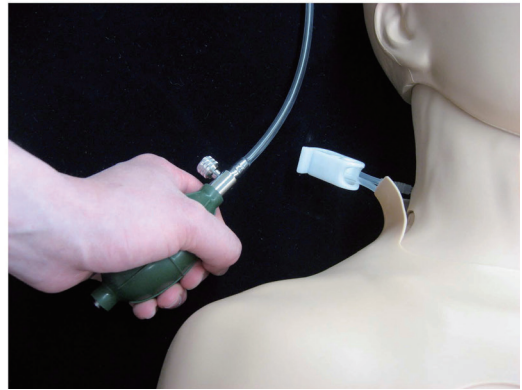
Place 4 batteries (AA) in the battery box, paying attention to the directions of their positive and negative terminals.



Turn the switch of the panel on. The green light will come on. The red lamp will light if the batteries have insufficient power.



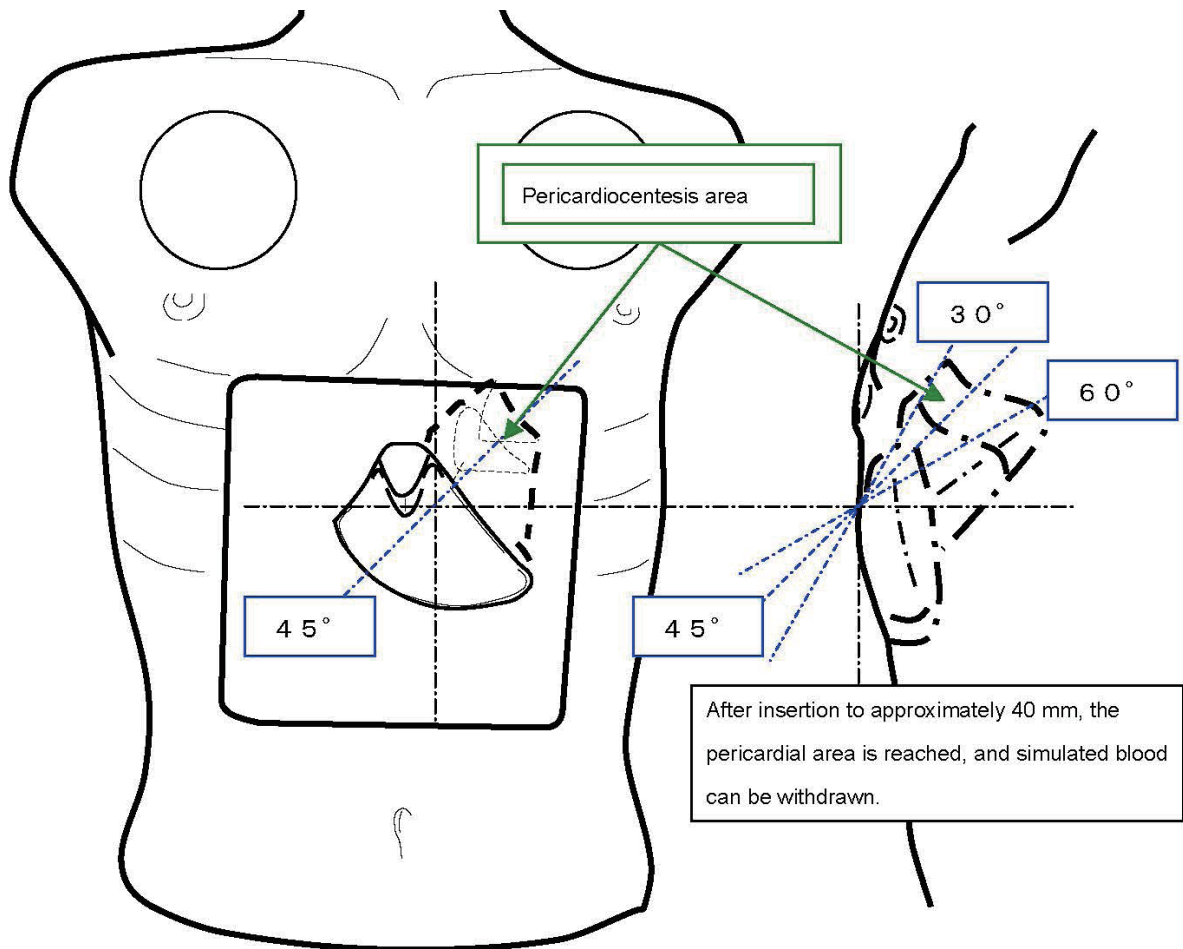
In order to simulate distension of the jugular vein during pericardiocentesis, close the clips on both sides and inject air using the rubber bulb.



Preparations for pericardiocentesis are complete.

If too much simulated blood leaks from the pericardiocentesis site for the sponge sheet to absorb, replace with a new pericardiocentesis site, referring to "Replacement of the Pericardiocentesis Site" on Page28.

Simplified Diagram of the Model Interior



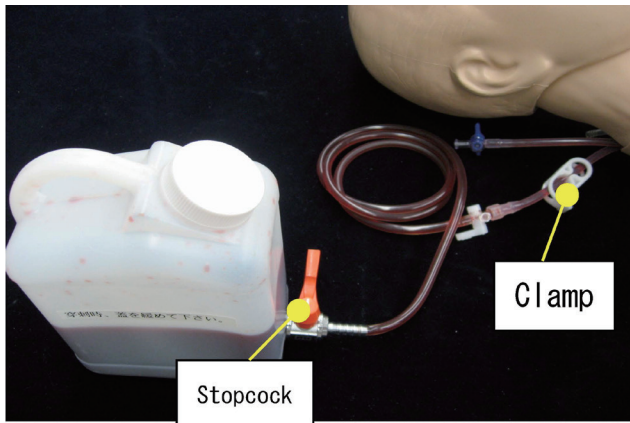
The effective range of the pericardial area is as shown above. In the event of pericardiocentesis outside of this area, the puncture needle will reach the error area, and the error alarm will sound. However, when the angle of pericardiocentesis causes the needle to enter the gap in the error area through which the simulated blood pathway passes, the error alarm may not sound, because the error area will not be contacted. When the error area is not contacted, the injection syringe will draw air.

Replacement of the Pericardiocentesis Site

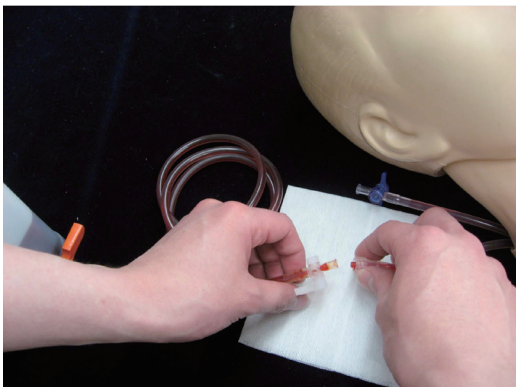
Remove the pericardiocentesis site skin and the pericardiocentesis site sponge sheet.



Close the stopcock on the simulated blood tank. Close the clamp of the simulated blood pathway tube.

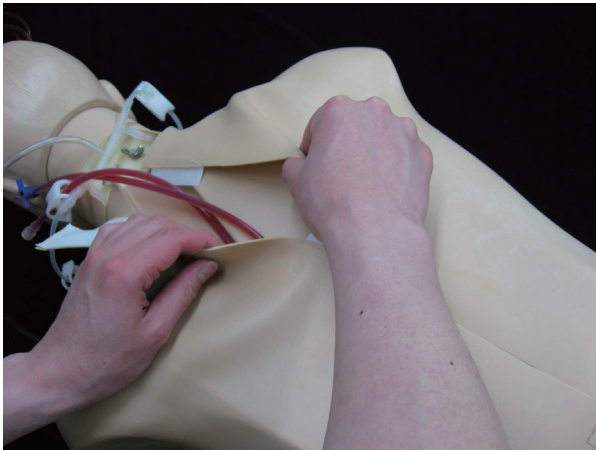


After closing the three-way stopcock of the simulated blood tank, remove the connector.

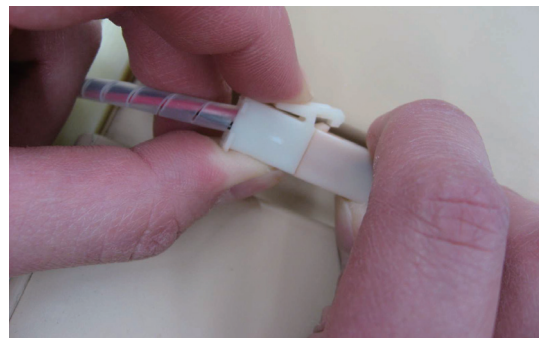
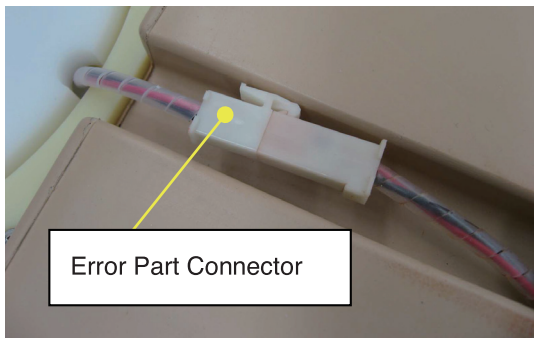


Simulated blood may leak when the connector is removed. In order to avoid dirtying the surrounding area, we recommend that you work above a tissue. Moreover, the simulated blood that is on the connector and three-way stopcock should be frequently wiped.

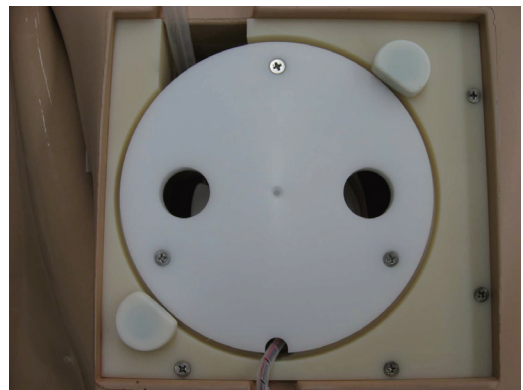
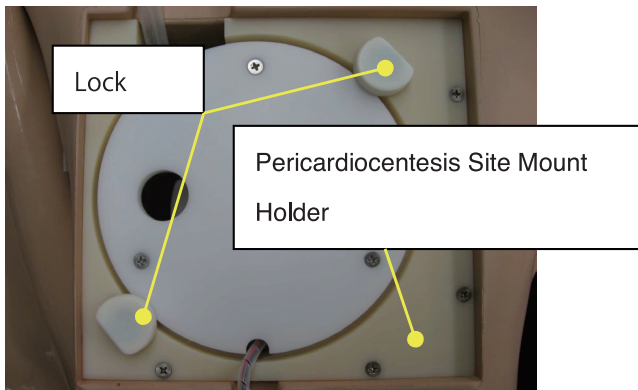
Remove the skin from the middle part of the back.



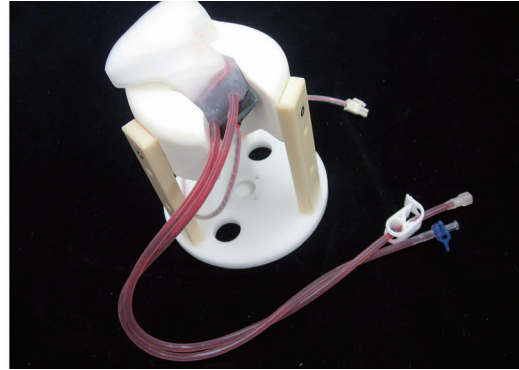
Squeeze the tab on the connector of the error part (located on the hip) and remove the connector.



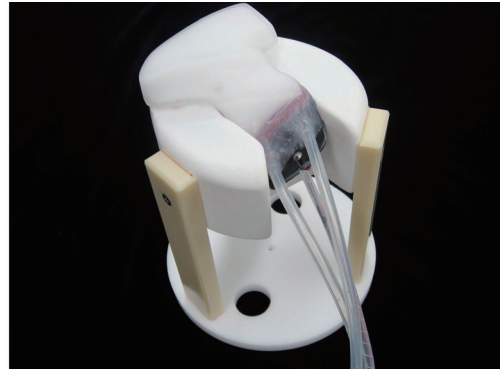
Rotate the locks on the puncture site mount holder so that their flat sides are facing inwards.



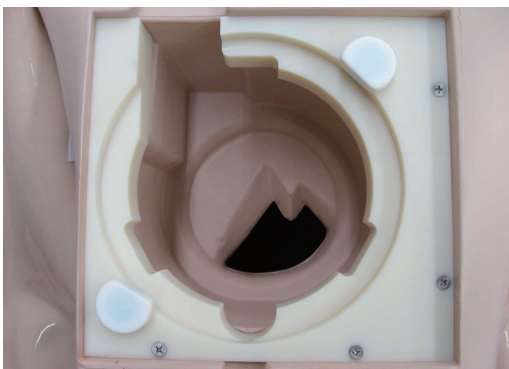
Remove the pericardiocentesis site mount from its holder.

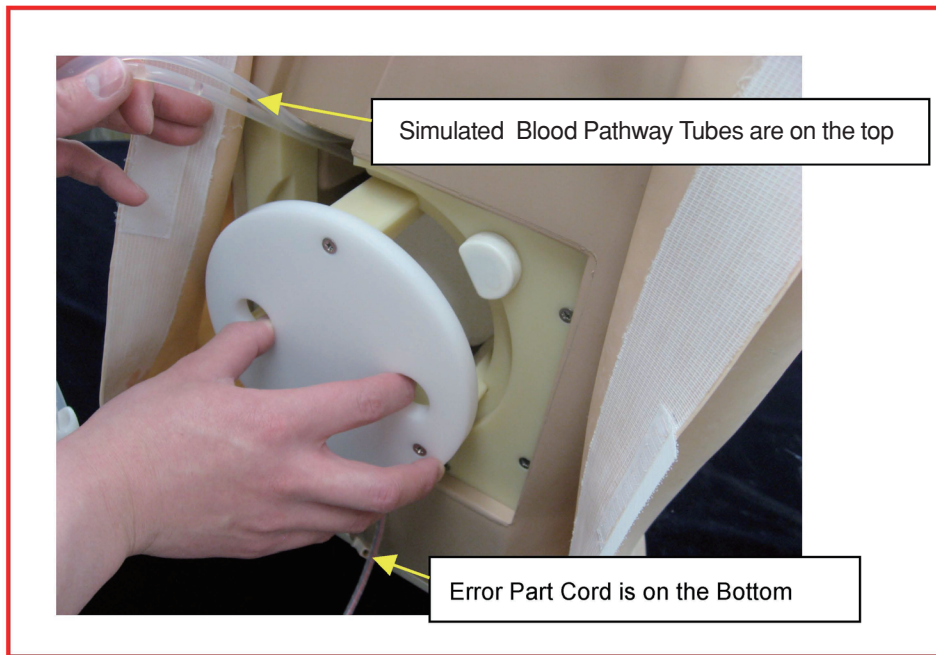


Attach the new pericardiocentesis site to the mount.

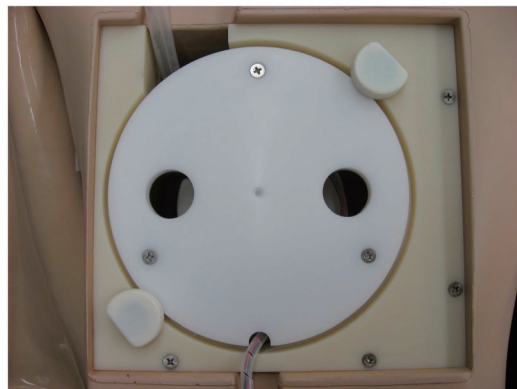
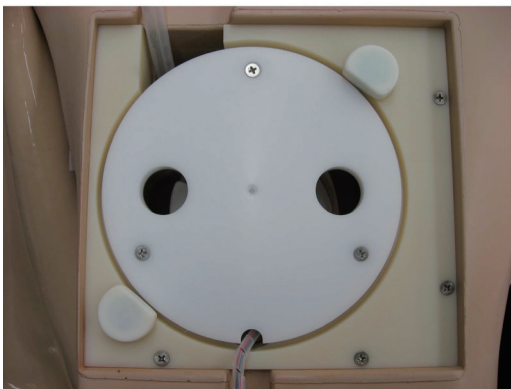


Rotate the locks on the pericardiocentesis site mount so that their flat sides are facing inwards and insert the aforementioned parts into the pericardiocentesis site mount holder.



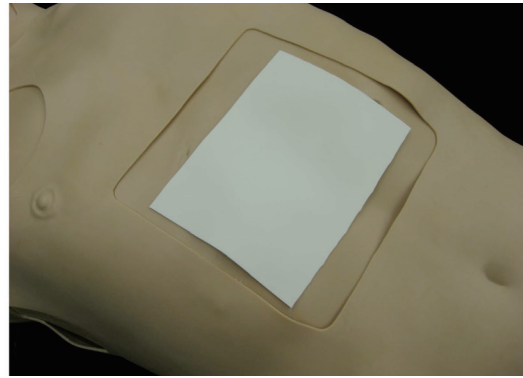
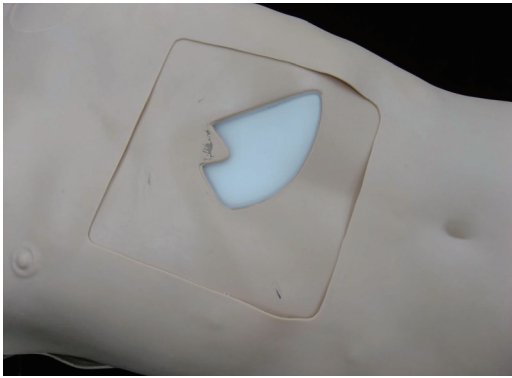


After confirming that the pericardiocentesis site is housed in its place in the chest area of the main body of the model, lock the locks of the pericardiocentesis site mount holder.

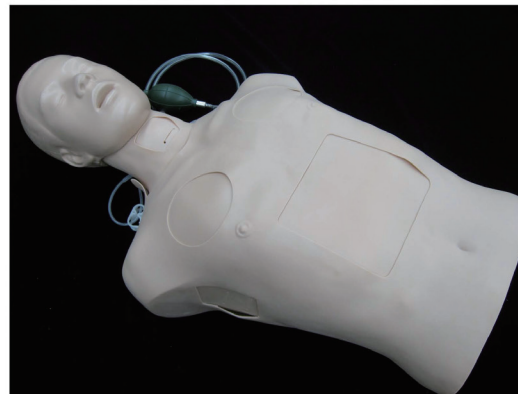


Hook up the error part connector and replace the skin of the main body while fastening the Velcro.

Place the pericardiocentesis site sponge sheet on top of the pericardiocentesis site.



Insert the pericardiocentesis site skin between the main body and its skin.



Replacement of the pericardiocentesis site is complete.

Connect the simulated blood tank and prepare for pericardiocentesis, referring to page 23, "Instructions for Use".

4. Specifications

	Length	Width	Height	Weight
Main body	Approx. 73 cm	Approx. 40 cm	Approx. 20 cm	Approx. 8 kg
Sponge Stand	Approx. 45 cm	Approx. 30 cm	Approx. 9cm	Approx. 560g

* The angle of the sponge stand is Approx.10°

5. Consumable items (Sold separately)

For Puncture of the Cricothyroid Ligament / Cricothyroid Ligament Incision	
LM-093B1	Cricothyroid Cartilage Skin (No Cut/10pcs)
LM-093B2	Cricothyroid Cartilage Skin (With Cut/5pcs)
For Thoracentesis	
LM-093CR	Thoracentesis Puncture Site (Right)
LM-093CL	Thoracentesis Puncture Site (Left)
LM-093D	Thoracentesis Puncture Skin (2 Pcs)
For Thoracic Drainage	
LM-093ER	Right Thoracic Drainage Site (With Cut)
LM-093EL	Left Thoracic Drainage Site (With Cut)
LM-093FR	Right Thoracic Drainage Site (No Cut/5pcs)
LM-093FL	Left Thoracic Drainage Site (No Cut/5pcs)
For Pericardiocentesis	
LM-093G	Pericardiocentesis Site for Thoracic Trauma
LM-093H	Skin Set for Pericardiocentesis Site for Thoracic Trauma (Pericardiocentesis Site Sponge Sheet and Pericardiocentesis Site Skin)
LM-090E	Simulated Blood (Dark Type) 500mL