SynDaver Labs

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SynDaver Synthetic Human :

Installation and Maintenance Guidelines

1. Model Quick Start Guide

- **Preparation for your SynDaver and list of included items**
- **Unpacking your SynDaver**
- **Initial treatment**
- **Removing your SynDaver from storage**

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5. Suture Removal

- **Suture removal procedure**

6. Transportation

- **Storage Container (ECS) and SSH model transportation**

7. Return Package Preparation

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SynDaver Synthetic Human Anatomy Model 101200

Quick Start Guide

SynDaver Labs' synthetic human tissues simulate real human tissue. Like open wounds, they present ideal conditions for microbial growth. Diligent care must be exercised in order to ensure the longevity of SynDaver soft tissues. Follow these simple guidelines and your SynDaver soft tissues will last for years to come.

SynDaver synthetic human tissues and body parts are manufactured from water, fibers, and salts. Synthetic humans are shipped in sealed plastic bags with water treated with the SynDaver Storage Solution (> 0.1% benzalkonium chloride).

Included with your unit:

- SSH model in body bag
- ECS case
- Procedure table with casters
- SynDaver Storage Solution (1qt) with measuring cup
- Circulation/drainage pump
- Anatomy and Physiology 1 Lab manual

Preparation for your SynDaver

Prior to your SynDaver's arrival, you will want to identify a storage area for it. The area should be minimally 6' x 4'. Your storage area should have the following:

- A designated power source (i.e. wall or floor outlet)
- Access to a water source (i.e. sink or hose)
- Access to a water drain (i.e. sink or floor drain)

Your installation tech will walk you through procedure table assembly and the unpacking of your SynDaver. If your pallet arrives before your scheduled installation, you may open the case to view the contents, but please refrain from cutting open the sealed plastic bag containing your SynDaver until the installation tech arrives.

Please refer to the "SynDaver Care and Storage Guide - Synthetic Humans" included in your shipment for regular care and maintenance of your SynDaver Synthetic Human. For information and MSDS sheets, please visit:

syndaver.com/care

Questions may be addressed to our company Customer Service Technician via info@syndaver.com.

Unpacking your SynDaver

Step 1:

Position the case lid in front of the case as shown. With two people, open the body bag and gently lift the bagged SynDaver onto the lid with two people.

Step 2:

Carry the SynDaver with lid to your procedure table. Clear your case of all materials and move it next to your table.

Step 3:

Wearing gloves, cut open the plastic shipping bag down the center, using care not to cut the soft tissues with the scissors. At the head and feet, cut perpendicular to your initial cut to fold open the bag.

You may notice a unique odor on your SynDaver after being sealed in the package with free air. The scent is no cause for concern and will be diminished by following through to the end of this instruction.

Step 4:

With two people, carefully lift the SynDaver down into the case. Use as much care as you would if you were lifting a real person to prevent tissue damage.

The plastic bag may be safely rolled up and discarded. If needed, you may drain any shipping solution safely down a sink or drain before discarding the plastic bag.

Initial Treatment

Step 1:

Before proceeding, ensure that the case drain is properly sealed.

Step 2:

Using a water hose, thoroughly rinse the SynDaver to remove any residual shipping solution while simultaneously draining with the included drainage pump.

For pump operation, please see section 4 of this guide, Pump Utilization.

Step 3:

Test the water and measure the appropriate amount of the included storage solution using the measuring cup. Add the solution to the case.

For water testing and appropriate amount of storage solution, please see section 3 of this guide, Storage Water Testing.

IMPORTANT:

The procedure table is for displaying and transporting the SynDaver only; do not fill the case on top of the table as it cannot hold the weight of the water. Please fill the case up on the ground or on a surface rated to hold at least 400 pounds.

Step 4:

Fill the case with water, agitating the storage solution for optimal distribution. You may notice a slight cloudiness in the water; this is caused by the storage solution and is no cause for concern.

Use a clean, white towel to cover and keep hydrated any floating parts of your SynDaver, including the chest and nose area. Ensure that the towel does not block the pump or water circulation.

Step 5:

Your SynDaver is now ready for storage. The pump should be operating in circulation mode during storage to ensure adequate distribution of the storage solution. You should place the lid at a slight angle for ventilation and to accommodate the pump cord.

Removing Your SynDaver from Storage

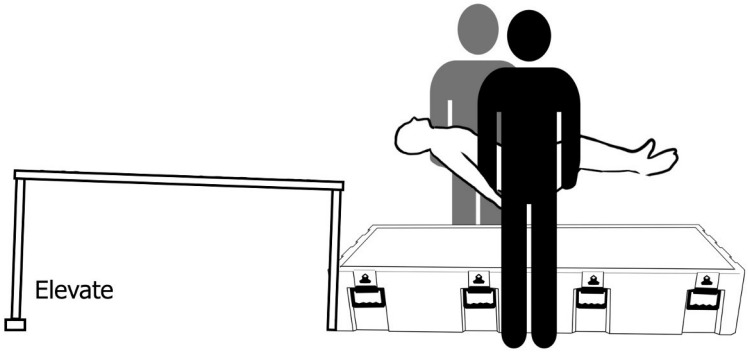
Method 1: Using the case lid

Your SynDaver will retain water when in storage. When you are ready to remove the SynDaver from storage for use, position the procedure table at the head of your green case. Place your case lid face down on the procedure table and with two people place the SynDaver inside it. The case lid will collect excess water that was retained by your SynDaver. Alternatively, you may follow the steps below.

Method 2: Directly on Table-top

Step 1:

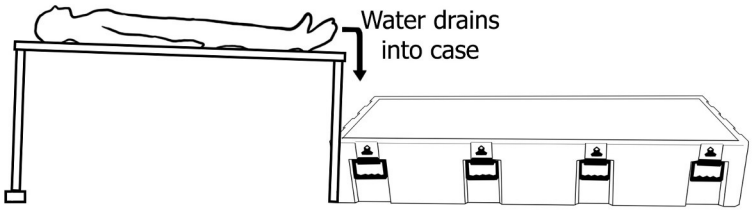
Position the procedure table at the head of your green case. Use one of your storage towels or a fresh towel to drape over the table as shown. This will help facilitate tidy drainage into your case when the SynDaver is placed on the table.



Step 2:

Use blocks to elevate the two table legs furthest from the case. If you have casters on your table, ensure all 4 brakes are engaged.

With two people, gently lift the SynDaver out of the water, allowing it to drain for a few moments before placing it on the procedure table.



Step 3:

Place the SynDaver onto the procedure table. You may use fresh towels to block water from dripping off the sides of the table. The SynDaver's arms may be positioned on top of the body as well.

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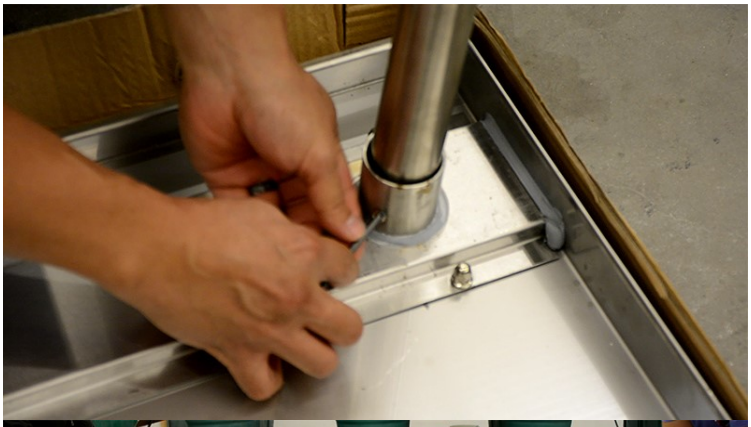
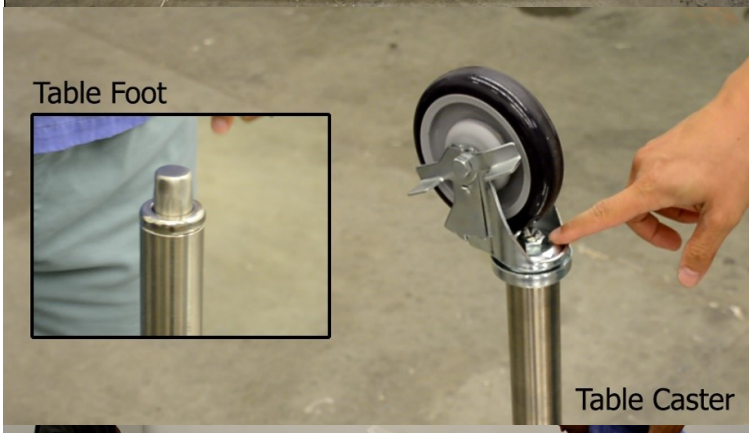
SynDaver Synthetic Human Table Assembly





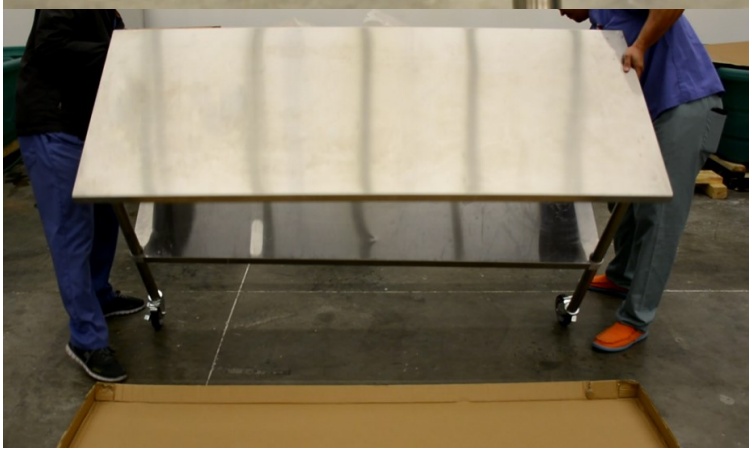


Table Assembly Procedure

Step 1:

Leaving the tabletop facedown in the box, attach each leg using the included allen wrench.

Step 2:

With two people, gently lower your shelf to the desired height. Use the same allen wrench to secure the shelf while a second person holds the shelf in place.

Step 3:

You may elect to use table feet. Install them by pressing them into the legs securely.

Alternatively, you may use the table casters for a portable table. Slide the end into the leg and twist the black base clockwise to create a tight seal. After inserting, continue to twist to create an even tighter seal. Do this for all four legs.

(Refer to next page for detail information)

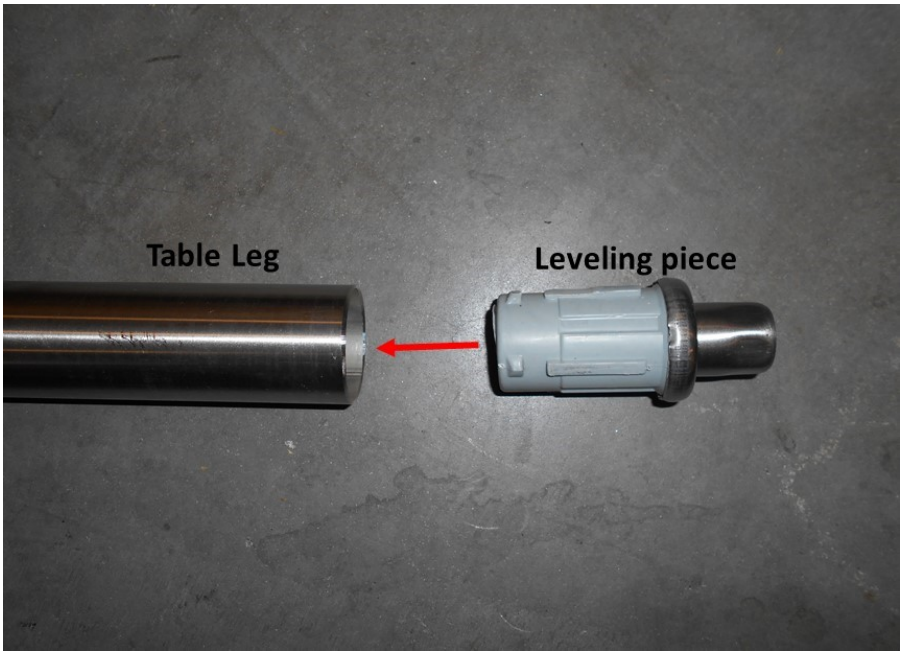
Step 4:

If you have chosen to use the table casters, ensure the brakes are engaged before turning the table upright.

SYNDAVER STAINLESS STEEL TABLES: FOOT ASSEMBLY

Tables May Be Erected as Stationary or On Casters

Stationary Table: Install leveling leg inserts

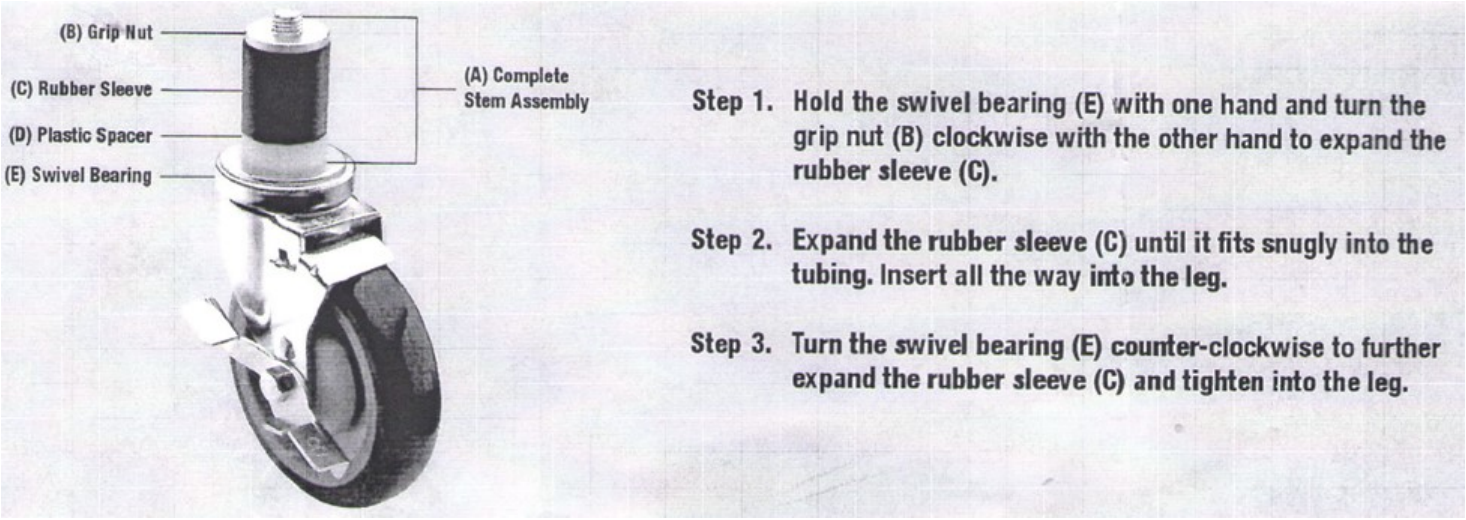


If you would like to install leveling pieces to your table, insert leveling pieces into the leg following direction of red arrow (Please refer to the image above).

*This process might take some force in order for leveling pieces to be fully inserted.

Install Casters

If you would like to install casters, please follow the step-by-step guideline below.



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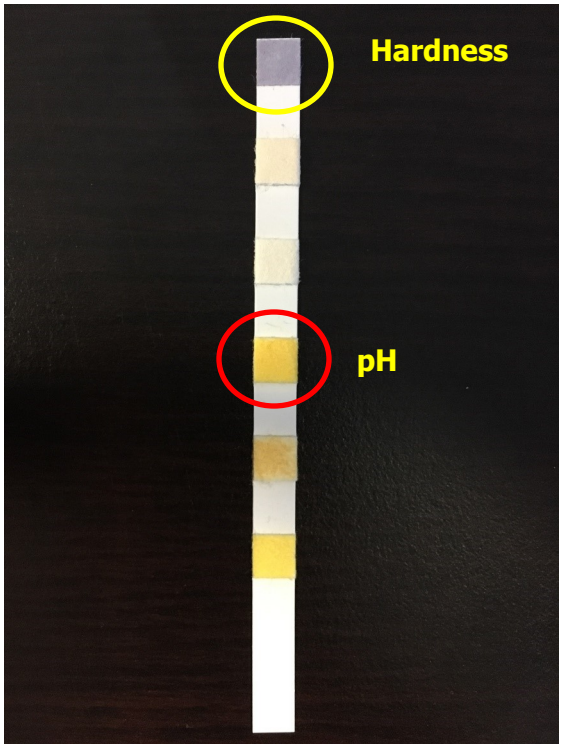
SynDaver Synthetic Human Storage Water Testing

Water Testing Procedure



Water hardness and pH can impact the effectiveness of the storage chemical. Therefore, it is important to check the hardness and pH of the storage water to determine the proper amount of storage chemical needed in the storage water.

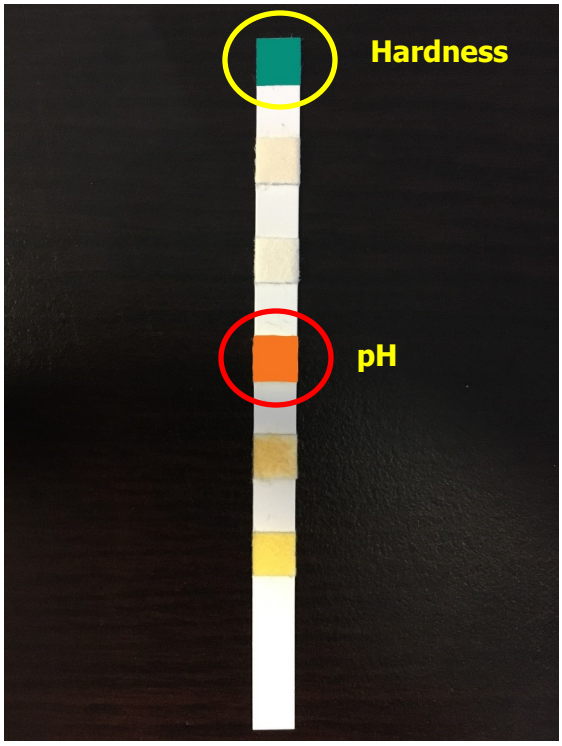
Illustrations in this section represent different conditions of storage water and water testing results.

Step 1:

Take a water strip out of the package. Make sure the strip is not damaged or missing color sections.

The first section on the top of the strip (yellow circle) will be used to test the hardness of the water.

The 4th section from the top of the strip (red circle) will be used to test the pH of the water.



Step 2 A:

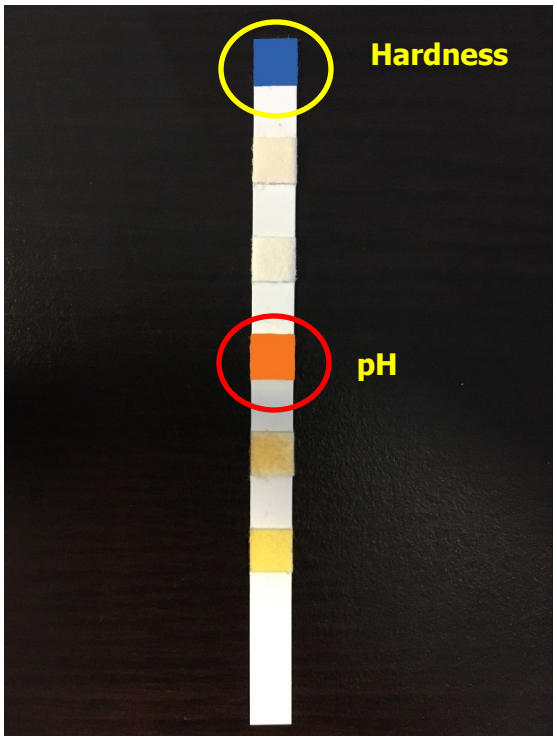
Dip the water test strip into the water until all color sections are fully immersed, then take it out.

Leave the test strip on a clean and flat surface for about 5-10 minutes to see the correct results.

If the hardness color changes to cyan/greenish, it indicates that the hardness of storage water is very low. This case does not require any additional storage solution.

The pH should be between 6.8 (light orange color) to 7.8 (orange color).

If your water test result shows these colors, you will use about 15 mL of storage solution.



Step 2B:

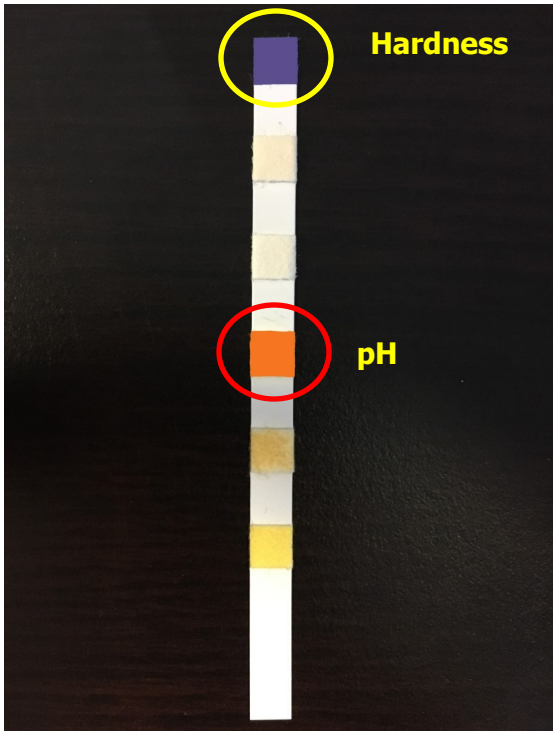
Dip the water test strip into the water until all color sections are fully immersed, then take it out.

Leave the test strip on the clean and flat surface for about 5-10 minutes to see the correct results.

If the hardness color changes to blue/navy blue, it indicates that the hardness of storage water is low to OK. This case does not require any additional storage solution.

The pH should be between 6.8 (light orange color) to 7.8 (orange color).

If your water test result shows these colors, you will use about 15 mL of storage solution.



Step 2C:

Dip the water test strip into the water until all color sections are fully immersed, then take it out.

Leave the test strip on the clean and flat surface for about 5-10 minutes to see the correct results.

If the hardness color changes to purple, it indicates that the hardness of storage water is very high. This case requires additional storage solution.

The pH should be between 6.8 (light orange color) to 7.8 (orange color).

If your water test result shows these colors, you will need to use additional 15 to 25 mL of storage solution.

If the storage water is too hard for the storage solution to mix in properly, you may need to install a water softener or filter to reduce the hardness of the water

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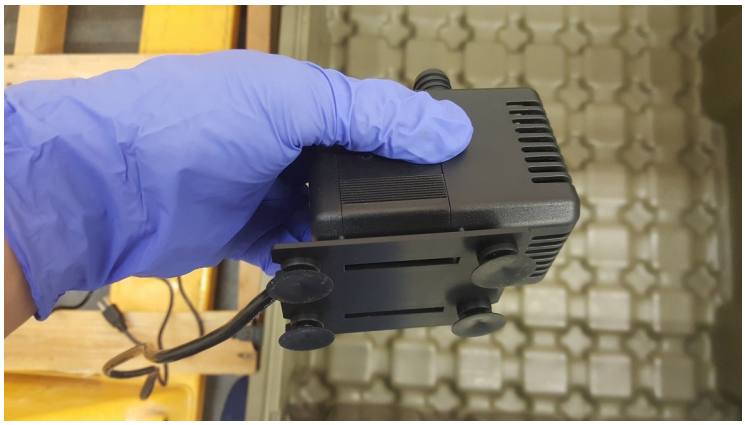
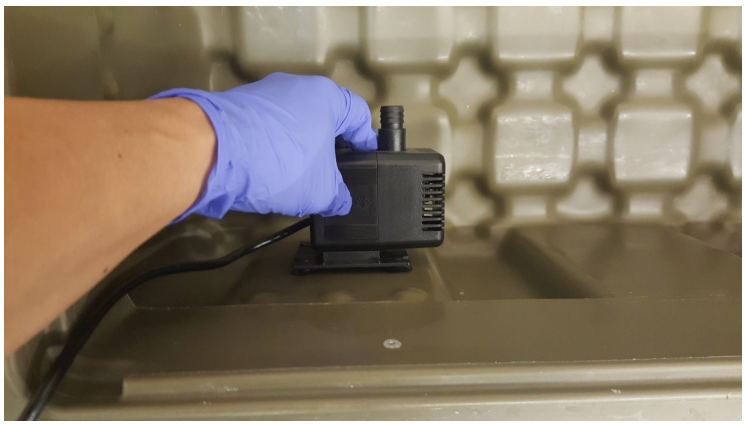
SynDaver Synthetic Human Pump Utilization



Circulation Pump Installation

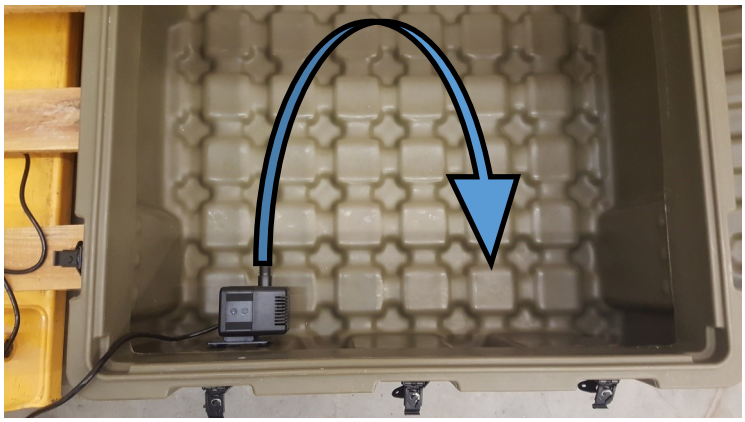
Step 1:

Make sure to obtain fully submersible circulation pump with minimum flow rate of 290 gallons/hour (1100 liters/hour) and maximum flow rate of 500 gallons/hour (1900 liters/hour). Plug in the power cord of the circulation pump into a grounded socket



Step 2.

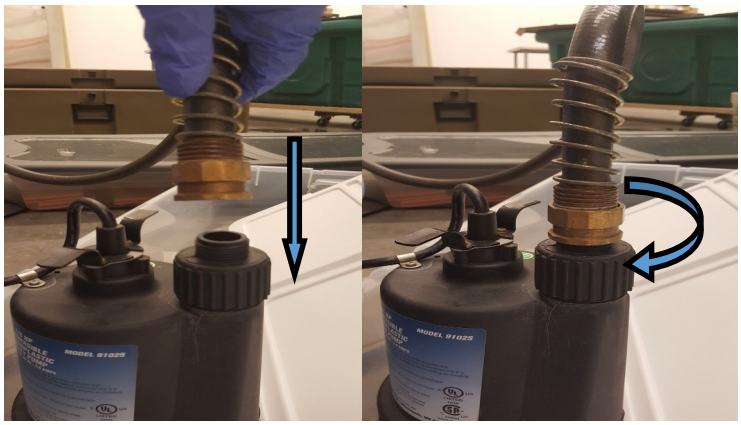
Place the circulation pump on the side wall of the storage container using suction cups. Place the opening toward the center of the ECS case, so it will create the most disturbance in water. Fill the ECS case with water and storage chemical.



Step 3.

Plug in the power cord of the circulation pump. Allow the water to circulate.

Drainage Pump Installation



Step 1:

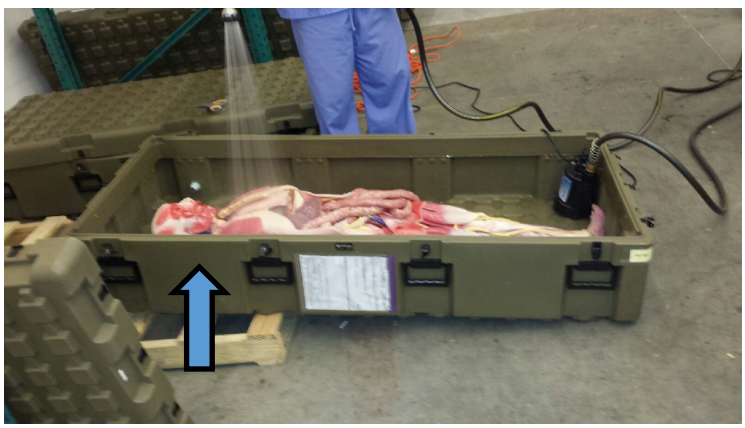
Unplug the circulation pump and place it aside. Connect one end of the drainage hose to the drainage pump opening.

Step 2:

Place the drainage pump at the corner of the storage container.

Step 3:

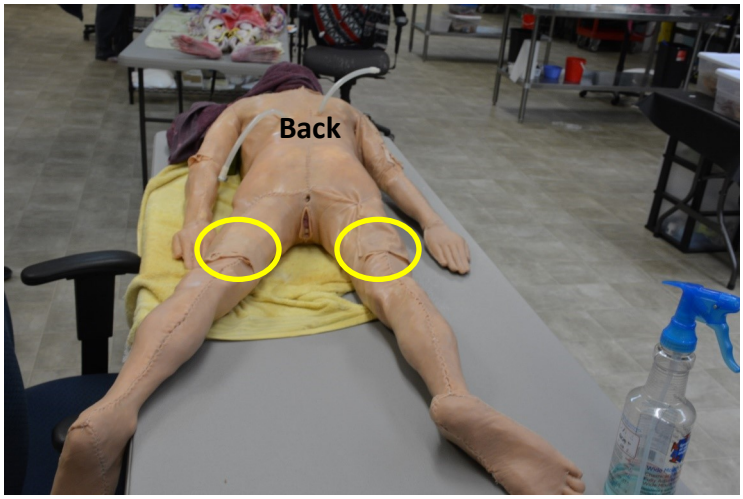
Place the other end of the drainage hose in a sink or wherever you plan to drain the water. Plug in the power cord of the drainage pump. Allow the water to drain.



Step 4:

When the storage water is almost drained, elevate one end (away from the drainage pump) of the ECS case for better draining. Continuously rinse off the body for about 5 minutes. Let the rinsed water drain as much as you can. Take the drainage pump out and store away. Place the tank on a flat surface. Fill the tank back up with clean water and storage chemical.

Irrigation Pump Installation

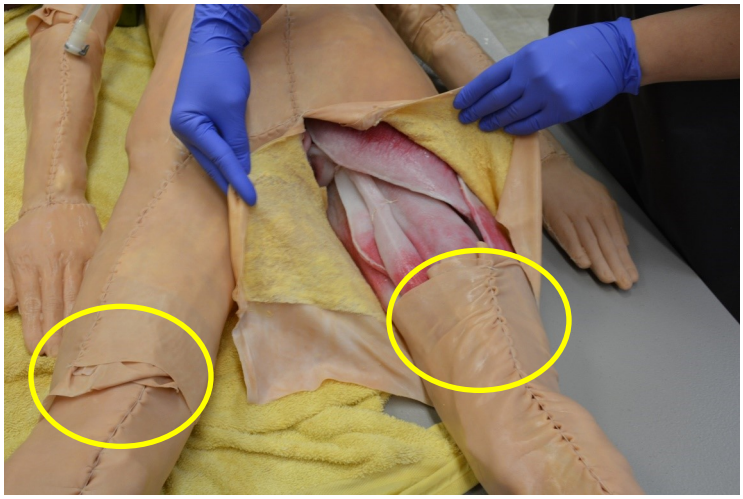


Skins on surgical and patient models could limit circulation of the storage solution inside the SSH. Therefore, surgical and patient models require an irrigation system which promotes circulation of the storage solution inside the SSH.

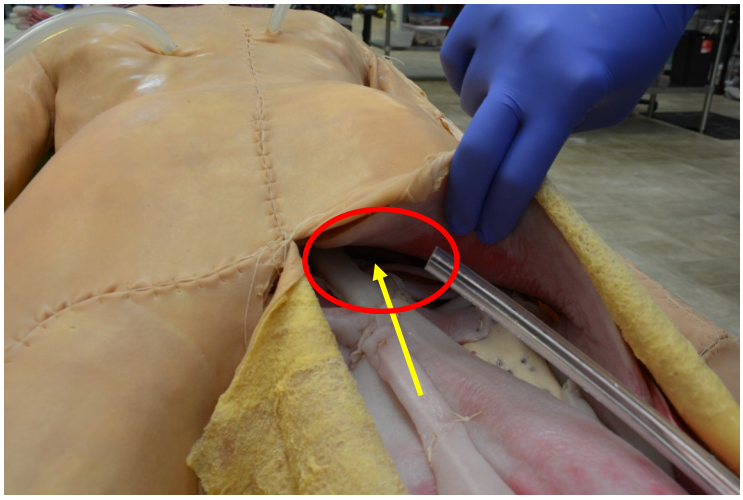
Step 1.

Place the SSH model face down as shown in the picture. Possible access points are in back of the leg (yellow circles).

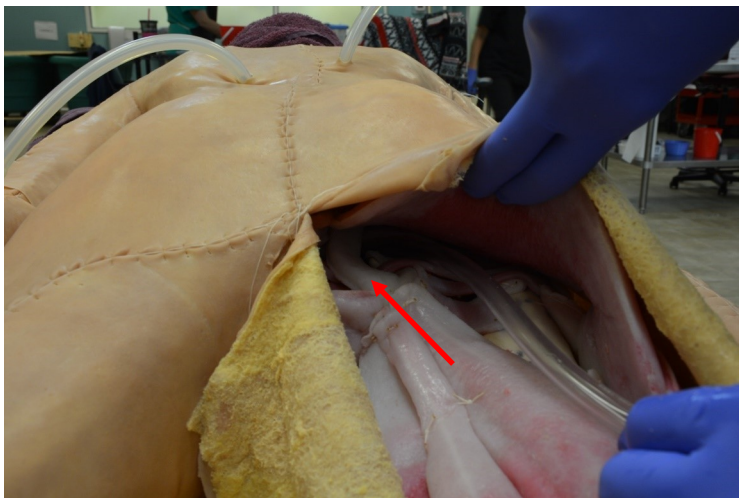
*Irrigation system installation is more convenient to perform in the storage container with water.



The skin on the back of the right leg is un-sutured to provide better visible guidance to the point of insertion of the irrigation hose. The irrigation process itself does not require suture removal.



There is an area (red circle) below the gluteus maximus muscle where the irrigation hose will be inserted.

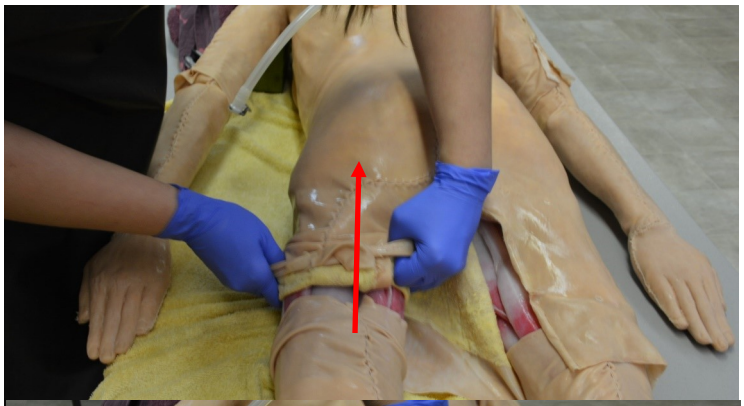


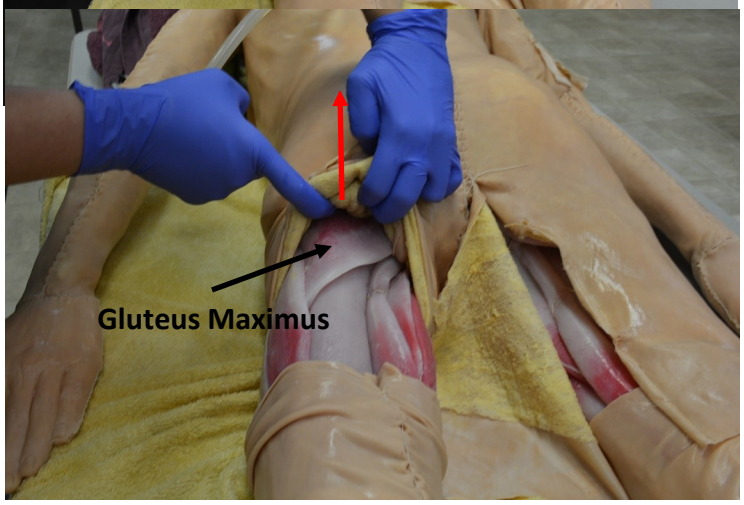
Insert the irrigation hose into the area. Do not force it. As it may damage the surrounding soft tissues.

Step 2.

If you are installing the irrigation system outside of the storage container, lubricate the skin by spraying water onto the surface.

Installing the irrigation system in the storage solution does not require this step.

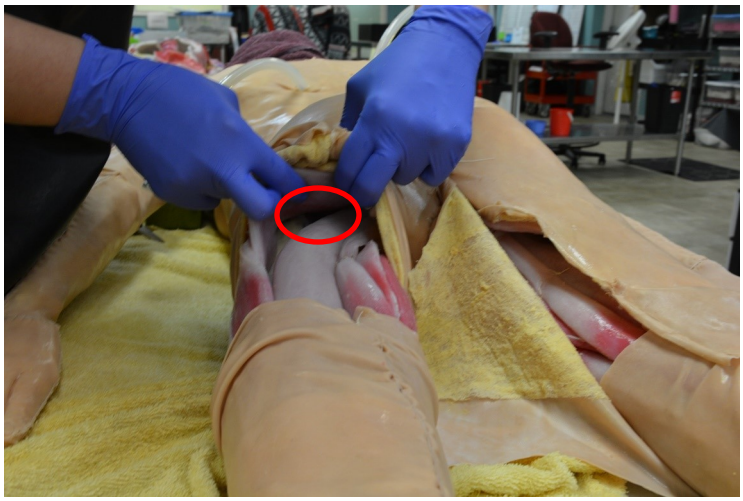




Step 3.

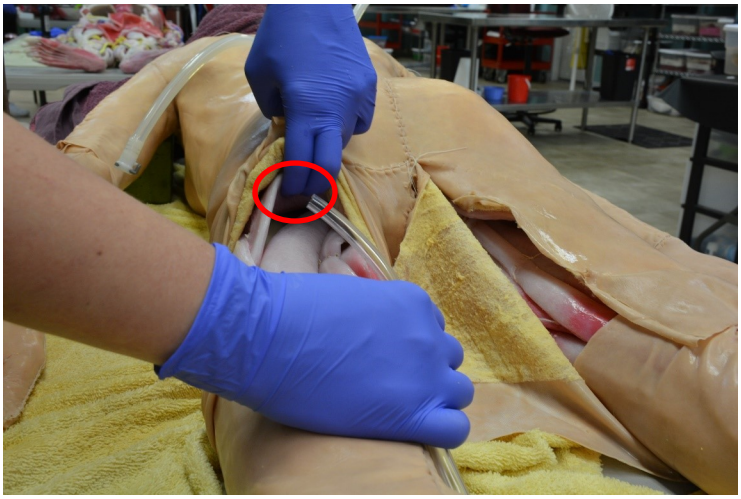
Roll the skin up towards the gluteus maximus.

Continuously roll the skin up until you can see the gluteus maximus.



Step 4.

Lift the gluteus maximus to locate the irrigation hose access.



Step 5.

Use one hand to hold the gluteus maximus muscle up and use another hand to feed the irrigation hose.

Step 6.

Insert the irrigation hose. Do not force it. Too much force might damage the surrounding soft tissues.

Roll the skin back down

Insert the exposed end of irrigation hose to the circulation pump to start the irrigation of the storage solution.

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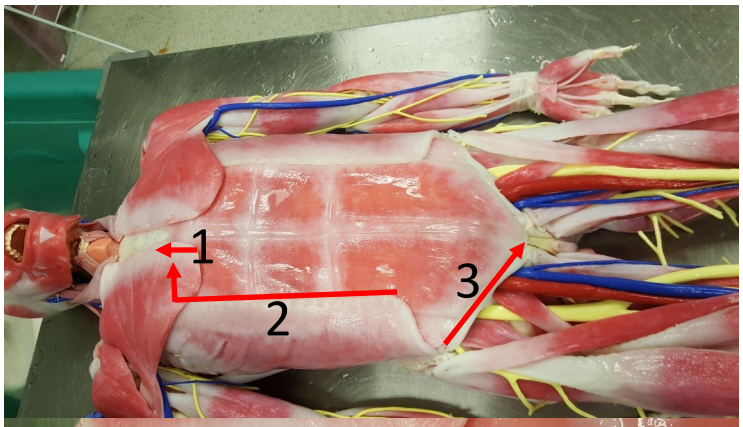
SynDaver Synthetic Human

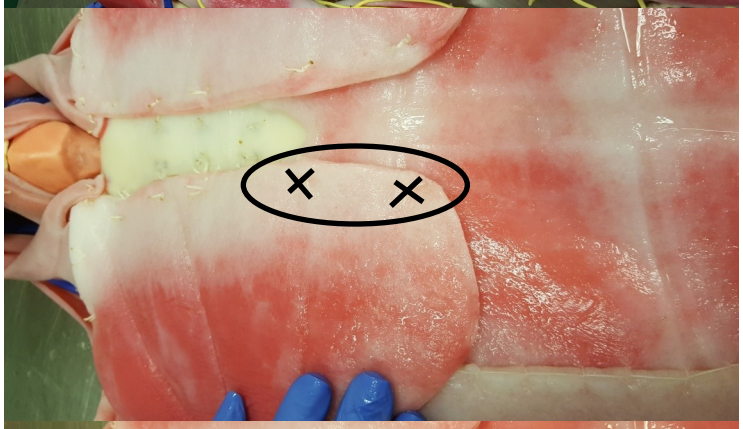


Suture Removal Procedure

Once the SSH model is received, it is recommended to open up the abdominal muscle to have access to internal organs.

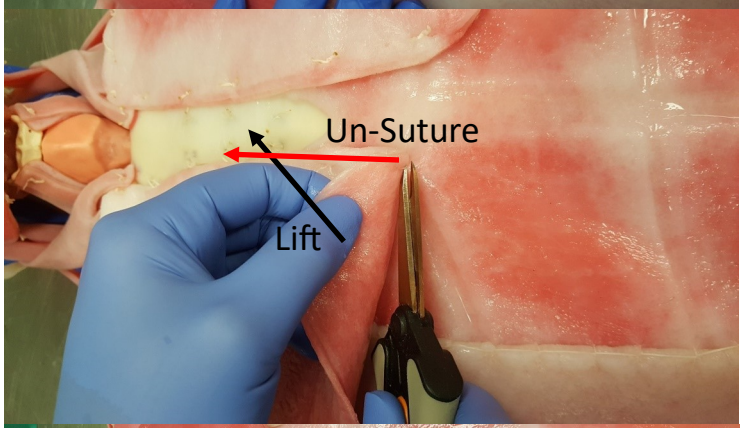
The numbers and the red arrows indicate where and in what order suture removal is performed.

***Gloves must be worn at all times while handling your SSH. This is to protect your product from microbial contamination.**



Step 1: Pectoralis Major Muscle Suture Removal

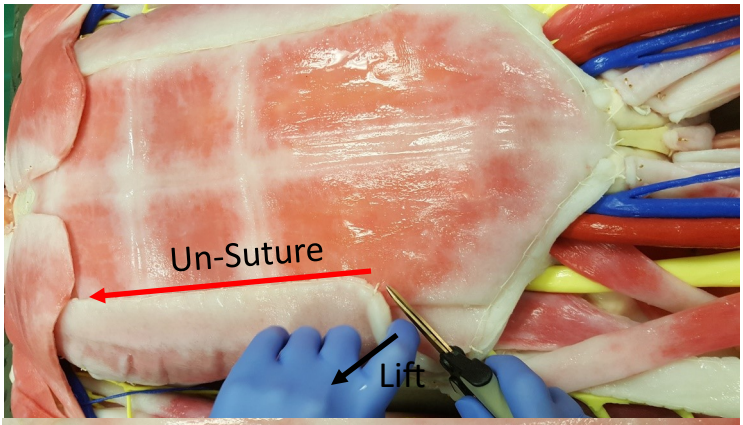
A. Locate the sutures (indicated by a circle) on the right pectoralis major muscle.



B. Lift and pull lower part of the pectoralis major muscle towards sternum and expose the strings beneath the muscle.

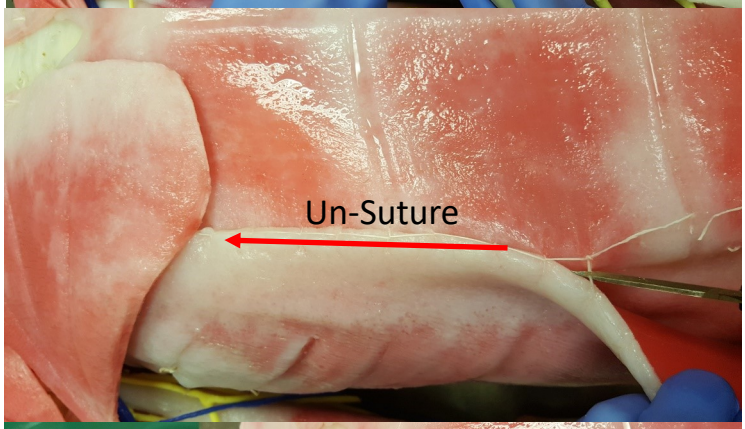
Cut the string.

C. Once first two strings are removed, the entire right side of the abdominal muscle is now accessible.

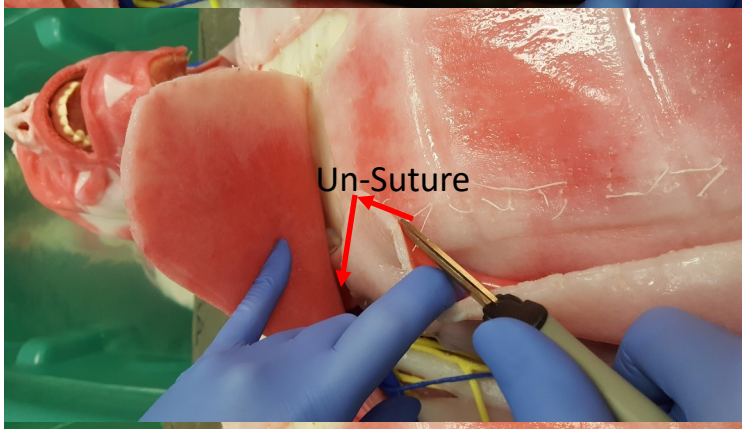


Step 2: Abdominal Muscle Suture Removal

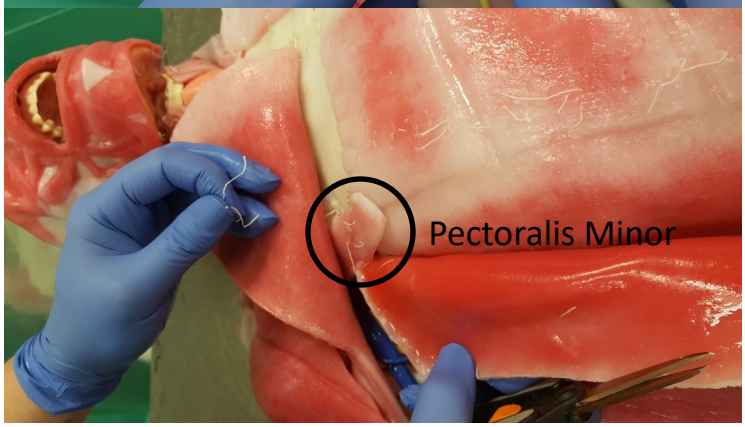
A. Lift lower portion of the external oblique and cut the string.



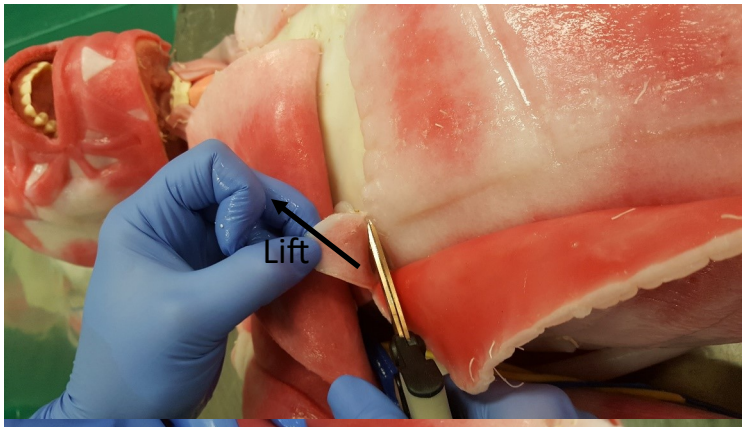
B. Cut the strings that connect external oblique and rectus abdominis toward the pectoralis major.



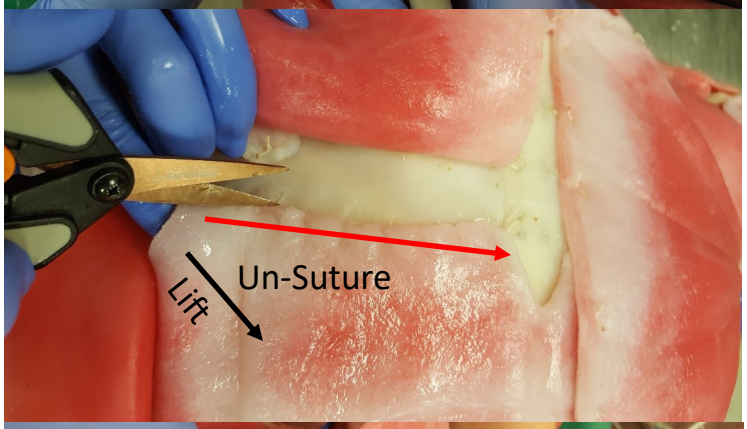
C. Lift pectoralis major muscle and continuously cut off the strings holding rectus abdominis and external oblique muscle.



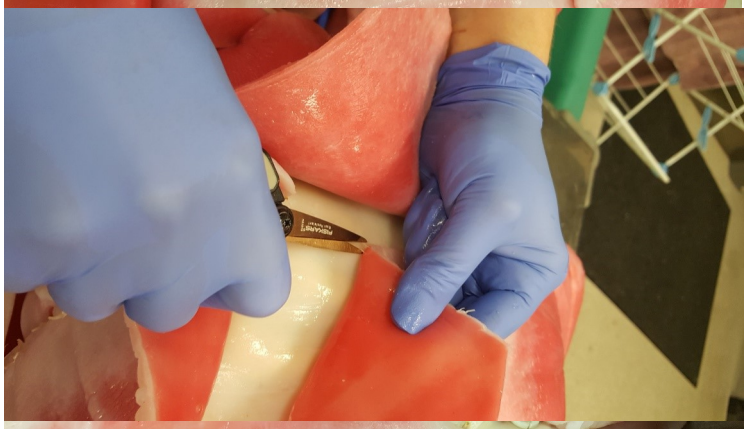
D. Once the external oblique muscle is un-sutured, the lower portion of the pectoralis minor should be un-sutured.



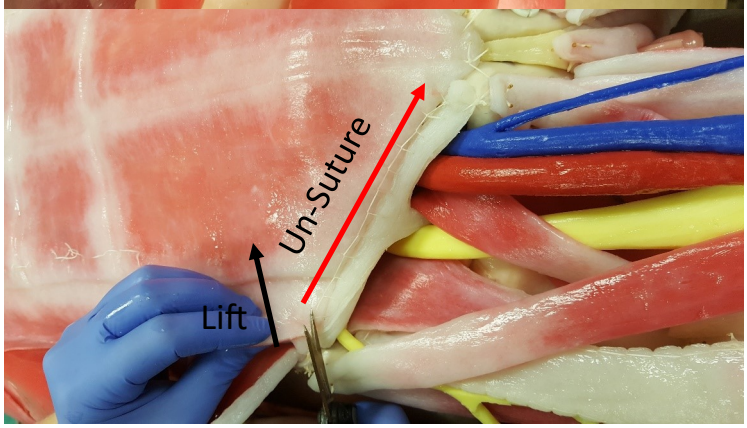
E. Lift pectoralis minor and cut the strings to have access to the rest of the rectus abdominis.



F. Lift rectus abdominis and cut the string that connects the rectus abdominis to the fasciae on rib cage.

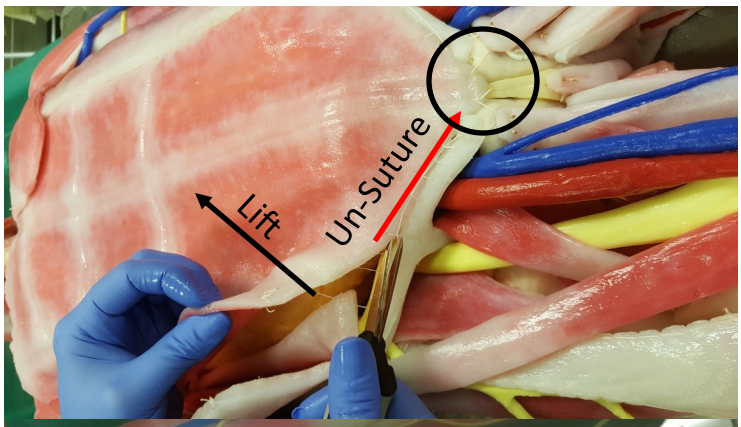


G. Continuously cut the strings towards the sternum.

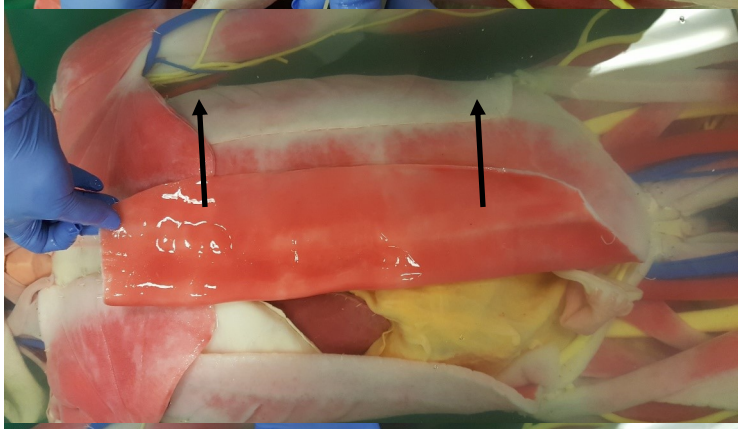


H. Once top portion of the rectus abdominis is un-sutured, approach the sutures between the rectus abdominis and Inguinal ligament.

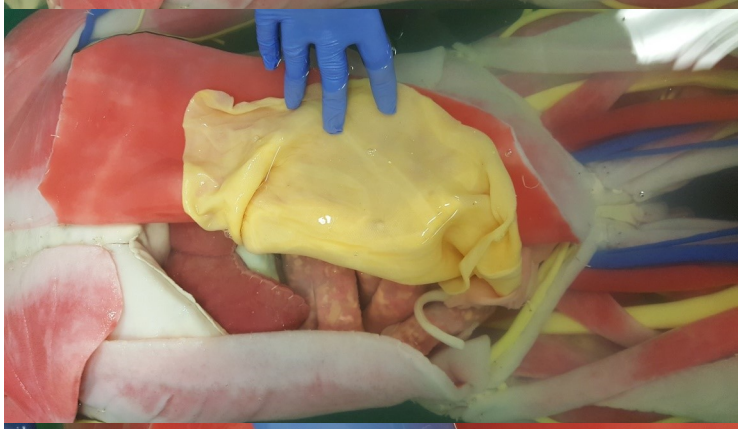
Lift lateral side of the rectus abdominis and cut the string that connects rectus abdominis and inguinal ligament.



I. Lift rectus abdominis and continuously cut the strings to pubic tubercle or pubic symphysis area (circled).

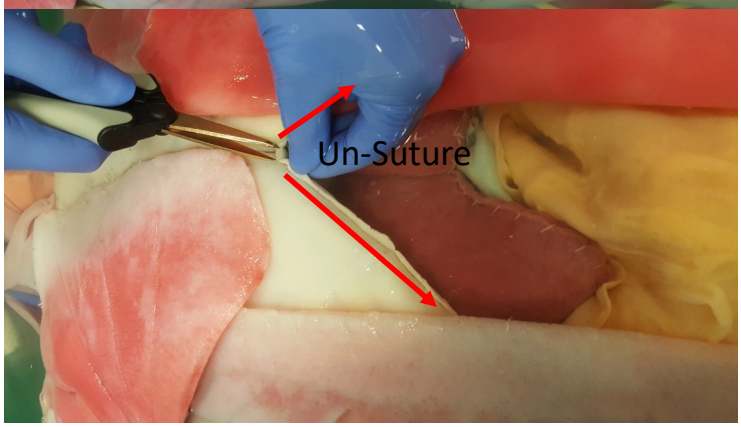


J. Pull rectus abdominis away from un-sutured area.



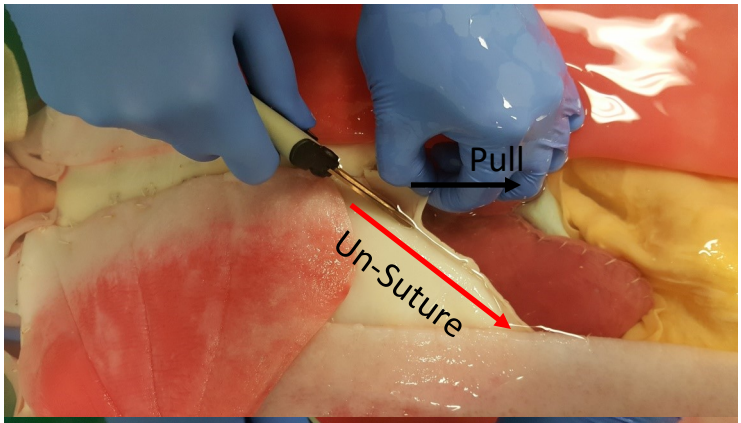
Step 3: Midsection Organs

Pull omentum to the side. You can explore all the organs located in the midsection of the body.

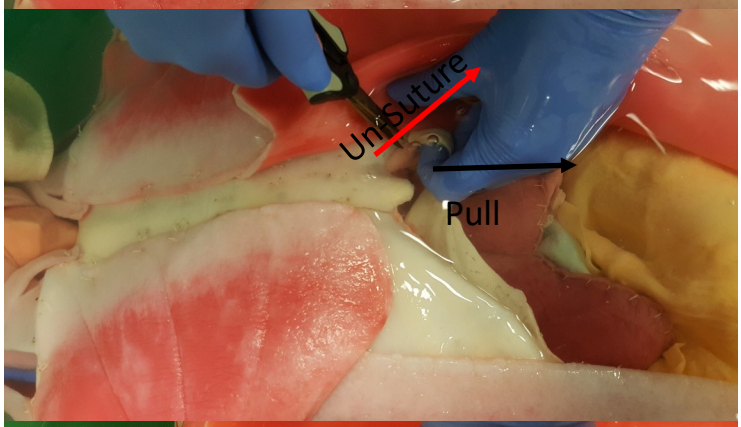


Step 4: Diaphragm Suture Removal

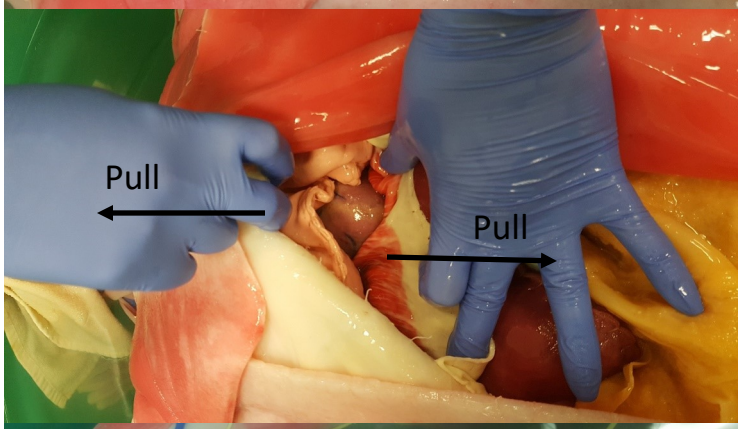
A. Cut the strings connecting the diaphragm and fasciae on rib cage.



B. Pull the diaphragm and continuously cut the strings as far as you can to the lower part of the rib cage (red arrow)

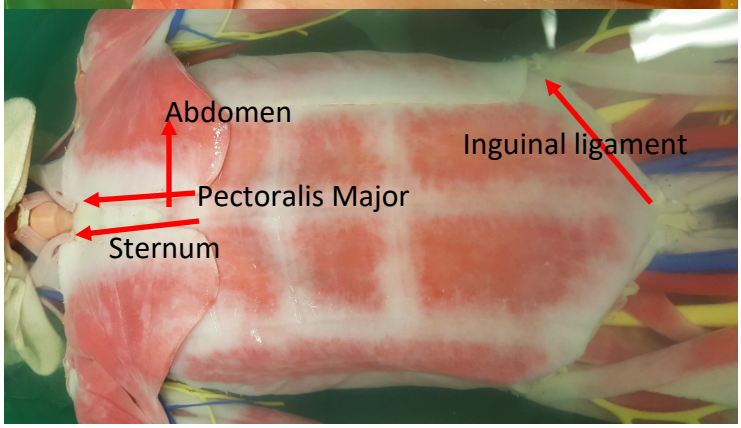


C. Un-suture the other side of diaphragm. Pull the diaphragm down towards the lower portion of the body and continuously un-suture as far as you can.



Step 5: Heart and Lungs

Once the portion of the diaphragm is un-sutured, the heart and lung can be explored.



Step 6: Other Suture Removal

Other parts of the SSH model can be un-sutured to have full exposure of the internal organs. You may follow the same un-suture process on the other side of inguinal ligament, pectoralis major, and abdomen area. The sternum can be un-sutured to have better exposure of heart and lungs.

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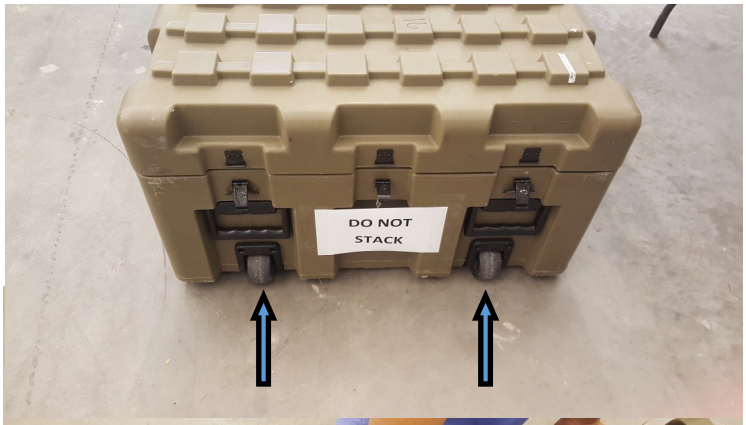
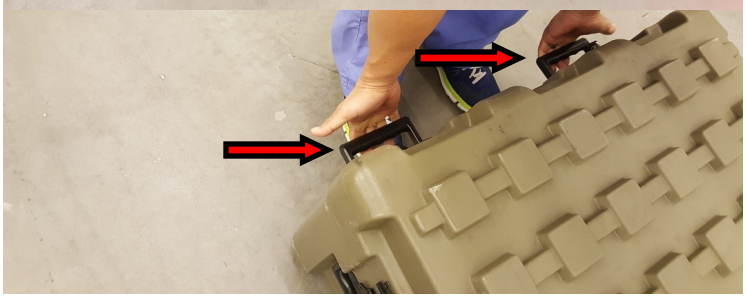
SynDaver Synthetic Human Transportation





Storage Container and SSH Model Transportation

The storage container has a set of wheels for easier transportation of the SSH unit.

Step 1:

Locate the side where the wheels are (blue arrows)

Step 2:

Locate the handles that are located the opposite side of the wheels (red arrows)

Step 3:

Lift the storage container using the handles located the opposite side of the wheels (blue arrow indicates where the wheels are). Now, you can transfer the storage container to desired area.

Step 4:

Once you place the storage container on the floor, you can open the lid and take the SSH model out of the container. It will be easier to operate with two people. One person holds by the underarms (indicated by yellow circles) while another person holds under the knees (indicated by black circle).

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SynDaver Synthetic Human

Return Package Preparation

Required Materials

- Pallet (78" x 36")
- Storage container
- Peanut bags
- Body bags
- Straps
- Plastic buckles
- Plastic bag

Step 1.

Place the pallet on the floor.

Step 2.

Place the Storage container on top of the pallet.

Step 3.

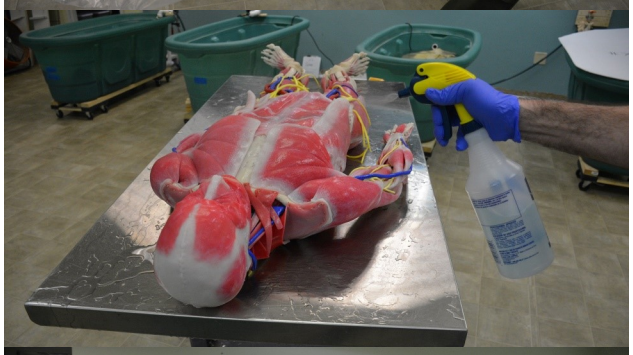
Place the peanut bag inside of the storage container.

Step 5.

Place the black body bag on top of the peanut bag.

Step 6.

Cuff up the plastic bag and spray water inside. It will help to place the body inside the bag.



Step 7.

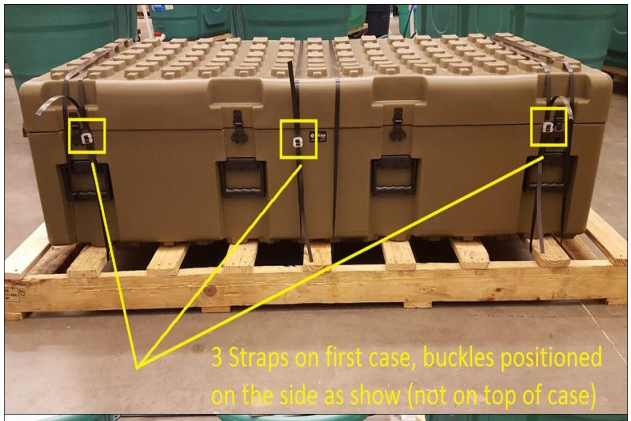
Spray water around the body. It will help to place the body inside the bag.

Step 8.

Place the body inside the plastic bag.

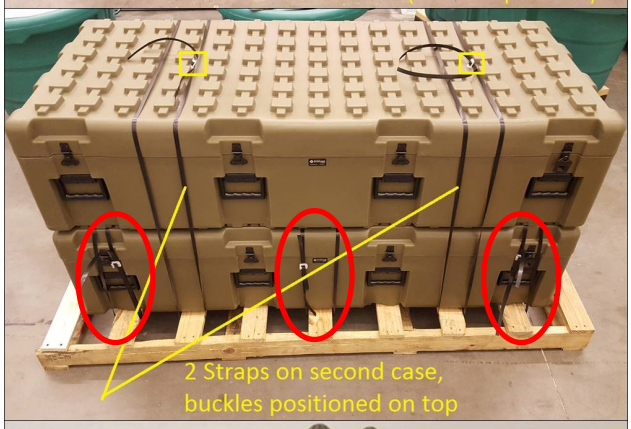
Step 9.

Zip tie open end of the bag.



Step 10.

Strap down the storage container to the pallet. It is recommended to have 3 straps at the position shown in the image.



Step 11. (This step applies only if customer has 2 storage container)

If you have two storage containers, you can stack 2 storage containers on one pallet. Stacking 2 storage containers will require 2 more straps at the position shown in the image. So, the first storage container has 3 straps (red circle) and the second storage container has 2 extra straps (yellow lines).

* Image on the left shows how to loop the straps to the plastic buckle.