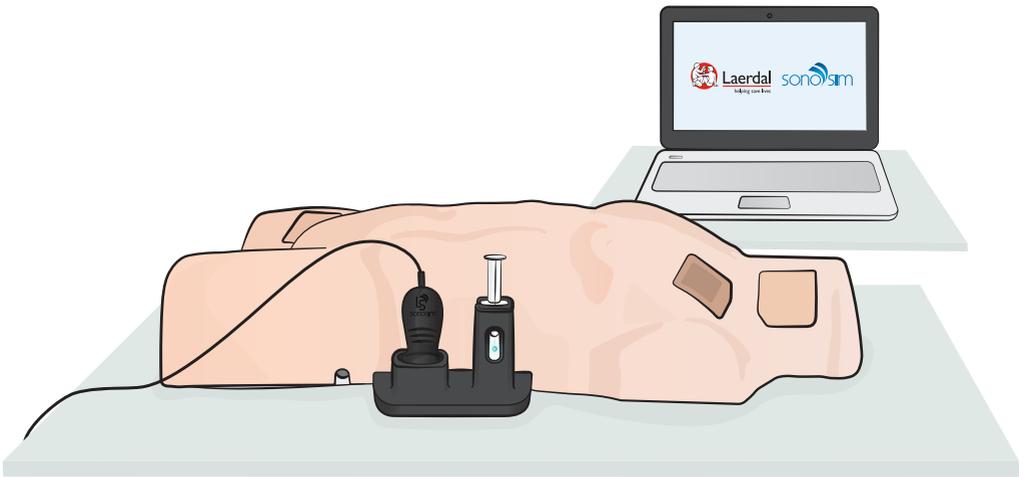


Laerdal-SonoSim Procedure Trainer

User Guide

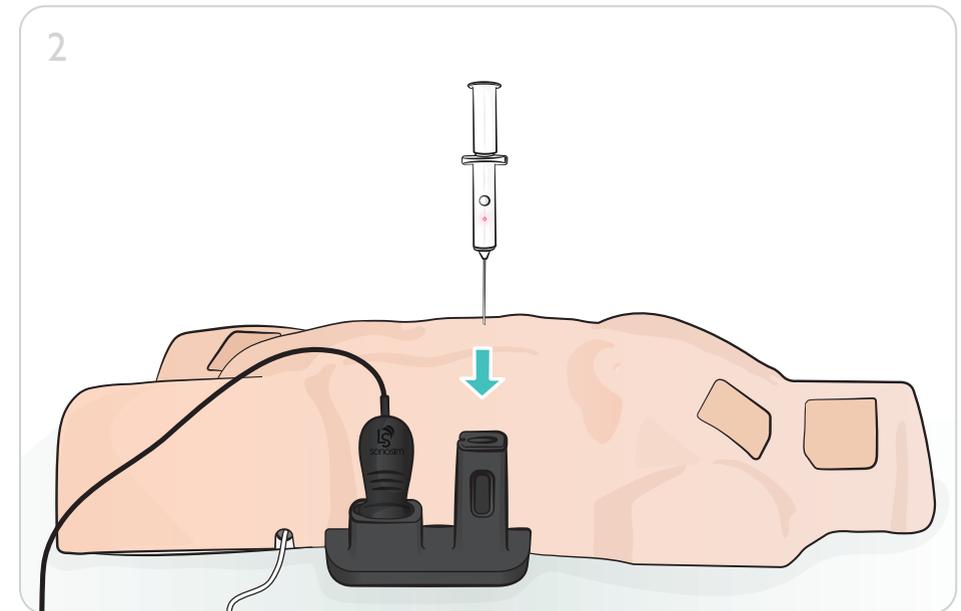
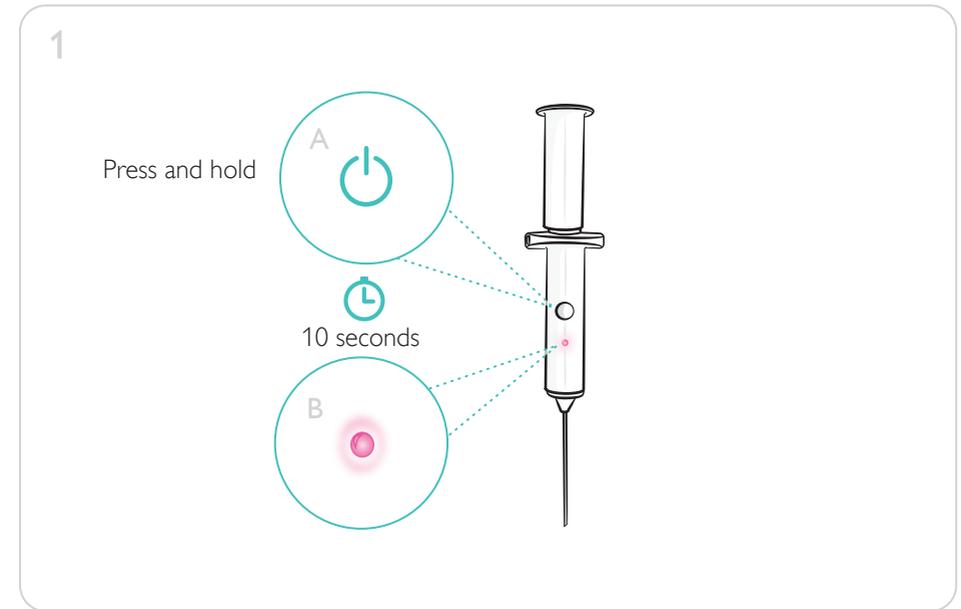
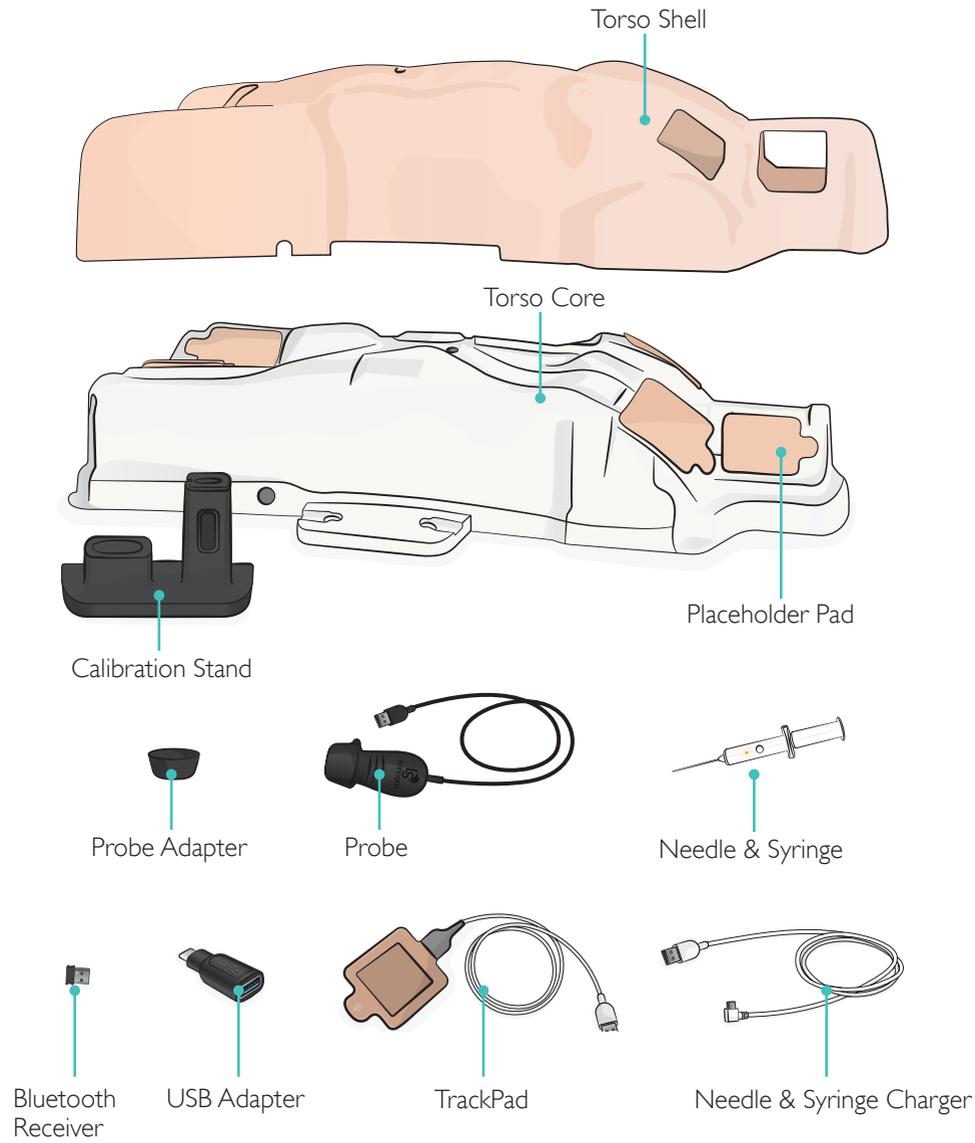


The Laerdal-SonoSim Procedure Trainer allows learners the ability to perform ultrasound guidance with real-patient data on multiple body morphologies and 20 real ultrasound data sets. This trainer gives users the opportunity to develop the critical psychomotor skills that will serve as a foundation for future ultrasound-guided interventions in a safe, simulated, and highly realistic ultrasound environment using only a laptop, simulated transducer, needle and training torso.

Laerdal-SonoSim Procedure Trainer Overview	6
Setup	7
Turn on the Needle & Syringe	7
Launch Laerdal Simulation Home	8
Select Laerdal-SonoSim Procedure Trainer	8
Pair Needle & Syringe	9
Interface Overview	10
Toolbar placement	10
Ultrasound Window Toolbar Definitions	12
Status Bar Definitions	13
Probe Guide Toolbar Overview	13
Use	14
Optimal Positioning	14
Calibrate the Probe and Needle & Syringe	15
Select A Case	16
Apply Gel	17
Start Scanning	17
Get Expert Probe Guidance	18
Review Expert Findings	19
Doppler Modalities	20
Doppler Playback Controls	20
Color-Flow Doppler	20
Pulsed-Wave Doppler	21
Power Doppler	21
Utilize Compression	22
Advance Needle & Syringe	23
Review Feedback	24
Successful	24
Unsuccessful	25
Charging Needle & Syringe	26
Storage	28

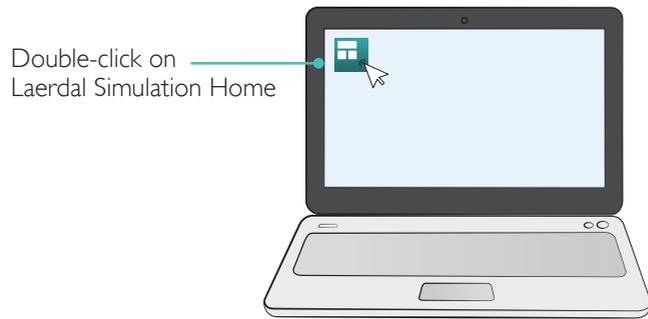
Cleaning	30
Cleaning Torso	30
Cleaning Track Pad	30
Cleaning Needle & Syringe	30
Cleaning Probe and Probe Adapter	31
Cleaning Calibration Stand	31
Troubleshooting	32

Turn on the Needle & Syringe



Launch Laerdal Simulation Home

Note
Refer to Quick Setup Guide before proceeding to start up.



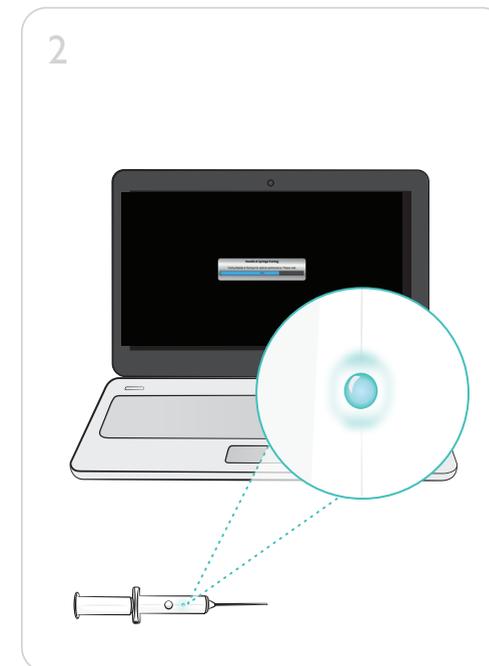
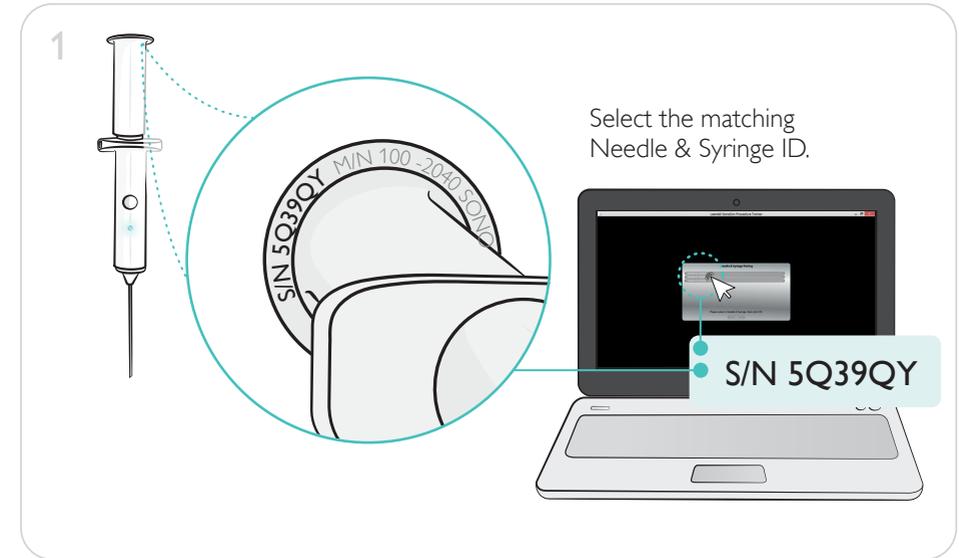
Select Laerdal-SonoSim Procedure Trainer



Note
Depending on version purchased, Laerdal Simulation Home screen may vary.

Pair Needle & Syringe

Find the Needle & Syringe ID under the top of the plunger.



Toolbar placement

Case in progress



Optimal Position Guide

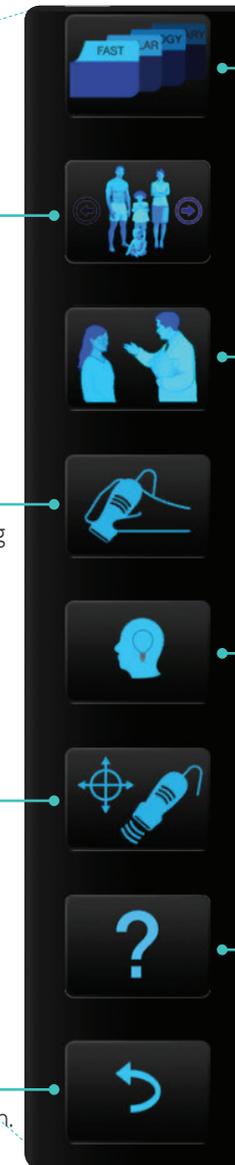
Window for ultrasound image

Ultrasound Toolbar

Toolbar

- Position for direct line of sight as shown below.
- Apply scanning gel to TrackPad.
- Calibrate, then start procedure.
- Maintain pressure with Probe to optimize tracking.
- Use Doppler and compression to identify vessels.
- Trigger cannulation by pressing Needle & Syringe button. Alternatively, apply traction or pressure on syringe plunger.

User Instructions



Case
Navigate through hands-on training cases.

Probe Guide
Offers assistance orienting the probe to the optimal imaging plane.

Calibrate
Instructions on how to calibrate the Probe and Needle & Syringe.

Close
Quits the application.

Case List
Available training cases sorted by region of interest.

Case History
Brief patient history.

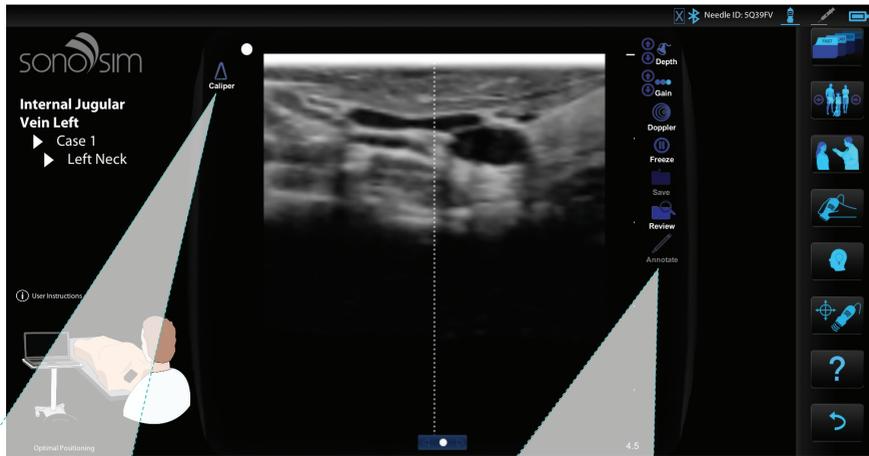
Findings
Plays ultrasound scan findings with narration by an expert.

Help
Access User Guide.

Notes

Probe Guide: Click to switch the interface to the body model screen. Click again to return to fullscreen.

Ultrasound Window Toolbar Definitions



Measure length, area, and volume.

Click arrows to adjust depth of ultrasound view.

Click arrows to adjust brightness of ultrasound view.

Click to freeze view. Click again to un-freeze view.

Review saved images.

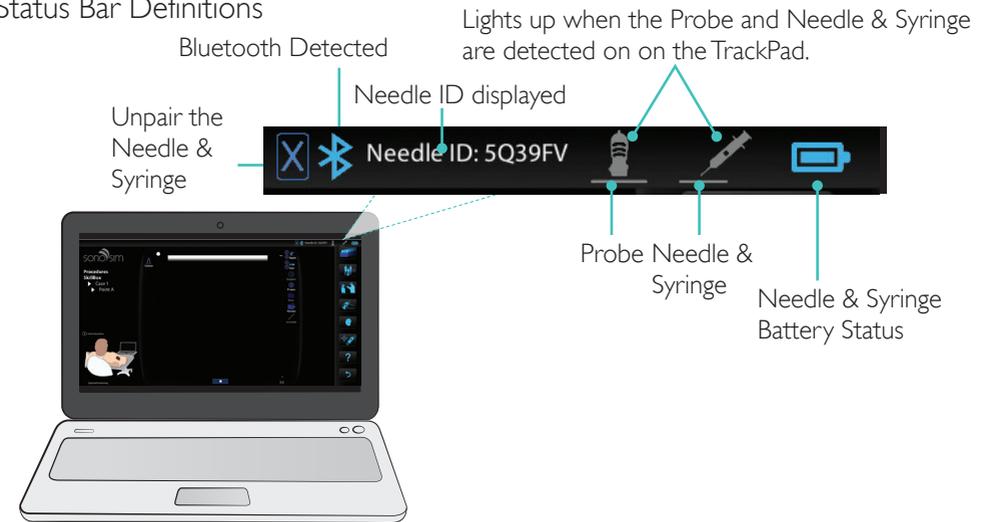


Displays power, color-flow, and pulsed-wave Doppler.

Saves the frozen view. Saved image can be annotated and archived for future use.

Only available when the image is frozen.

Status Bar Definitions



Lights up when the Probe and Needle & Syringe are detected on on the TrackPad.

Bluetooth Detected

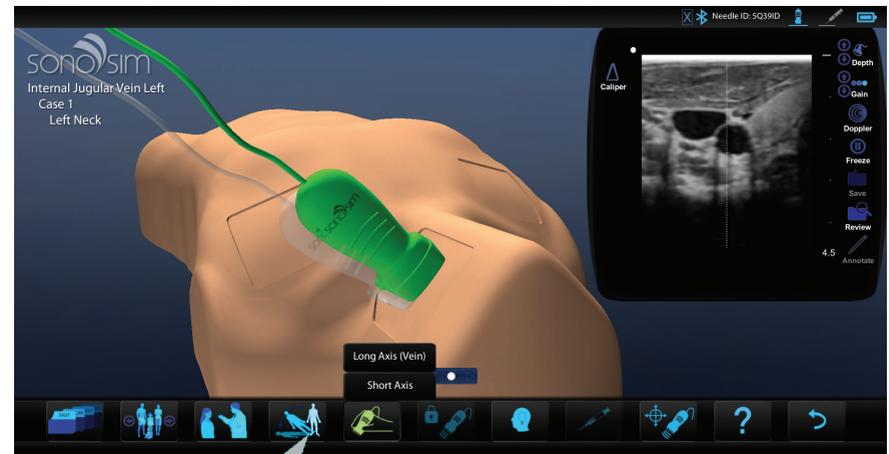
Needle ID displayed

Unpair the Needle & Syringe

Probe Needle & Syringe

Needle & Syringe Battery Status

Probe Guide Toolbar Overview



Change Position
Changes the position of the virtual body.

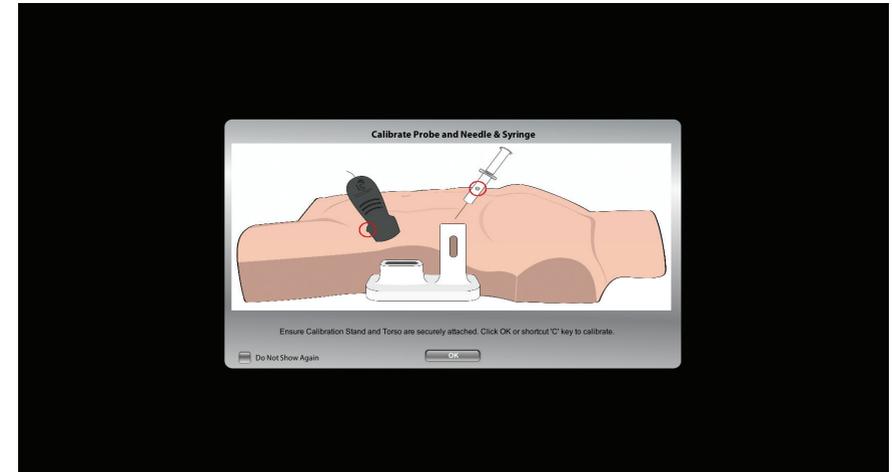
Optimal Positioning

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 pad location has a unique optimal positioning.

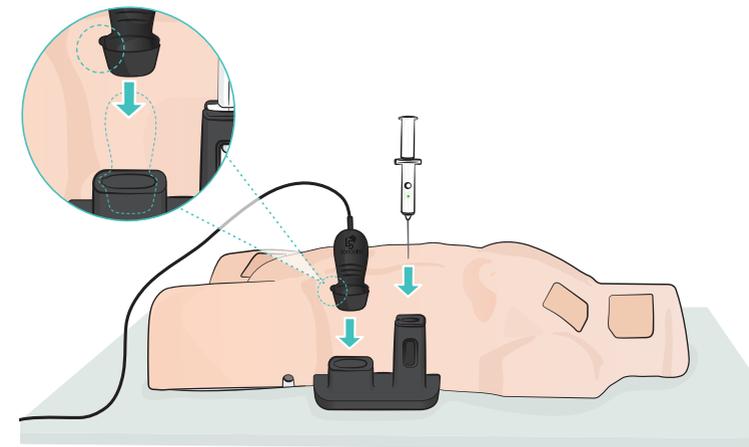


Follow the position guide for optimal use. Position yourself, the Torso and Computer as instructed in the optimal positioning illustration. Ensure that the TrackPad is in the same pad location as seen in the on-screen illustration.

Calibrate the Probe and Needle & Syringe



Ensure the Calibration Stand is secured to the Torso. Refer to Quick Setup Guide for instructions on placement of the Calibration Stand, Probe and Needle & Syringe. Follow the on-screen instructions to complete calibration. If calibration is successful the LED light on the Needle & Syringe will flash pink.

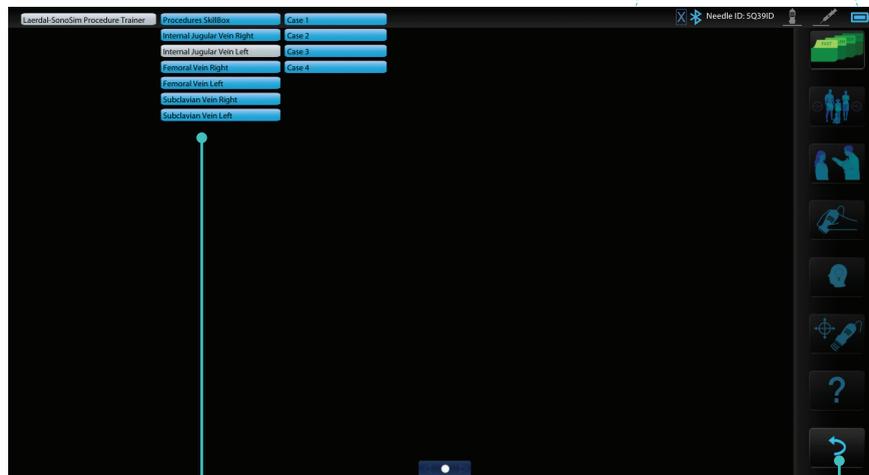
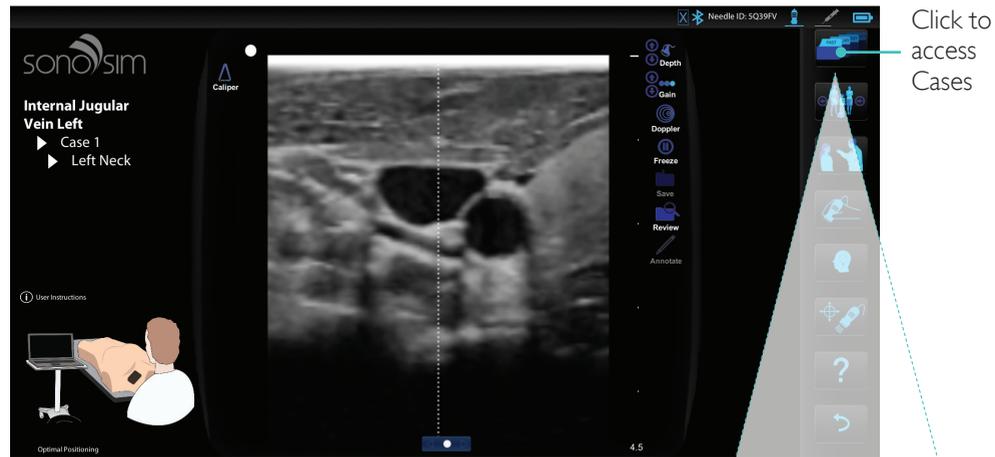


Note

- Ensure that the Probe and Needle & Syringe are correctly placed as shown.
- 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.
- If the Torso moves at any time, you must recalibrate.
- Calibrate at the start of each case.

Select A Case

Select Case List to browse the available training cases, sorted by region of interest.



Select case

Click to exit

Note

Remember to review *Optimal Positioning* for each training case.

Apply Gel

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

Note

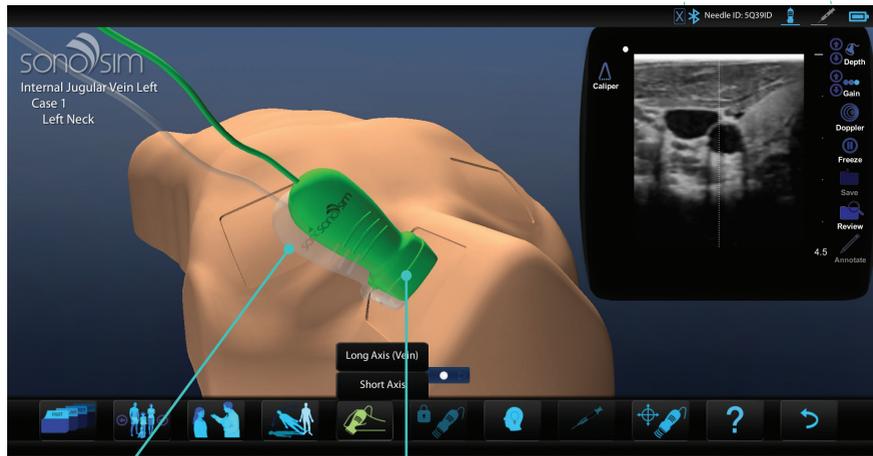
Applying too much ultrasound gel will negatively impact TrackPad performance

Start Scanning

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

Get Expert Probe Guidance

Select Probe Guide to get immediate assistance with optimally orienting the probe to acquire short- and long-axis views of the target structure.

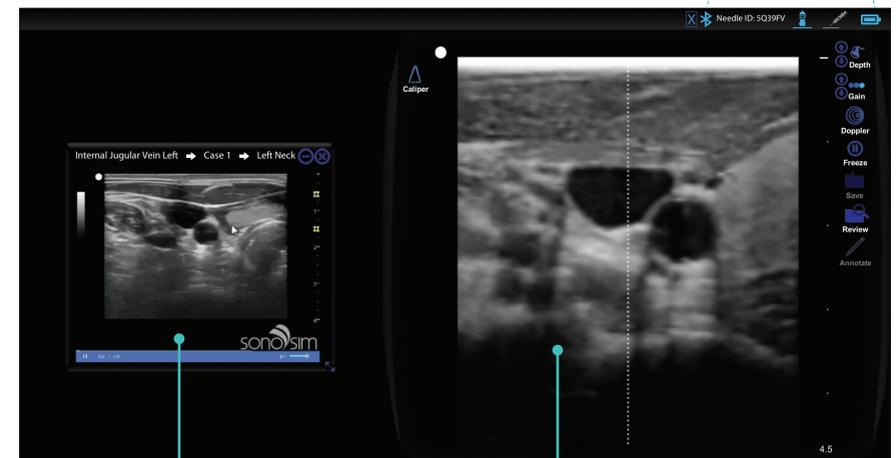


A translucent probe will display to use as reference

The Probe will turn green when close to the correct view

Review Expert Findings

Select Findings button to review a narrated version of the ultrasound scan.



Narrated version of the ultrasound scan

Continue real time scan while reviewing Expert Findings

Doppler Modalities

Select Doppler to assess vasculature using power, color-flow, and pulsed-wave Doppler.



Click to access Doppler function

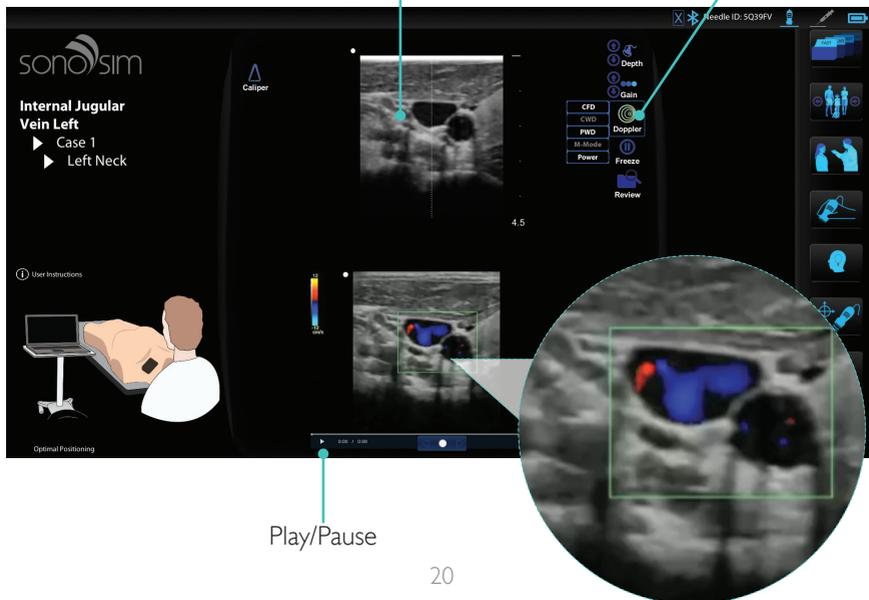
Doppler Playback Controls

The Doppler Playback Controls allows you to pause and play the Doppler recordings.

Color-Flow Doppler

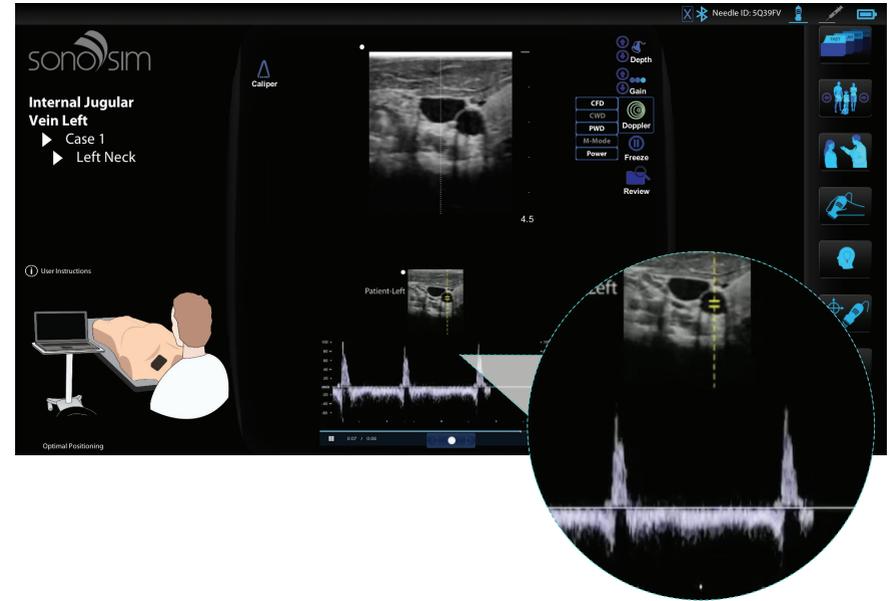
Ultrasound scanning available when Doppler is enabled

Activate Doppler

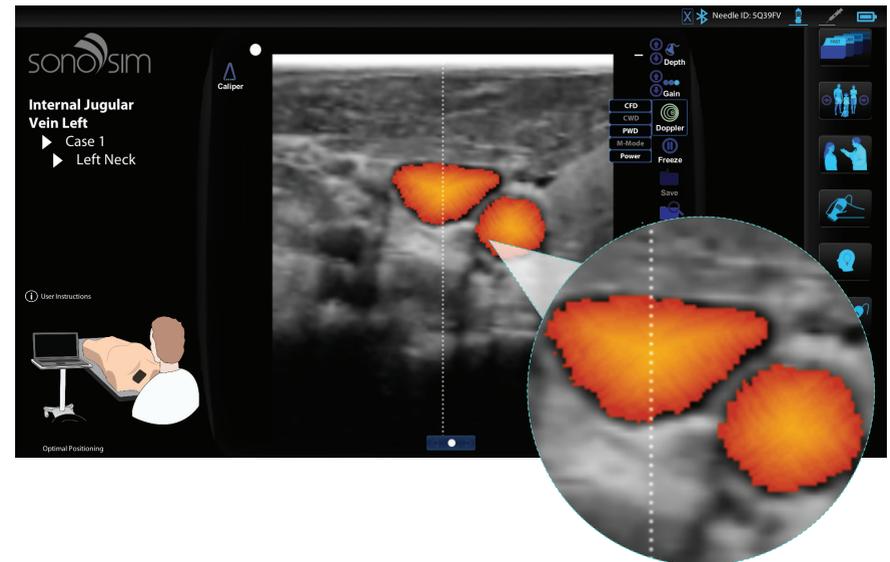


Play/Pause

Pulsed-Wave Doppler

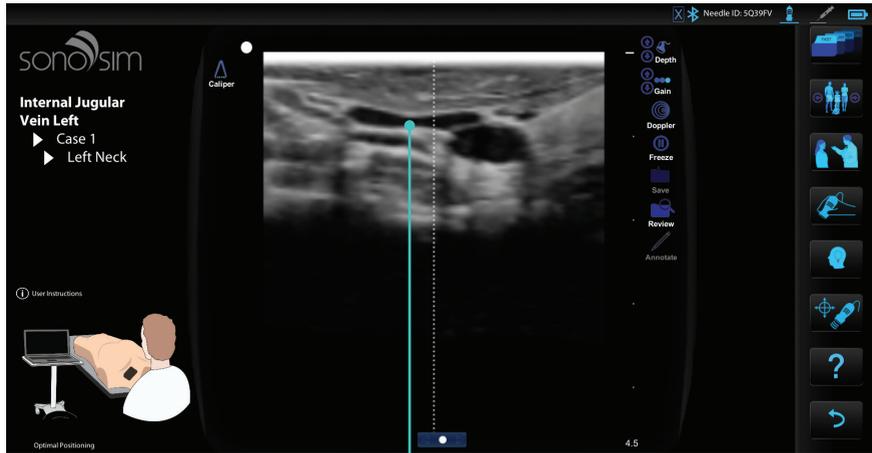


Power Doppler



Utilize Compression

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

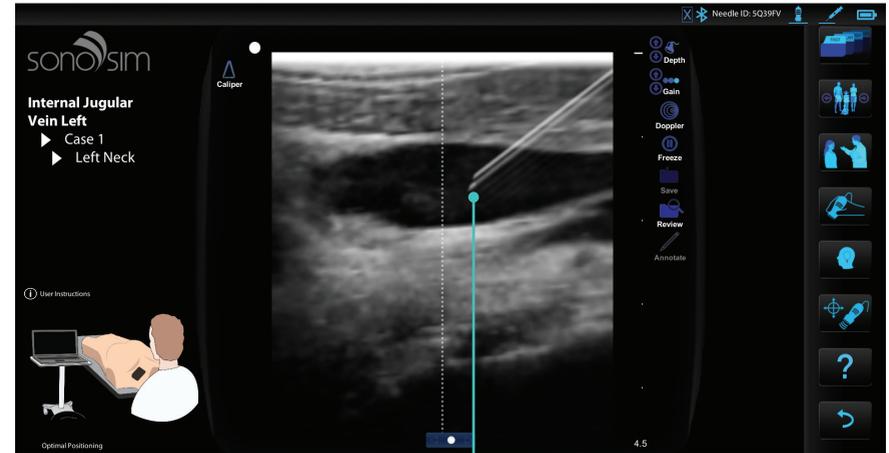


Compressed vein

⚠ Caution
Do not put too much pressure on the TrackPad.

Advance Needle & Syringe

Once the target structure has been identified, place the Needle & Syringe on the TrackPad and orient correctly. Then, advance the Needle & Syringe "into" the vein. When needle is in the correct position, pull back on the Needle & Syringe plunger to aspirate.

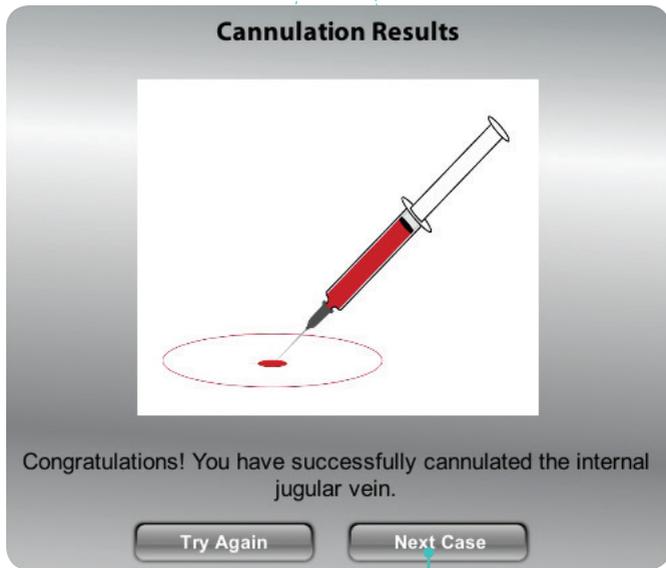
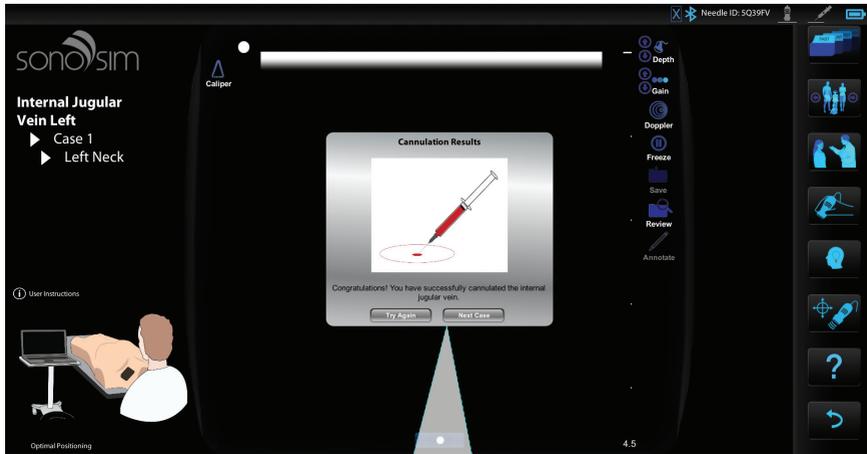


Needle in vein

Review Feedback

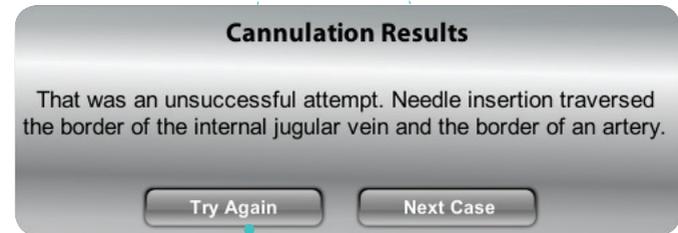
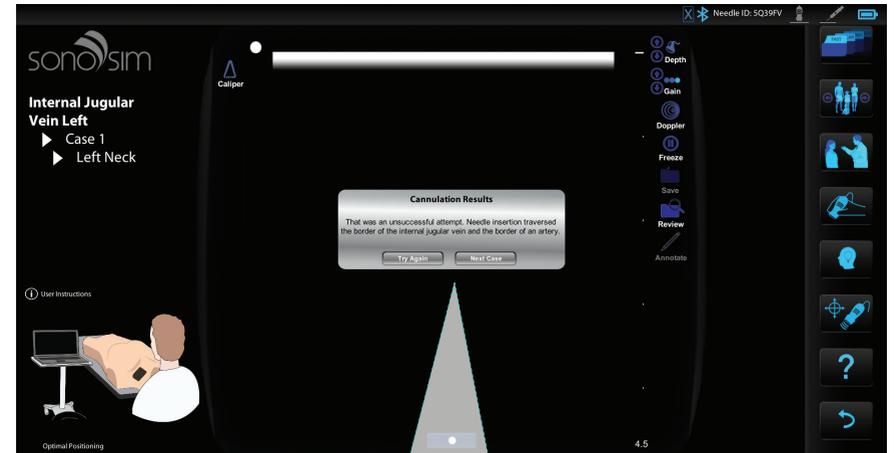
After aspirating, real-time feedback will show if the cannulation was successful or unsuccessful.

Successful



Click Next Case to move onto the next case.

Unsuccessful



Click Try Again to repeat

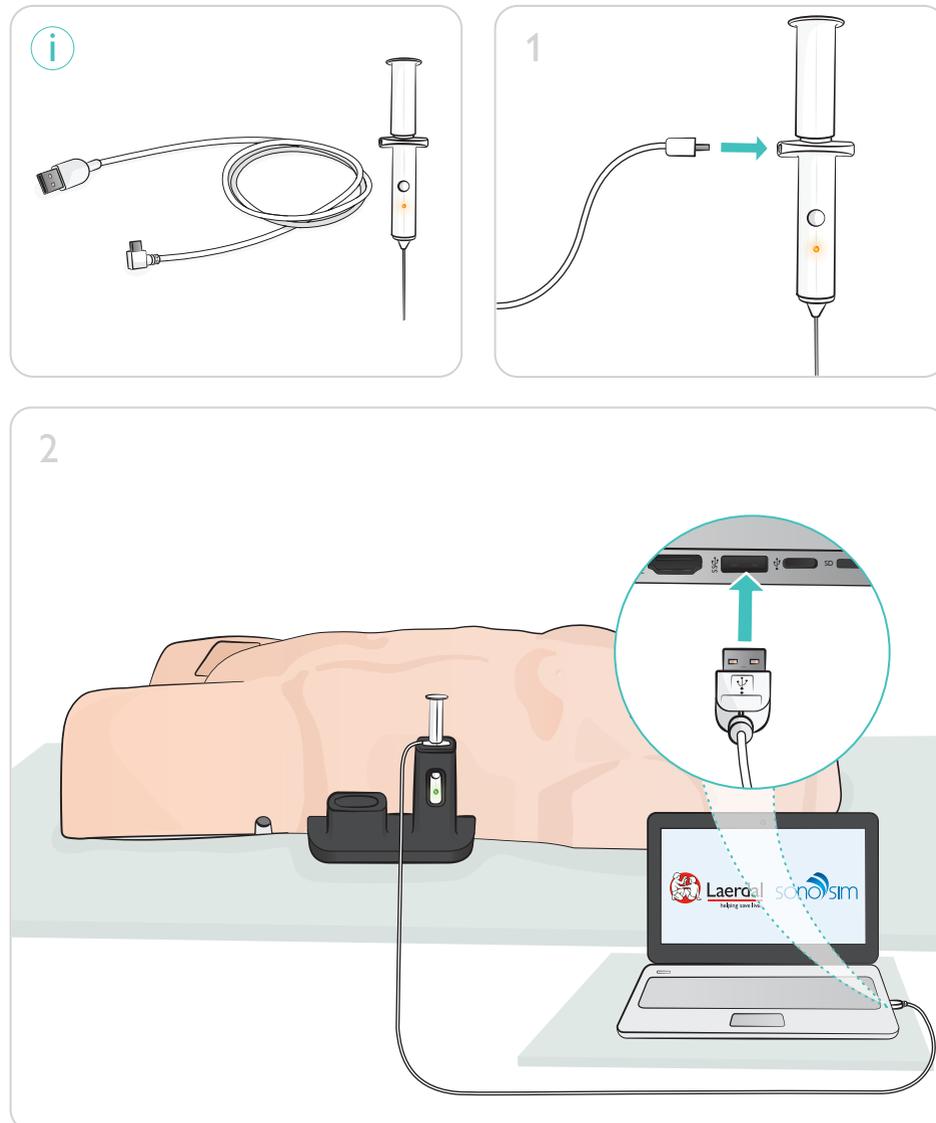
Charging Needle & Syringe

Charge Needle & Syringe every six months and/or when the battery level gets low as reported by the simulator.



Note

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



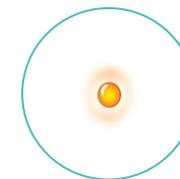
Charging Needle & Syringe

During charging, the LED light displays the level of battery charge.

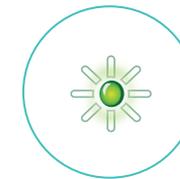


Note

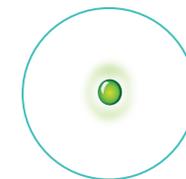
After plugging in the Needle & Syringe, the LED light will be solid green for a few seconds before starting to blink.



Orange
Critical battery level.



Flashing Green
Battery not fully charged.



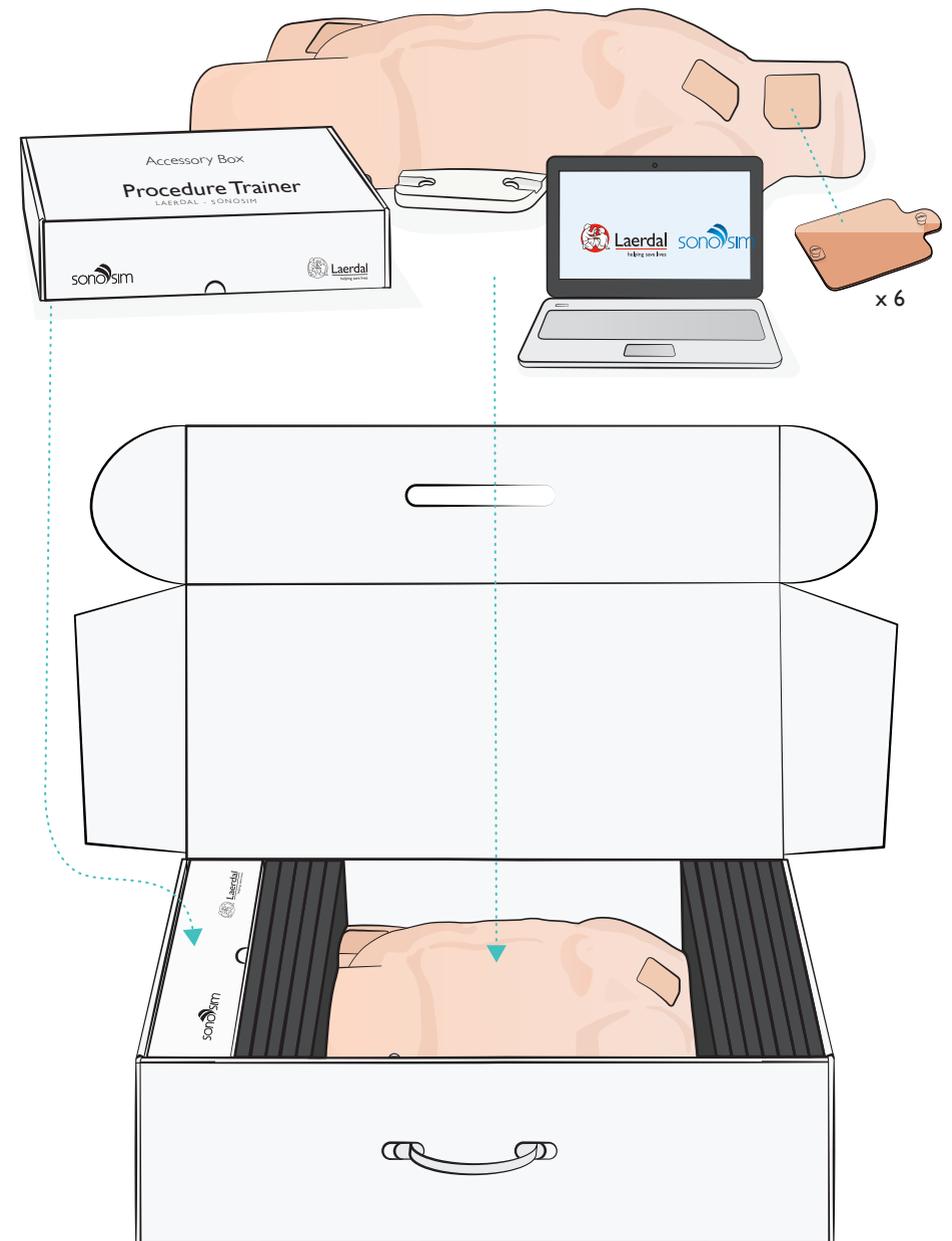
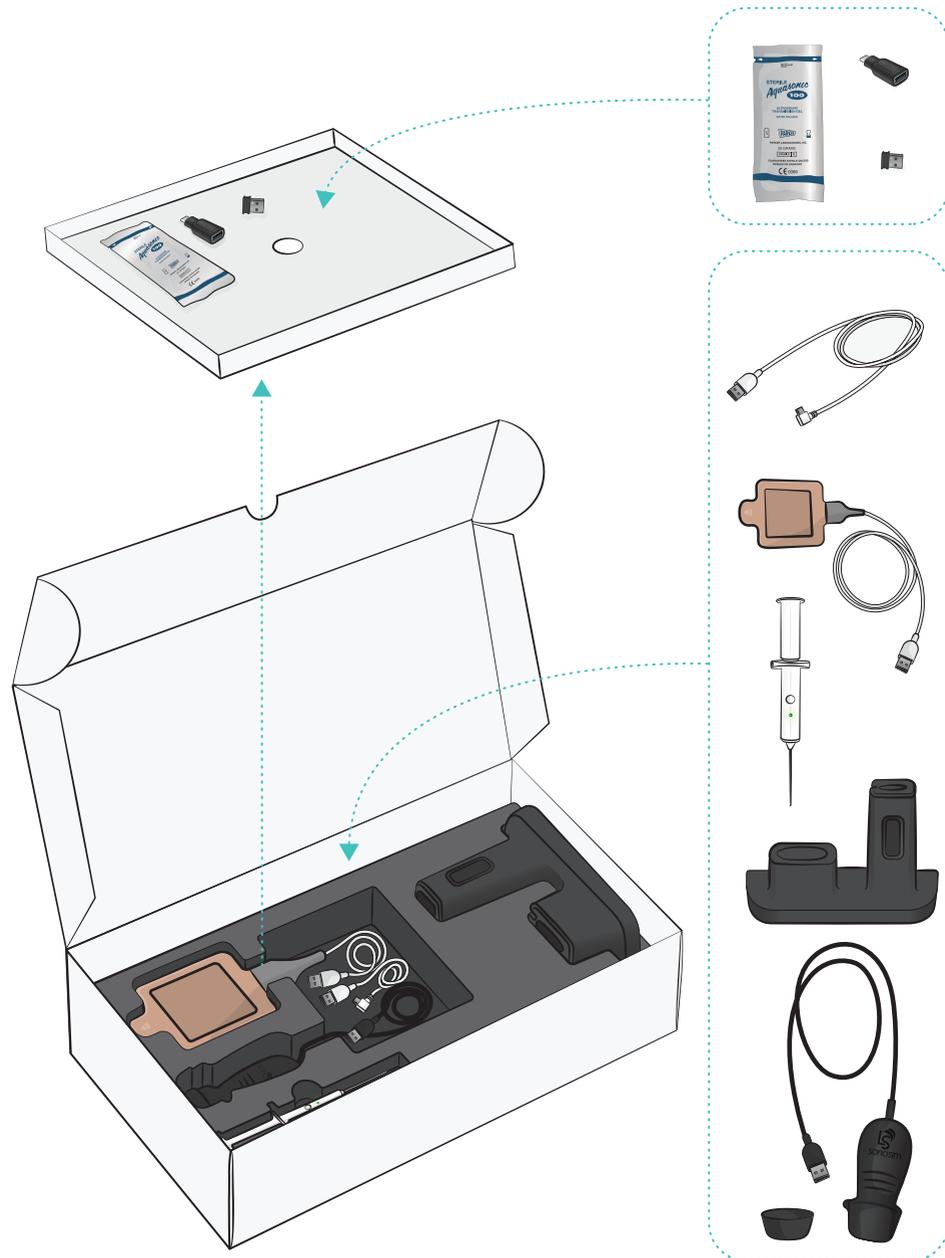
Green
Battery fully charged



⚠ Cautions

- Do not continue to charge the Needle & Syringe after it is fully charged as this will reduce battery performance and life.
- The Needle & Syringe must be recharged at least once every six months to maintain optimal battery performance and life.

Store as shown between sessions.



Cleaning Torso

1. Clean with mild soap and water.
2. To ensure longevity, each manikin should be cleaned after each training session and a general inspection should be conducted regularly.



Note

- *Do not submerge Torso or other parts in cleaning fluids or water.*
- *Avoid felt tipped markers, ink pens, acetone, iodine or other staining products and avoid placing the manikin on newsprint or inked lines of any kind.*

Cleaning Track Pad

1. Remove the TrackPad from the Torso.
2. Wipe off any leftover ultrasound gel from the stand using a dry cloth.
3. Do not use any water or any alcohol based products.
4. Do not apply too much pressure on the TrackPad while cleaning.
5. The TrackPad should be cleaned after each use.

Cleaning Needle & Syringe

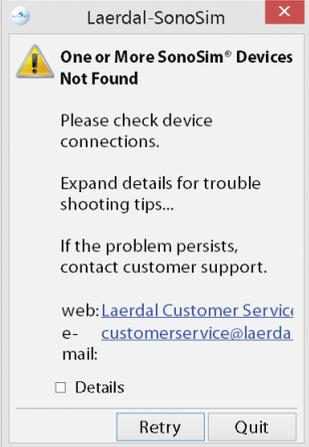
1. Wipe off any leftover ultrasound gel from the needle.
2. Do not use any water or any alcohol based products.
3. Do not pull on the needle while cleaning.
4. Do not push the needle in while cleaning.
5. The Needle & Syringe should be cleaned after each use.

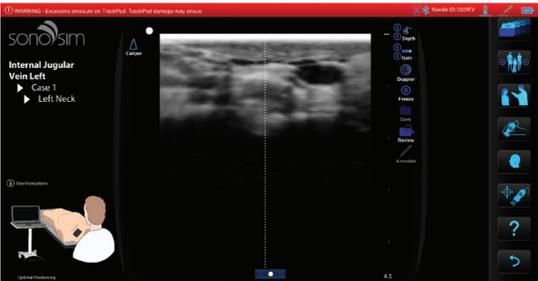
Cleaning Probe and Probe Adapter

1. Remove the Probe Adapter from the Probe.
2. Wipe off any leftover ultrasound gel from the Probe and the Probe Adapter using a dry cloth.
3. Make sure to clean inside to Probe Adapter.
4. Do not use any water or any alcohol based products.
5. The Probe and Probe Adapter should be cleaned after each use.

Cleaning Calibration Stand

1. Remove the components from the Calibration Stand and remove the stand from the Torso.
2. Clean out any leftover ultrasound gel from the stand using a damp cloth.
3. Ensure that the Calibration Stand is totally dry before returning the components.
4. The stand should be cleaned after each use.

Message wording	Condition	Action
<p>One or More SonoSim® Devices Not Found</p> 	<p>Probe, TrackPad or Bluetooth Receiver are not plugged into the Computer upon application startup.</p> <p> Note <i>This message will also appear if a wire is poorly connected in the port.</i></p>	<p>Ensure all devices are connected, then select "Retry."</p>
<p>Sensor Error</p> 	<p>Probe, TrackPad or Bluetooth Receiver become unplugged while running the application.</p>	<p>Close the application, ensure all devices are connected, and restart.</p>
<p>Needle & Syringe Not Found</p> 	<p>The Needle & Syringe is not wirelessly connected upon application startup.</p>	<p>Perform the following steps sequentially until the message disappears:</p> <ol style="list-style-type: none"> 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 after 10 seconds, recharge the Needle & Syringe.

Message wording	Condition	Action
<p>Needle Disconnected</p> 	<p>The Needle & Syringe stops sending signal to the Needle & Syringe USB Receiver while the application is running.</p>	<p>This can occur as a result of three things:</p> <ol style="list-style-type: none"> 1. The battery has run out. ⇒ Charge. 2. Gone into sleep mode from inactivity ⇒ Press the plunger or the button on the face of the Needle & Syringe. 3. Charger has been plugged into the Needle & Syringe. ⇒ Unplug the Charger.
<p>Needle Battery Level Warning</p> 	<p>The Needle & Syringe battery level drops to 40%.</p>	<p>Charge the Needle & Syringe. (If not charged soon after reaching 40%, the Needle & Syringe will automatically disconnect until charged to preserve optimal performance).</p>
<p>Excessive Pressure on Trackpad Detected</p> 	<p>Appears as a red banner across the top of the screen whenever too much pressure is applied to the TrackPad.</p>	<p>Release pressure.</p>
<p>Insufficient Pressure on TrackPad Detected</p> 	<p>Appears as a yellow banner across the top of the screen whenever insufficient or inconsistent pressure is applied to the TrackPad.</p>	<p>Apply more consistent pressure.</p>

© 2018 Laerdal Medical AS. All rights reserved.

Manufactured in the USA for:
Laerdal Medical AS
P.O. Box 377
Tanke Svilandsgate 30, 4002 Stavanger, Norway
T: (+47) 51 51 17 00

20-12958 Rev B

www.laerdal.com



Laerdal
helping save lives

sonosim