



# TraumaMan<sup>®</sup> v.5

**Instructional & User Guide**

# Table of Contents

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## About TraumaMan®

- » System Features ..... 2
- » TraumaMan Procedures ..... 3

## System Overview

- » System Overview ..... 4
- » Maintenance Kit ..... 8

## System Preparation

- » Procedural Air Responses ..... 8
- » Quick Setup ..... 9

## System Procedures

- » Cricothyroidotomy & Trach ..... 11
- » Chest Tube ..... 13
- » Needle Decompression ..... 15

## System Procedures (cont..)

- » Pericardiocentesis ..... 14
- » IV Cutdown ..... 15
- » Optional DPL Subsystem ..... 16

## Extendable System

- » Airway Station Solutions ..... 25
- » Adjunct Station Solutions ..... 26
- » Surgical Team Training ..... 27

# About the **TraumaMan**<sup>®</sup> System

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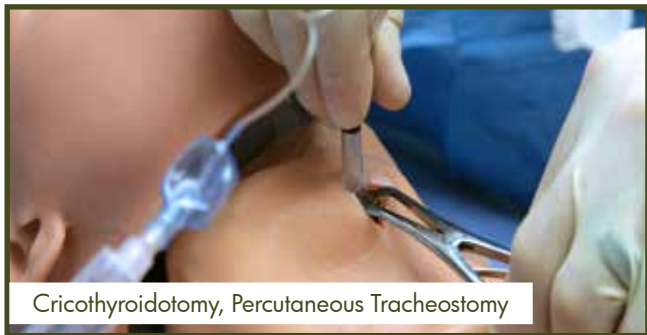
The TraumaMan System has been designed to allow students to practice advanced surgical procedures including needle and surgical cricothyroidotomy, percutaneous tracheostomy, bilateral needle decompression, diagnostic peritoneal lavage, and intravenous cutdown. This trauma simulator bleeds and breathes like a human providing an immersive experience from incisions to suturing.

The replaceable tissue sets offer a first-cut procedural experience for each student. TraumaMan is designed to allow easy rotation of groups of 4 learners.

The TraumaMan System is an extendable surgical platform with an ever-growing list of additional modules that allow instructors and students to explore a wide variety of procedures under realistic settings as well as build communication and trauma team experience.



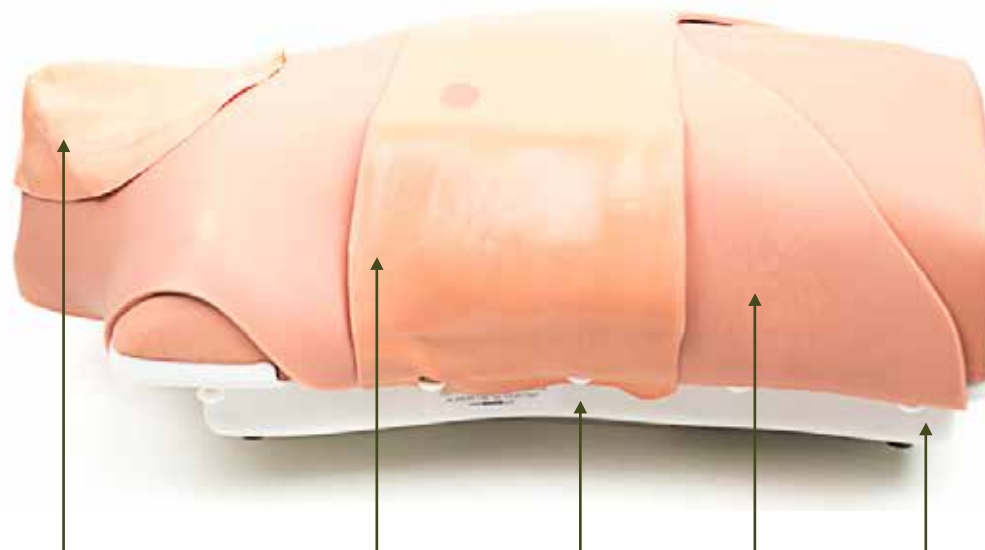
# Procedures



*Optional TraumaMan® subsystems include Diagnostic Peritoneal Lavage and IV Cutdown.*

# System Overview

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Neck Tissue

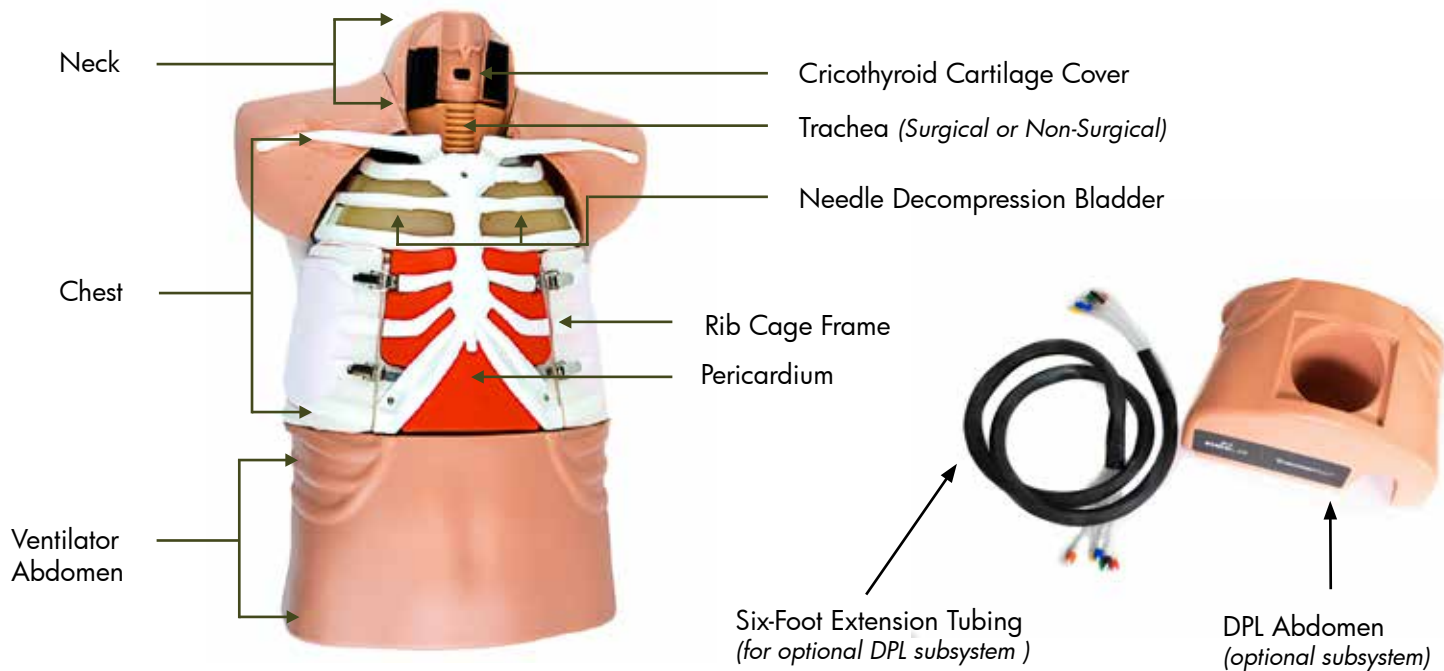
Chest Tissue

Button Anchors

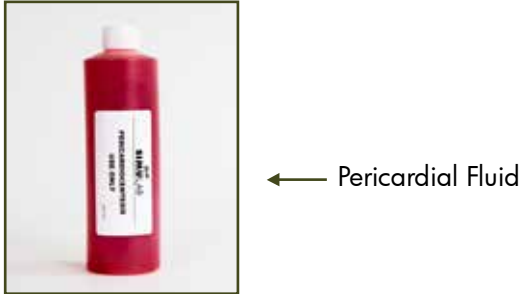
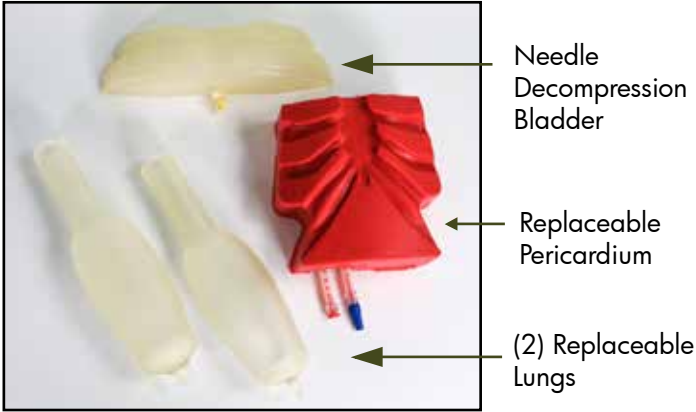
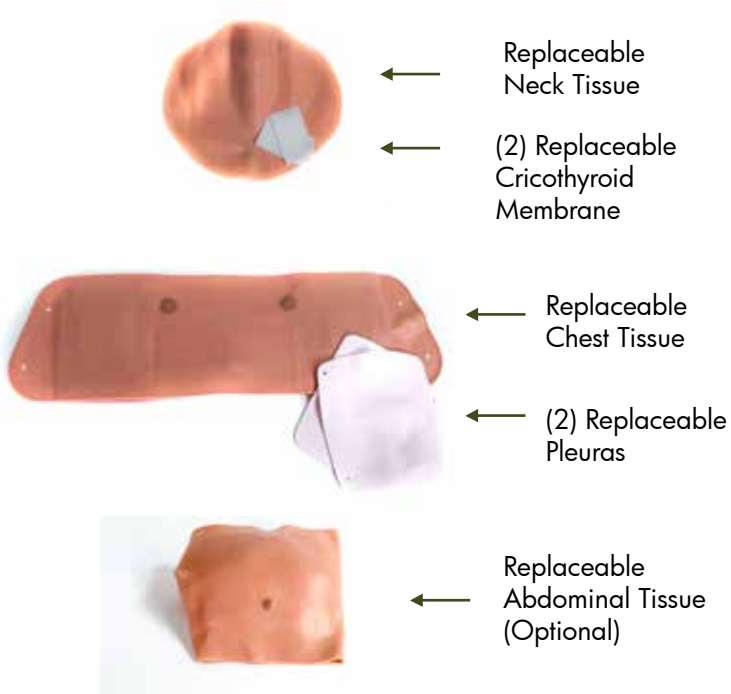
Torso Skin

Torso Tray

# System Overview



# System Overview



# System Overview





# Maintenance Kit Components



Water-based  
Lubricating Gel



7/64" Hex Driver



(2) Black Thumb Screws



(12) Replacement  
Screws

Red Concentrate



Skin Conditioning  
Powder



(2) 60 ml Syringe

# Procedural Air Responses

*The TraumaMan System is an anatomically correct surgical simulator incorporating breathing and pathological pressures that closely mimics the human trauma patient.*

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## Neck

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- » The **Neck** provides airflow in the larynx during **Cricothyriodotomy** and **Percutaneous Tracheostomy** to replicate a patient breathing and can also be used with simulated blood or water to create a more realistic scenario.

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## Chest

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- » The **Chest Cavity** is pressurized for a realistic experience during **Needle Decompression** and **Chest Tube Insertion** and the lungs will engage once the Pleura has been penetrated.

**Needle Decompression** has air pressure in the 2nd Intercostal space at the midclavicular (2ICS-MCL), and at the 4th and 5th intercostal space at the anterior axillary (4/5ICS-AAL).

- » The 2ICS-MCL is an enclosed bladder that can withstand over 50 incisions bilaterally before being replaced.
  - » The 4/5ICS-AAL is supported by a replaceable pleura that can withstand multiple needle insertions. Once the pleura has been compromised during CTI it must be replaced to create positive pressure for Needle Decompressions in the 4/5ICS-AAL.
- » **Chest Tube Procedure** is set up for two (2) students per side; and the first cut on each side will release the pressure in the Chest Cavity and engage the lungs. Air pressure is reduced on the second cut.

# Quick Setup

*The TraumaMan System is shipped with a surgical trachea, pre-filled Pericardiocentesis bladder, replaceable cricothyroid membrane and pleuras, optional DPL module and optional IV cutdown module.*

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- 1 If performing the DPL Procedure see page 19 for instructions on connecting the DPL module.
- 2 Lubricate the cricothyroid membrane and pleuras with water-based gel found in the Maintenance Kit.
- 3 Lay the neck tissue over the neck and secure the Velcro on both sides.
- 4 Lay the chest tissue over the torso skin by matching up the nipples on both skins and attach to the button anchors.
- 5 Connect the TraumaMan to wall power or optional battery power.
- 6 **Turn the power switch on, and the system is now ready to train a four-student rotation.**
- 7 For further instructions on tissue usage see page 23.
  - » If using bleeding tissues, check tissues for optimal fluid level. (Page 21)

# Cricothyroidotomy / Percutaneous Tracheostomy

(Needle or Surgical)

- » The replaceable neck tissue is designed for unlimited needle procedures and **two** surgical procedures.
- » Cartilage landmarks are pronounced for instructional purposes.
- » The cricothyroid membrane is designed for surgical dissection.
- » For procedural integrity, **replace** the membrane after each surgical dissection.
- » A size 6 endotracheal tube is recommended.
- » To assist in locating the trachea; the cricoid cartilage and thyroid cartilage are prominent, and the rings of the trachea can be palpated.
- » Lubricate the inside and outside of the trachea if you have difficulty inserting the tube.
- » For increased realism when surgically dissecting the tissue layers, place one drop of the simulated blood concentrate on the lubricated cricothyroid membrane and add 2cc's of water in the trachea with a syringe.

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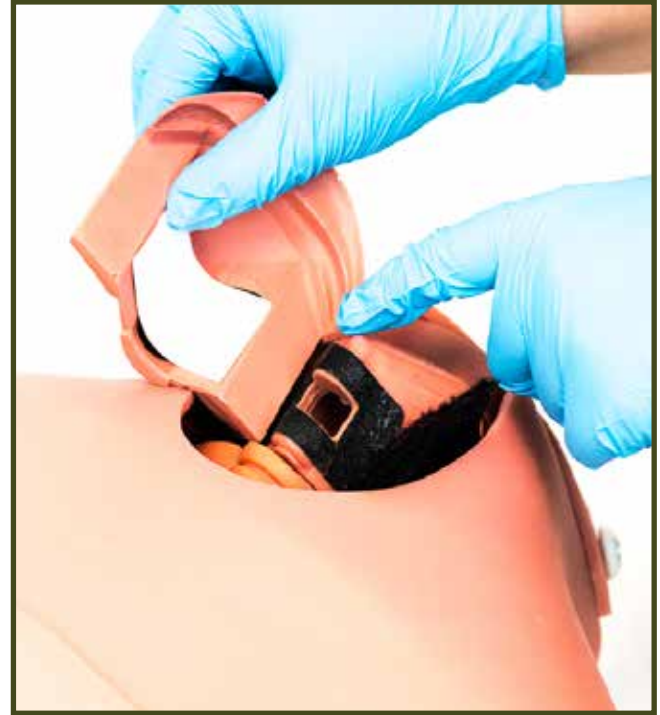
## Change Cric Membrane Between Students

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- » Remove the neck tissue. Open the cricothyroid cover by releasing one side of the Velcro straps.
- » Place a new membrane over the opening, close the cricothyroid cover, and secure the Velcro strap.
- » Apply the supplied lubricating gel to the cricothyroid cartilage and membrane.
- » Attach the neck tissue by aligning the Velcro on the tissue and the cricothyroid cover.
- » For the second procedure, shift the neck tissue slightly higher on the neck and replace cricothyroid membrane so an uncut area can be used.
- » After two procedures, replace neck tissue and replace cricothyroid membrane. Line up the Velcro, and secure.

# Cricothyroidotomy / Percutaneous Tracheostomy

*(Needle or Surgical)*



# Chest Tube Insertion

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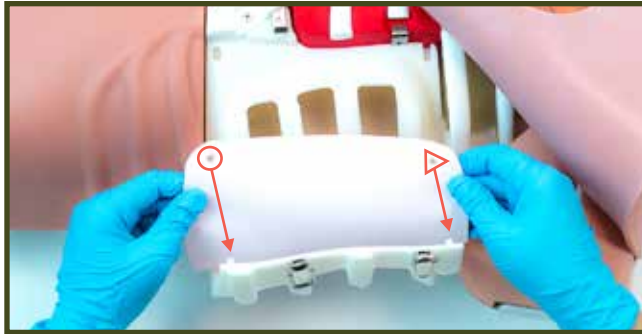
- » **The lung inflates when a chest tube is inserted into the pleural cavity. Each side works independently to provide a 1st cut experience.**
- » The replaceable chest tissue has simulated blood flow integrated into the operative sites (unless using the non-bleeding tissue option).
- » The simulated pleura requires substantial penetrating force and provides a realistic “pop” sensation when entering the pleural cavity.
- » A medium Kelly clamp is recommended.
- » The pleural cavity provides a positive airflow response, which will be felt in the exterior end of the inserted chest tube.
- » The tissue can be sutured and offers an opportunity to practice securing the chest tube.

- » Each chest tissue can be used for 4 students. **Two** procedures can be performed on each side.
- » Each individual simulated pleura can be used for 2 procedures. **Replace** the pleuras when you replace the tissue.



*Procedural Sites*

# Chest Tube Insertion *(Continued)*



*Line the pleura up with the triangle facing towards the head.*

- » To replace the pleura, remove the used chest tissue, pull back the body form tissue and open the rib cage on each side.
- » The triangle on the pleura should always go towards the head and placed in the frame on the alignment pins, then neatly tuck the bottom of the pleura along the bottom of the frame and close the rib cage.
- » With both pleuras secured, lubricate then rebutton the body form skin and a new chest tissue can be installed.
- » Lay the tissue across the body form with the nipples positioned towards the head and connect to the button anchors on the body form tray.

# Needle Decompression

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- » Needle Decompression has air pressure in the 2<sup>nd</sup> intercostal space at the midclavicular (2ICS-MCL), and at the 4<sup>th</sup> and 5<sup>th</sup> intercostal space at the anterior axillary (4/5ICS-AAL).
  - » The 2ICS-MCL is an enclosed bladder that can withstand over 50 incisions bilaterally before being replaced.
  - » The 4/5ICS-AAL is supported by a replaceable pleura that can withstand several insertions, but it is shared procedurally with Chest Tube Insertion (CTI), so once the pleura has been compromised for CTI it must be replaced for additional Needle Decompressions.
- » Make sure the needle is cleared, it may become cored after repeated use.

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## Between Procedures

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- » The air bladder in the 2<sup>nd</sup> intercostal space is robust

and does not need to be changed out between students.

- » The pleura at the 4<sup>th</sup> and 5<sup>th</sup> intercostal space can be used multiple times until a chest tube insertion is performed which will cause a loss of pressure.
- » The patient's left and right side of the chest are pressurized independently so both sides can be used before a new tissue is required.





# Pericardiocentesis

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- » The TraumaMan rib structure and xiphoid process are anatomically correct, and the pericardial sac is properly positioned for procedural accuracy.
- » The pericardial sac is pre-filled with fluid that will aspirate, providing a positive response to the procedure.
- » This system is designed for needle pericardiocentesis.

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## Return Fluids

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- » After the procedure, return the fluids to the pericardial sac by pushing the fluids back into the cavity with the syringe. This will ensure that the sac retains fluids and it is prepped for the next user.



# IV Cutdown *(Optional Subsystem)*

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- » For increased realism during the catheterization, the saphenous vein is pre-filled with simulated blood.
- » The greater saphenous vein, saphenous nerve, medial malleolus and tibia bone are anatomically positioned.
- » The simulator allows you to suture the vein as you would a human patient.

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## Change Tissue

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- » Each replaceable ankle tissue can be used for two student procedures.
- » To secure the replaceable ankle tissue onto the base, start by securing the Velcro on the heel side of the base. Hold the top and bottom of the tissue and stretch it securely onto the remaining Velcro.



# Diagnostic Peritoneal Lavage *(Optional Subsystem. See page 19 for module installation instructions)*

- » Review the provided DPL sample of abdominal tissue for a visual understanding of the simulated tissue layers.
- » Perform the closed DPL procedure near the umbilicus for best results.
- » The subcutaneous fat tissue can be bluntly dissected through to the mid-line fascia.
- » The System is designed to receive and return fluids in the abdomen for this practice.

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## Change Tissue

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- » To prepare the abdomen, fill the abdominal reservoir with simulated fluids.
- » The Replaceable Abdominal Tissue is designed for **two** open procedures only.



*A DPL Sample Tissue is included to show the tissue structure and layering*

# Setting up the DPL Module

*If Diagnostic Peritoneal Lavage is part of your training, the DPL Abdomen will need to be added to your system. (Optional)*

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## Connecting the DPL Abdomen

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- » Lift the Ventilator Abdomen slightly up and off the tray allowing enough space to loosen the colored fittings.
- » Disconnect the six airway tubes by turning each fitting **counter-clockwise** until loose. This will allow the Ventilator Abdomen to be completely removed from the tray and set aside.
- » Attach the 6-foot Extension Tubing fittings in a color-coded fashion to the fittings coming from the chest; and do the same on the other end to the Ventilator Abdomen. Twist the lock rings into place by twisting clockwise until finger-tight.
- » Place the DPL Abdomen on the tray with the extension tubing placed through the tunnel under the DPL Abdomen.
- » Connect the other end of the tubing to the Ventilator Abdomen.

- » Once all fittings are secure, place the Ventilator Abdomen in a convenient place and ensure the power cord or battery is plugged in. Turn on the System, it is now ready for use. The Ventilator will continue to drive procedural air responses while using the DPL Abdomen on the tray.

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## Reconnecting the Ventilator Abdomen

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- » Remove the DPL Abdomen from the tray and Disconnect the 6-foot extension tubing from the Ventilator.
- » Match the color-coded tubing on the Ventilator to the color coded tubing extending from the Chest.
- » Connect the corresponding color-coded fittings and secure by twisting **clockwise** until finger tight.
- » Once all the fittings are secure, guide the tubing into the opening in the chest ensuring that it curls smoothly to prevent the tubing from kinking.
- » Place the Ventilator Abdomen against the chest so that it is seated securely in the tray.

# Setting up the DPL Module



*Lift the Ventilator off the tray to expose the tubing. When replacing the Ventilator be careful to guide the tubing into the chest smoothly to prevent the tubes from kinking.*

TraumaMan® User Guide | 20



*Match the color-coded tubing extending from the chest to the extension tubing. Connect and secure until finger-tight.*



*With the DPL Abdomen on the tray, guide the extension tubing through the tunnel and connect to the Ventilator. Set aside and this will continue to power the procedural air responses.*

# Refilling Tissues

Set out additional replacement tissues so they can be easily replaced between student procedures. Check the tissue fluid reservoirs and if low, they will need to be refilled for proper blood response during procedures.

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## To Refill Tissue Fluid Reservoirs

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- 1 Prior to using replaceable tissue sets, check the reservoir in both the abdominal tissue and chest tissue for blood pressure and flow. If the reservoir tubes are flat, the fluid level is low.
- 2 The TraumaMan System comes with two 60 ml syringes and red concentrate for refilling fluid reservoirs. Any Luer Lock syringe that is 20 ml or greater may be used.
- 3 The chest tissue has four Luer Lock tips. When filling, attach syringes to the top tip on one side and the corresponding tip on the opposite side. ( $a_1 - a_2$  or  $b_1 - b_2$  as shown.)

- 4 Attach an empty syringe without the plunger to one side and a syringe containing fluid to the other side. As fluid fills the reservoir, the empty syringe will begin to fill. This indicates that the reservoir is full and tissues are ready for use.
- 5 Carefully remove the syringes when fluid reservoirs are round and full. Do not overfill. If excess fluid has entered the empty syringe, place a finger over the tip. Do not tip it since fluid can spill out of the top of the syringe.

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### Note

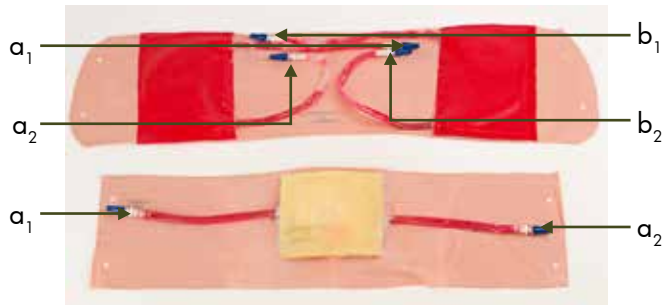
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- » Use the same procedure for both abdominal and chest tissues.

# Refilling Tissues



Add a few drops of the red concentrate to water and stir to mix. Fill the syringe halfway with fluid. About 30 cc.



Attach syringes to each side of one set of tubing. ( $a_1 - a_2$ ) ( $b_1 - b_2$ )



Attach an empty syringe without the plunger to one side and the syringe with the fluid to the other.

# Setting Out Tissues

*Once the chest, neck and abdomen areas are prepped and ready for procedures, you will want to set out the appropriate number of new tissues so they can be easily replaced between student procedures to ensure the smooth running of your training.*

## To Set Out The Tissues

- 1 In addition to the tissues on the body form, lay out one additional neck tissue set and one additional abdominal tissue (if training DPL) next to each body form for each group of four students.
- 2 Evenly divide the stack of cricothyroid membranes and place them next to each body form along with one tube of lubricating gel.

## Tissue Usage

Neck Tissue	2 Students
Chest Tissue	4 Students
Abdominal Tissue	4 Students
Cric Membrane	1 Student
Pleura	2 Students per side



# Tissue Usage

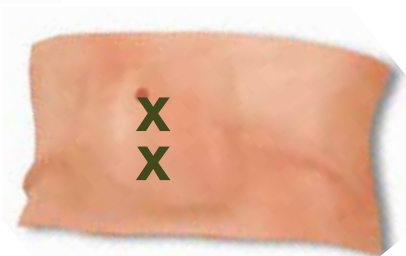
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*Neck tissue procedural sites*



*Chest tissue procedural sites*



*\*Optional abdomen tissue procedural sites*

# Airway Station Solutions

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## **AirwayMan**

The AirwayMan is an Airway Management System to train intubation as well as cricothyroidotomy and tracheostomy.



## **SimuCric Surgical Airway Training Simulator (TM-SC)**

Mobile trainer provides flexibility to train cricothyroidotomy and tracheostomy.

# Adjunct Station Solutions

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## **SonoSkin for FAST/eFAST (SSTP-20)**

A diagnostic ultrasound platform to train FAST/eFAST, the SonoSkin Ultrasound Diagnostic Wearable can be worn on a standardized patient or used on the TraumaMan®. The extensive pathology library can be set to mentor or student mode for varied learning.

## **Articulating Head (AHTM-20)**

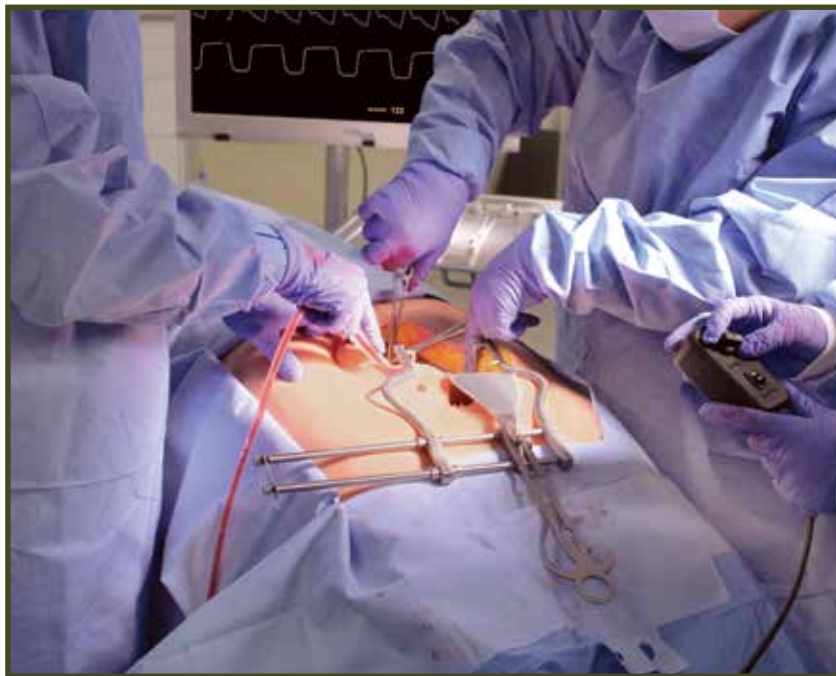
Provide additional landmarks, enhance visual and tactile realism with the Articulating Head for TraumaMan®.

## **IO Needle Insertion Pad (IOT-10)**

Practice IO needle insertion techniques.

# Surgical Abdomen Team Training

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## **TraumaMan® Surgical Abdomen Team Training System (SA-1230)**

Practice surgical team training including the diagnosis and treatment of a renal or aortic injury, the management of an emergency surgery, preparation for a catastrophic surgical event.

Build confidence and reliability in an individual role within a team framework. The Universal Surgical Abdomen Training System includes a Complete Digestive Tract, Nicked Renal Artery, Nicked Aorta Bifurcation, Lacerated Bleeding Kidney and a Virtual Patient Monitor to allow for a variety of training scenarios.

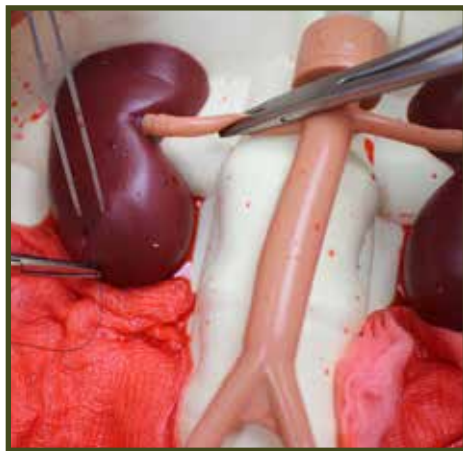
# Surgical Abdomen Team Training

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TraumaMan® Surgical Abdomen Team Training System Modules Include:



*Nicked Renal Artery*



*Lacerated Kidney*



*Nicked Aorta*



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