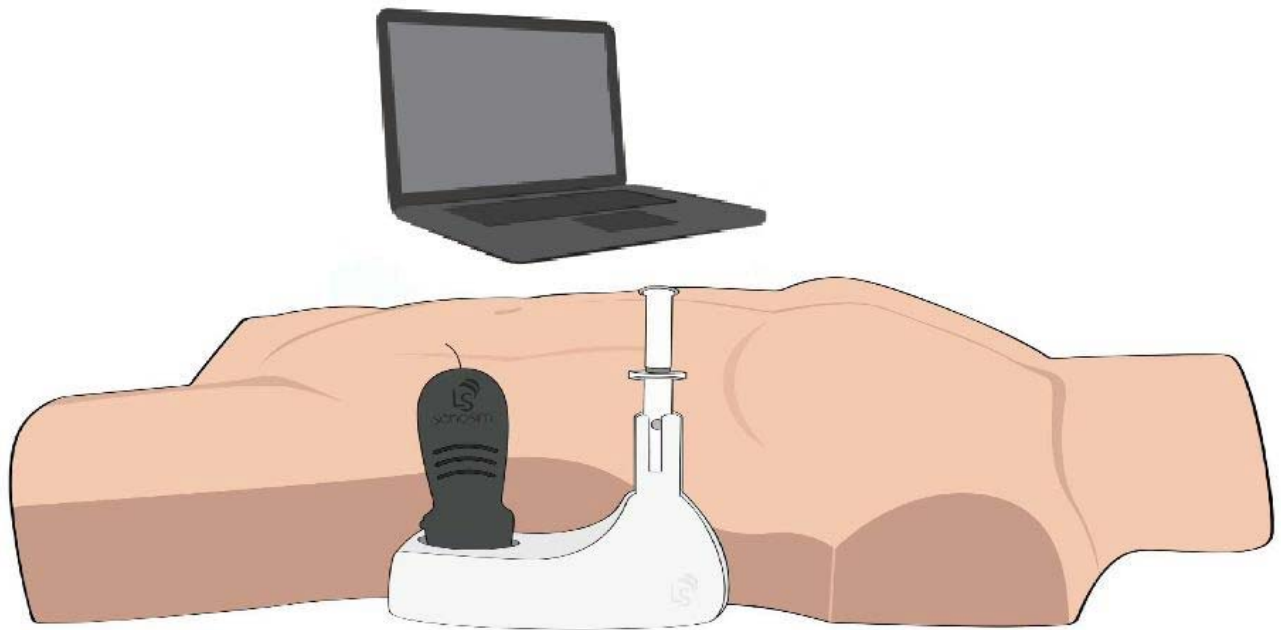


# Laerdal-SonoSim Procedure Trainer

## User Guide



# Table of Contents

## Setup

Equipment Overview	2
Setup Instructions	3

## Features

Application Interface Features	8
Toolbar Button Definitions	9
Ultrasound Window Button Definitions	10
Status Bar Definitions	11
Optimal Positioning	12

## How to Use Laerdal-SonoSim Procedure Trainer

Case Walk-Through	13
Charging the Laerdal-SonoSim Needle & Syringe	17

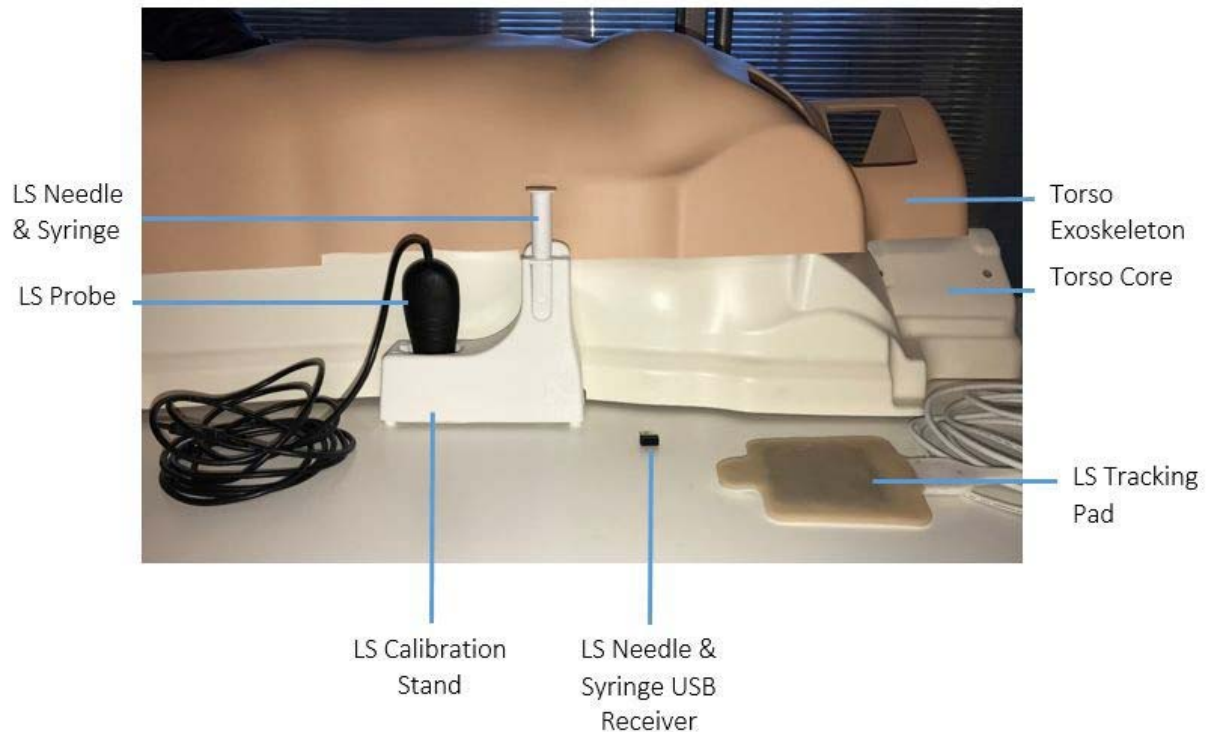
## Support

Troubleshooting & Error Messages	18
Technical & Customer Support	20
Instructions to the User	22

# Setup

## Equipment Overview

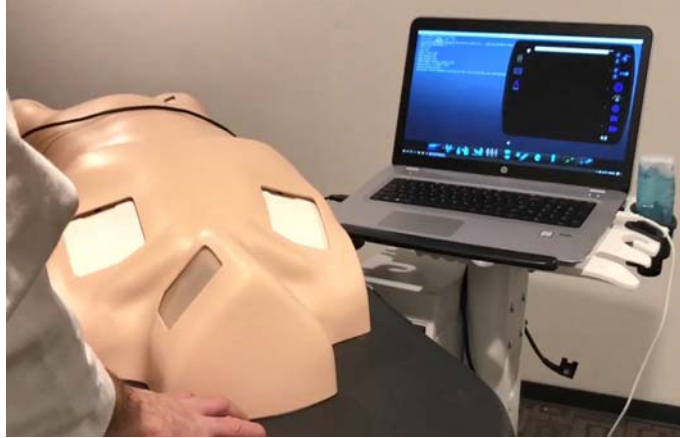
1. Laerdal-SonoSim Computer
2. Laerdal-SonoSim Computer Charger
3. Laerdal-SonoSim Torso
  - a. Torso Exoskeleton
  - b. Torso Core
4. Laerdal-SonoSim Needle & Syringe
5. Laerdal-SonoSim Needle & Syringe USB Receiver
6. Laerdal-SonoSim Needle & Syringe Charger
7. Laerdal-SonoSim Probe
8. Laerdal-SonoSim Probe Adapter
9. Laerdal-SonoSim Calibration Stand
10. Laerdal-SonoSim TrackPad
11. Placeholder Pads
12. USB Converter
13. Ultrasound Gel (*not included*)



*Note: Ultrasound gel is recommended for optimal use.*

# Setup Instructions

1. Place the Laerdal-SonoSim Computer and Laerdal-SonoSim Torso on separate stands.



2. Remove the Torso Exoskeleton and set it aside.



3. Gently attach the Laerdal-SonoSim TrackPad to the location of interest by placing the pad legs in the peg holes. *Avoid applying excessive pressure on the pad.*



4. Pass the cord of the TrackPad through the center opening of the Torso Core. It should exit through the one of the cord outlets on either side of the Torso.



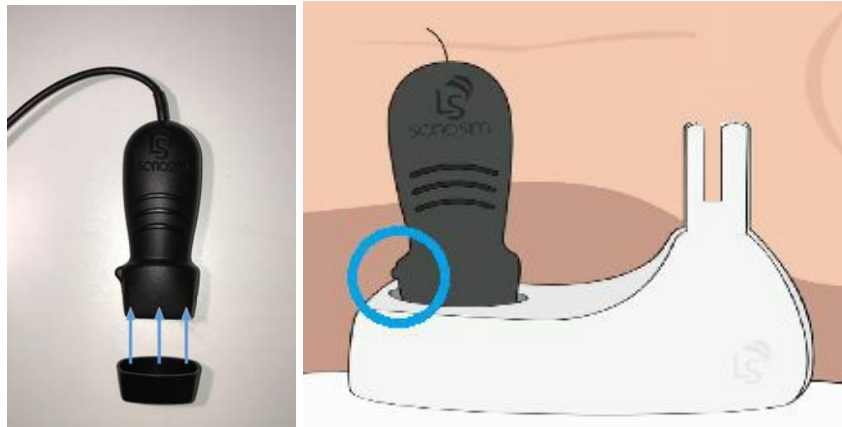
5. Place the Torso Exoskeleton on top of the Torso Core.



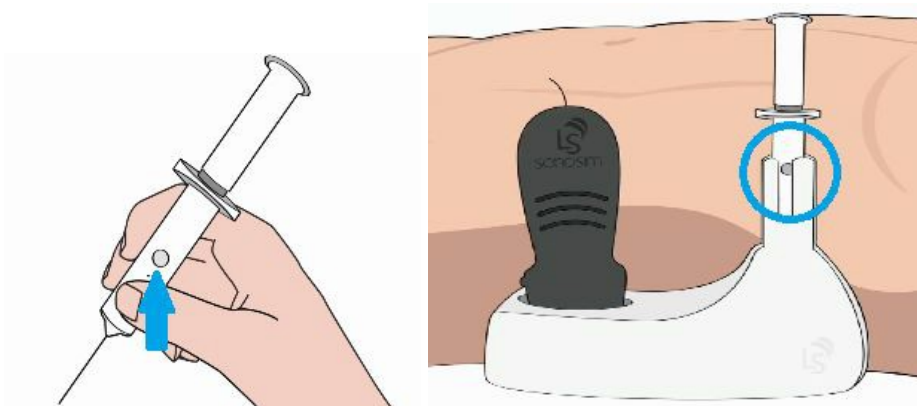
6. Attach the Laerdal-SonoSim Calibration Stand to the anatomic-left side of the Torso.



7. Secure the Laerdal-SonoSim Probe Adapter to the Laerdal-SonoSim Probe; place in the Calibration Stand with the probe indicator towards the Torso's legs.



8. Turn on the Laerdal-SonoSim Needle & Syringe by pressing the button on the syringe face until the light above the button flashes. Place the Needle & Syringe in the Calibration Stand with the button facing outward.



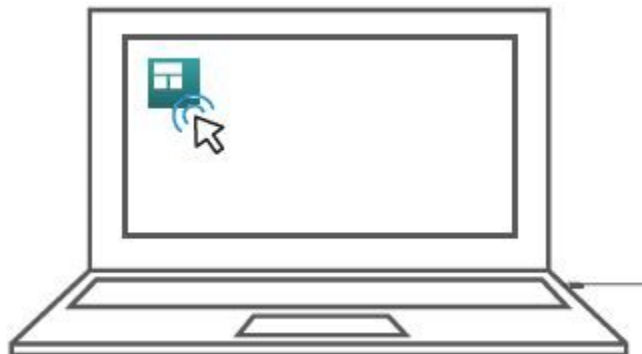
9. Connect the USB ends of the TrackPad and Probe to the Computer. Insert the Laerdal-SonoSim Needle & Syringe USB Receiver into the USB Converter, and plug into the Computer.



10. Connect the Computer to internet.



11. Launch Laerdal Simulation Home by double-clicking the icon on the desktop.



12. Select Laerdal-SonoSim Procedure Trainer from the Laerdal Simulation Home menu.



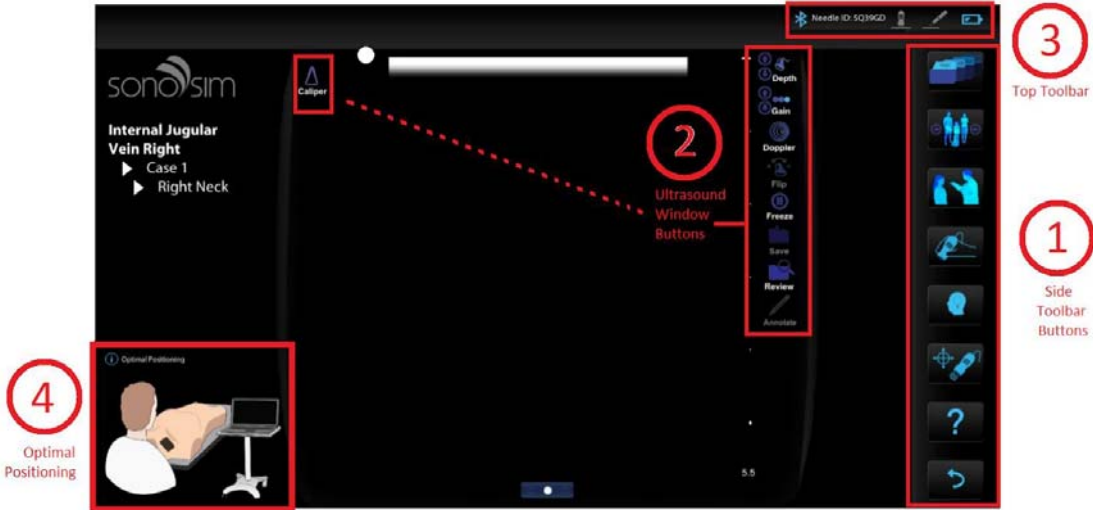


# Features

## Application Interface

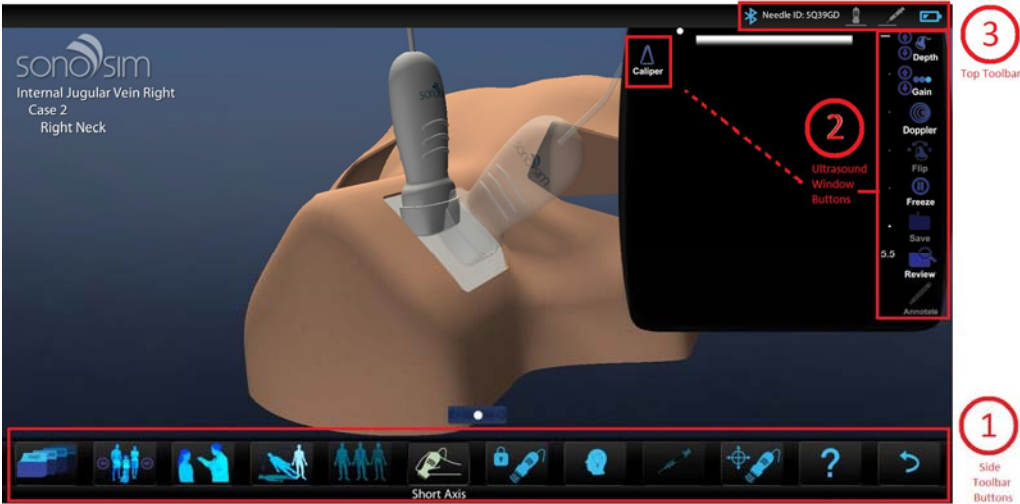
### Fullscreen

This is the default view.












### Body Model Screen


To get to this view, click the Probe Guide button. Click again to return to fullscreen.






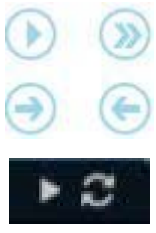



1. Toolbar Buttons
2. Ultrasound Window Buttons
3. Status Bar Icons
4. Optimal Positioning




## Toolbar Button Definitions

Case List		Brings up a list of available training cases sorted by region of interest.
Case		Allows you to navigate to the next (or previous) hands-on training case via clicking the arrow icons.
Case History		Provides a brief patient history.
Change Position		Changes the position of the virtual body on screen. <i>Note: Only available in the body model screen.</i>
Probe Guide		Offers assistance orienting the probe to the optimal imaging plane. <i>Note: This switches the interface into the body model screen. Click again to return to fullscreen.</i>
Lock Probe		Locks the on-screen probe in its current position and holds the ultrasound view in place. <i>Note: Only available in the body model screen.</i>
Findings		Plays the clip of the ultrasound scan narrated by an expert who points out the important structures and features of the scan.
Calibrate		Provides instructions on how to calibrate the Laerdal-SonoSim Probe and Laerdal-SonoSim Needle & Syringe.
Help		Brings up the Laerdal-SonoSim Procedure Trainer User Guide.





Close		Quits the application.
-------	---	------------------------

## Ultrasound Window Button Definitions

Depth		Adjusts the depth of the ultrasound view by clicking the arrows.
Gain		Adjusts the brightness of the ultrasound view by clicking the arrows.
Doppler		Displays power, color-flow, and pulsed-wave Doppler.
Doppler Playback Controls		Plays and pauses Doppler clips. Additional Doppler controls are located underneath the Doppler Clip; there, the clip can be paused, played, and looped.
Flip		Flips the probe indicator to the opposite side of the ultrasound screen and displays the mirror ultrasound view.
Freeze		Freezes the current ultrasound view; a subsequent mouse-click will unfreeze the view.
Save		Saves the frozen ultrasound view. This image can now be annotated and archived for future review and analysis.

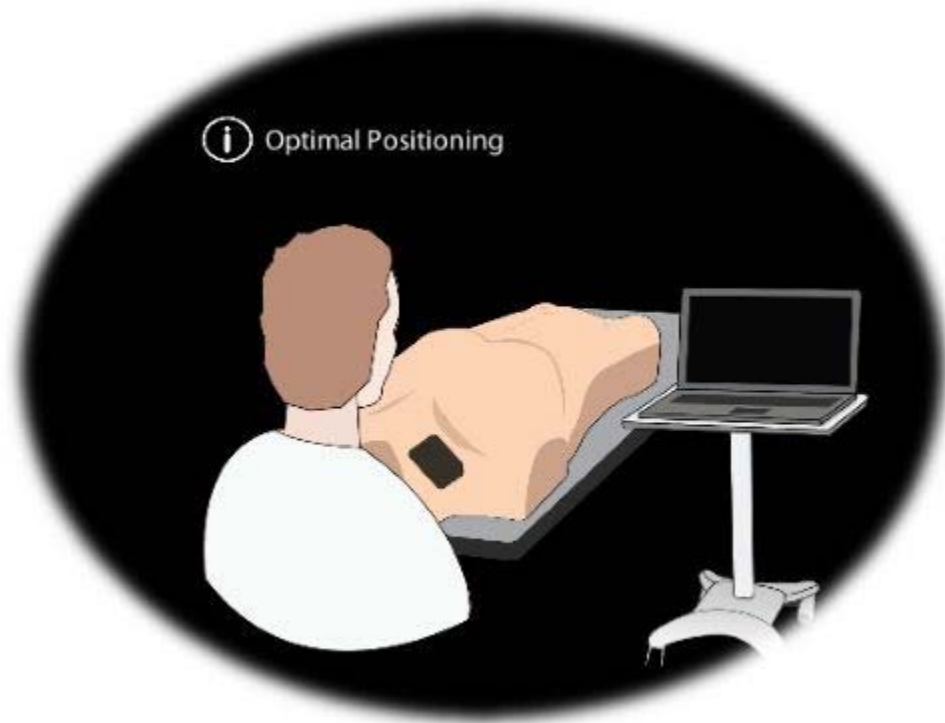
Review		Reviews saved images.
Annotate		Allows user to type notes associated with the ultrasound view. <i>Note: Only available when the image is frozen.</i>
Caliper		Enables user to perform measurements of length, area, and volume.

## Status Bar Definitions

Laerdal-Sono Sim Needle & Syringe Connectivity		Lights up blue when the Needle & Syringe is connected. The 'NEEDLE ID' of the connected Needle & Syringe will display to the right of the icon. The icon will remain gray otherwise.
Laerdal-Sono Sim Probe Detected		Lights up blue when the Probe is detected on the Laerdal-SonoSim TrackPad. The icon will remain gray otherwise.
Laerdal-Sono Sim Needle & Syringe Detected		Lights up blue when the Needle & Syringe is detected on the TrackPad. The icon will remain gray otherwise.
Laerdal-Sono Sim Needle & Syringe Battery		Identifies Needle & Syringe battery levels.

# Optimal Positioning

This feature shows users how to optimize user-system positioning so that the ultrasound screen and procedure site are in the same line of sight, minimizing the need for head movement and body rotation. Each TrackPad location has a unique optimal positioning.



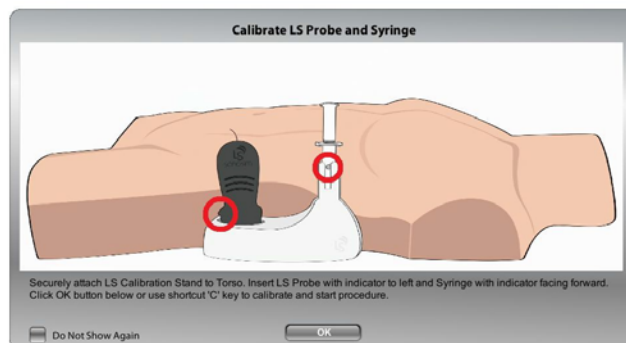
# How to Use Laerdal-SonoSim Procedure Trainer

## Case Walk-Through

### 1. Calibrate the Laerdal-SonoSim Probe and Laerdal-SonoSim Needle & Syringe

Ensure the Laerdal-SonoSim Calibration Stand is secured to the Laerdal-SonoSim Torso. Place the Laerdal-SonoSim Needle & Syringe in the Calibration Stand with the button facing outwards. Place the Laerdal-SonoSim Probe in the Calibration Stand with the probe indicator facing towards the legs of the Torso. Press “OK” or “C” to initiate calibration.

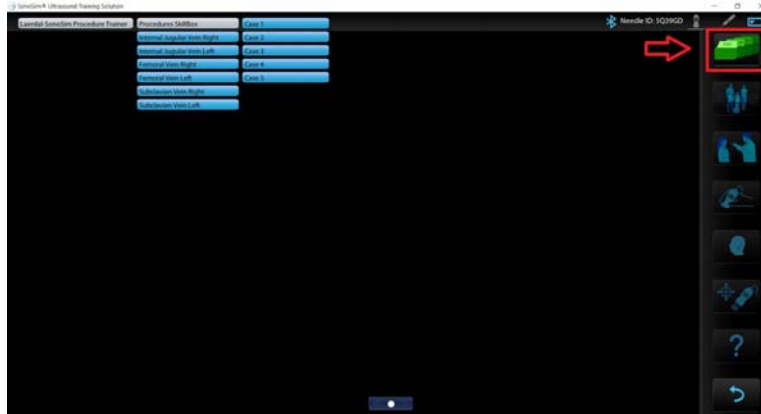
*Note: You can choose to recalibrate at any time during the procedure by selecting the Calibrate button in the toolbar and following the on-screen instructions.*



### 2. Select A Case

Click the ‘CASE LIBRARY’ button to browse the available training cases, sorted by region of interest.





### 3. Review Optimal Positioning

Place the Torso and Laerdal-SonoSim Computer as instructed in the optimal positioning illustration. Ensure that the Laerdal-SonoSim TrackPad is in the same pad location as seen in the on-screen illustration.

### 4. Apply Gel

Apply a small amount of ultrasound gel (about the size of a coin) to the TrackPad. Gel is optional but recommended for optimal use.

*Note: Applying too much ultrasound gel will negatively impact TrackPad performance*

### 5. Start Scanning!

Place the Probe on the TrackPad and begin by using 2D (greyscale) ultrasound to examine the structure of interest and surrounding structures.

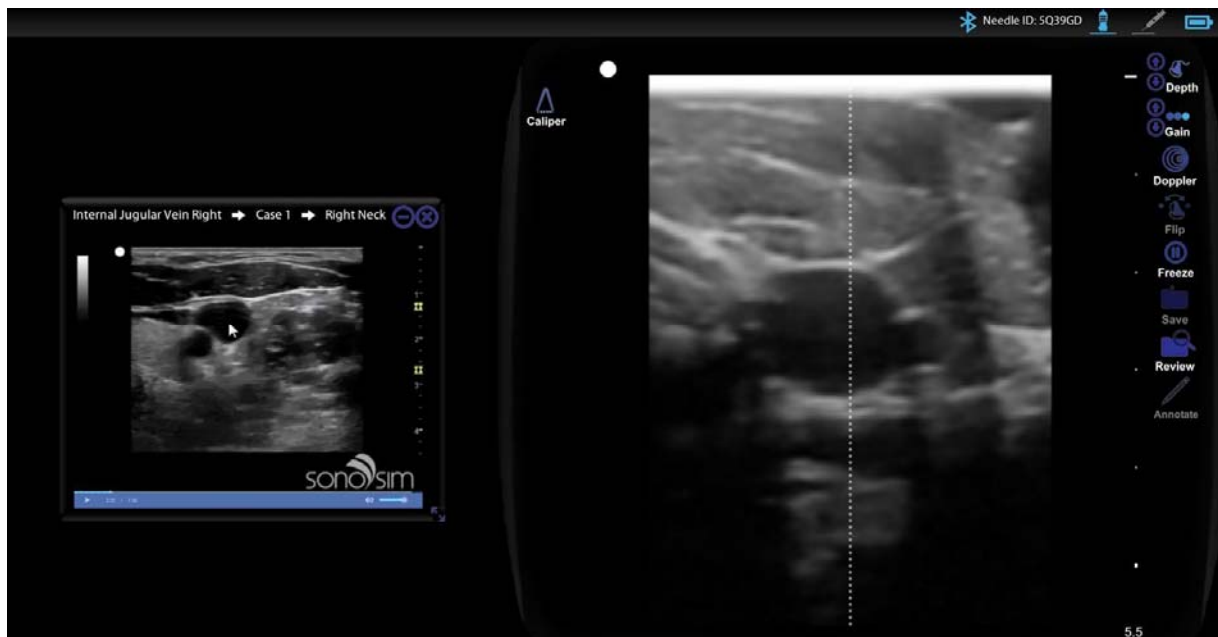
### 6. Get Expert Probe Guidance

Select the 'PROBE GUIDE' to get immediate assistance with optimally orienting the probe to acquire short- and long-axis views of the target structure. A translucent probe will display to use as reference.



## 7. Review Expert Findings

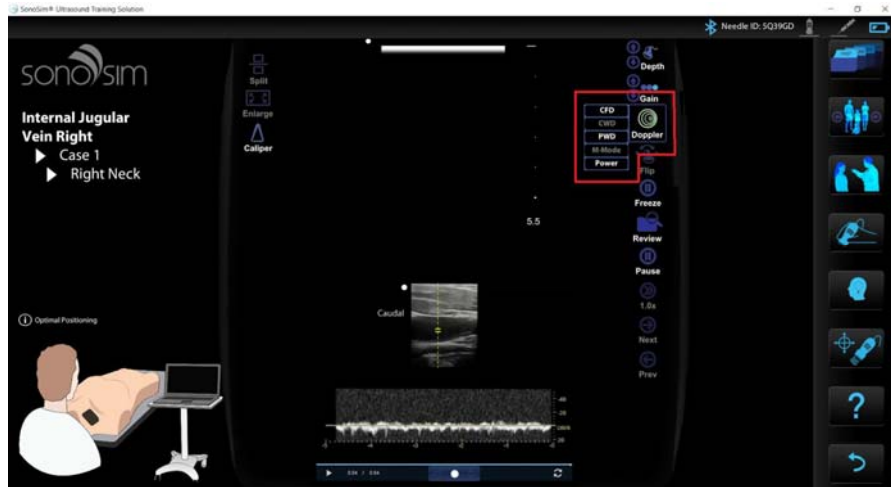
Select the 'FINDINGS' button to review a narrated version of the ultrasound scan; the video points out important structures and features from the scan.





## 8. Access Doppler Modalities

Utilize the Doppler feature to assess vasculature using power, color-flow, and pulsed-wave Doppler.



## 9. Utilize Compression

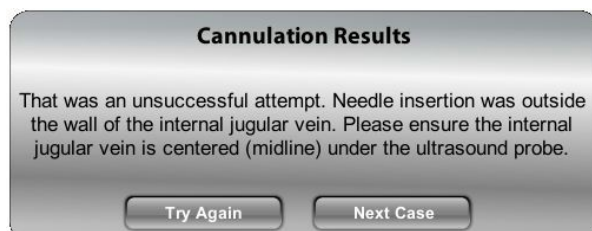
Assess the target structure with compression by pressing on the TrackPad with the Probe.

## 10. Advance the Needle

Once the target structure has been identified, place the Needle & Syringe on the TrackPad and orient as desired. Then, advance the Needle & Syringe "into" the vein. When the desired amount of penetration has been achieved, pull back on the Needle & Syringe plunger to aspirate.

## 11. Review Feedback


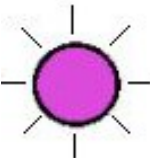

After aspirating, real-time feedback will be provided alerting the user if the cannulation was successful or unsuccessful. From there, the user will be given the option to try again or to move on to the next case.



# Charging the Laerdal-SonoSim Needle & Syringe

It is recommended to charge the Laerdal-SonoSim Needle & Syringe when the battery level gets below 40%. In order to charge, plug the Laerdal-SonoSim Needle & Syringe Charger into the Needle & Syringe and connect to any powered drive with a USB port.

The LED light on the Needle & Syringe has three distinct states during charging:

Solid Orange	 The battery is charging but is below 20%.
Blinking Pink	 The battery is charging.
Solid Pink	 The battery is fully charged.

The Needle & Syringe will not connect to the application while charging.

# Support

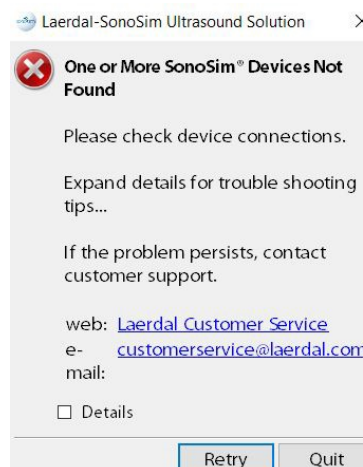
## Troubleshooting & Error Messages

### One or More SonoSim® Devices Not Found

This message appears if any of the following items are not plugged into the Laerdal-SonoSim Computer upon application startup:

- Laerdal-SonoSim Probe
- Laerdal-SonoSim TrackPad
- Laerdal-SonoSim Needle & Syringe USB Receiver

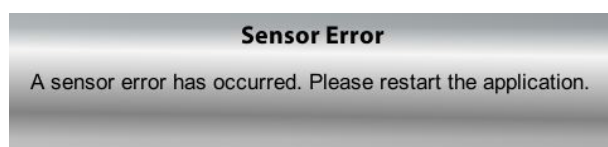
To fix, ensure all devices are connected, then select “Retry.”



### Sensor Error

This message appears if any of the following items become unplugged while running the application:

- Probe
- TrackPad
- Needle & Syringe USB Receiver

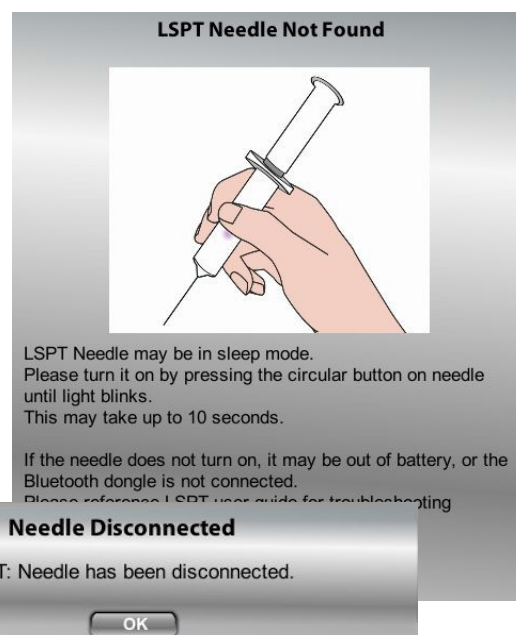


To fix, close the application, ensure all devices are connected, and restart.

### LSPT Needle Not Found

This message appears if the Needle & Syringe is not wirelessly connected upon application startup. To connect the Needle & Syringe, perform the following steps sequentially until the message disappears:

1. Press the Needle & Syringe plunger.
2. Hold the button on the face of the Needle & Syringe until the light blinks.
3. If the light does not blink, recharge the Needle & Syringe.



### Needle Disconnected

This message appears if the Needle & Syringe stops sending signal to the Needle & Syringe USB Receiver while the application is running. This can occur as a result of three things:

1. The battery in the Needle & Syringe has run out.
  - a. To fix, charge the Needle & Syringe.
2. The Needle & Syringe has gone into sleep mode from inactivity.
  - a. To fix, press the plunger of the Needle & Syringe or the button on the face of the Needle & Syringe.
3. The Laerdal-SonoSim Needle & Syringe Charger has been plugged into the Needle & Syringe.
  - a. To fix, unplug the Needle & Syringe Charger from the Needle & Syringe.

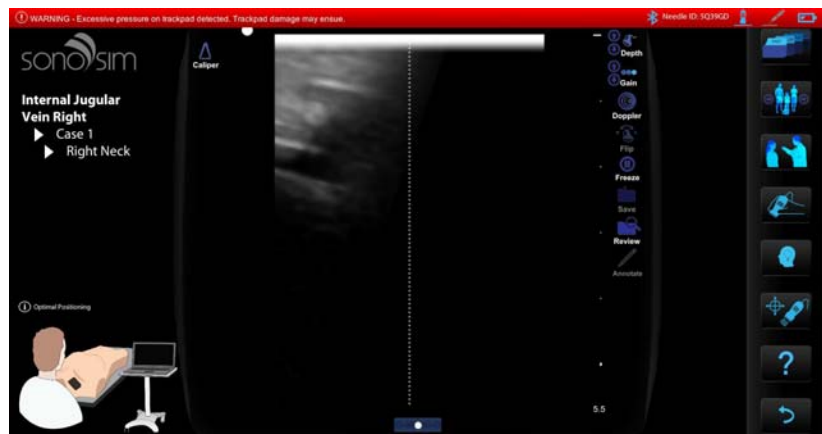
### Needle Battery Level Warning

This message appears if the Needle & Syringe battery level drops to 60%. The message will appear again if the battery level drops to 40%. If the Needle & Syringe is not charged soon after reaching 40%, the Needle & Syringe will automatically disconnect until charged.



### Excessive Pressure on Trackpad Detected

This message appears as a red banner across the top of the screen whenever too much pressure is applied to the TrackPad.



## Technical & Customer Support

Laerdal and SonoSim are committed to providing clients with the gold standard of customer service. Laerdal Customer Service Representatives will provide the first line of customer support.

If you are experiencing technical issues with Laerdal-SonoSim Procedure Trainer, please contact us at <http://www.laerdal.com/pages/contactforms> and choose your country for support.

# Cleaning Instructions

It is important to regularly clean the Laerdal-SonoSim Procedure Trainer. Each component has unique cleaning instructions.

## **Laerdal-SonoSim Torso**

Separate the Torso Core from the Torso Exoskeleton. Wipe down each part using a damp cloth and dry. Clean regularly.

## **Laerdal-SonoSim Calibration Stand**

Wipe down all surfaces, including inside the probe well and around the rim of the needle holder with a damp cloth and dry. Ensure the stand is completely dry before placing any components inside. Clean regularly.

## **Laerdal-Sonosim TrackPad**

Wipe off all ultrasound gel from the surface of the pad using a dry cloth. Ensure no ultrasound gel or residue remains. Take care not to press too hard on the trackpad. Clean after each use.

## **Laerdal-SonoSim Probe**

Wipe off all ultrasound gel from the probe using a dry cloth. Take off the Laerdal-SonoSim Probe Adapter and wipe off the inside of the adapter. Ensure no ultrasound gel or residue remains. Clean after each use.

## **Laerdal-SonoSim Needle & Syringe**

Wipe off all ultrasound gel from the tip of the needle using a dry cloth. Ensure no ultrasound gel or residue remains. Take care not to pull too hard on the needle. Clean after each use.

## Instructions to the User

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- \* Reorient or relocate the receiving antenna.
- \* Increase the separation between the equipment and receiver.
- \* Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- \* Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference and
- (2) This device must accept any interference received, including interference that may cause undesired operation.