

Healthcare

CAE Blue Phantom User Guide

BPLP2101 Lumbar Puncture and Lumbar Epidural Ultrasound
Training Model

BPLP2102 Lumbar Puncture and Thoracic Epidural Ultrasound
Training Model

BPLP2103 Lumbar Puncture and Cervical Epidural Ultrasound
Training Model



CAE

Disclaimer

This product is a simulation device designed for training and demonstration purposes only.

Proprietary Notice

This document, including the information contained herein, is confidential and/or proprietary to CAE Inc., and shall not be reproduced or disclosed in whole or in part, or used for any purpose whatsoever without the prior written authorization of CAE Inc.

Trademark Information

Trademarks and/or registered trademarks of CAE Healthcare Inc. and/or its affiliates include but are not limited to: Apollo, Ares, AresAR, Aria, Athena, BabySIM, BluePhantom, Caesar, CathLabVR, EndoVR, HPS, ICCU, InfantSIM, iStan, Juno, LapVR, LearningSpace, Lucina, LucinaAR, Luna, Maestro, METIman, Müse, NeuroVR, PediaSIM, SimEquip, Simulex, StethoSym, SymDefib, SymEyes, UniSIM, Vimedix, VimedixAR and Vivo. All other brands and product names are trademarks or registered trademarks of their respective owners. All logos, tradenames and trademarks referred to and used herein remain the property of their respective owners and may not be used, changed, copied, altered, or quoted without the written consent of the respective owner. All rights reserved.

Contents

Cautions and Warnings.....	1
General Precautions.....	1
Latex-Free.....	1
Needles and Catheters.....	1
Fluids System.....	2
Service and Repair.....	2
Introduction.....	3
Anatomy.....	5
Equipment Overview.....	5
Using the Training Model.....	7
Setup.....	7
Fluid Setup.....	7
Training.....	9
Ultrasound Scanning.....	9
Ultrasound-guided Procedures.....	9
Care and Maintenance.....	11
Storage and Transport.....	11
Cleaning.....	11
Replacing Tissue Inserts.....	12
Emptying the Drain Tubes.....	12
Troubleshooting.....	13
Fluid Overfill.....	13
Removing Air.....	13
Help and Technical Assistance.....	13

THIS PAGE INTENTIONALLY LEFT BLANK

Cautions and Warnings

Read this user guide, including all cautions and warnings, before you use your CAE Blue Phantom™ ultrasound training model. Use this product only as described in this guide. If you use the product incorrectly, it may be unsafe and will void your warranty. Keep this information for future reference.

General Precautions

- Make sure the training model is set up on a stable, sturdy work surface such as a bed, stretcher, or table that will not collapse and cause injury to users.
- Heavier training models should be placed on a patient bed or stretcher rated to support such weight.
- Place the model on smooth surfaces only. Rough or uneven surfaces can leave impressions on the skin and damage the model.
- Do only the procedures supported by each product as described in this guide.
- Use only needles to access fluids.
- Do not use or store other sharp objects such as scissors, scalpels, or box-cutters with the training model.
- Do not pull on the training model skin. This can cause the skin to tear.
- Do not mark directly on the training model as this will permanently damage it.
- Do not insert any objects or tools into the model except for the equipment, accessories, or medical supplies intended for use with this model.
- Do not use chemical solvents on the models.
- Clean the training model with water and a light soap solution only. Do not immerse the model or use large amounts of liquid to wash it.

Latex-Free

- All CAE Blue Phantom training models, products, and accessories are manufactured only of materials that do not contain latex.

Needles and Catheters

- Use only new, sharp, unbent 18–21 gauge needles or 7F catheters. Smaller needles (higher than 22 gauge) can bend during use and damage the model.
- The self-healing feature of CAE Blue Phantom simulated tissue applies only to needle sticks from 18–21 gauge needles. Healing is not guaranteed if needles larger than 18 gauge, scalpels, or other sharp implements are used to cut into or pierce the model.
- Replace needles after ten uses. Dull needles can damage the model.
- Use extreme caution when using needles during training to avoid injury.

Fluids System

- Use only CAE Blue Phantom fluids. Other fluids can affect the imaging quality and promote fungal or bacterial growth, and may void your warranty. Use fluids only as directed.
- Do not substitute any other fluid unless indicated by this guide.
- Do not modify the fluid reservoirs or any assembly components.
- Protect your eyes, skin, and clothing against accidental fluid exposure. Refer to the Material Safety Data Sheet (MSDS) for guidance.
 - May irritate eyes or skin; flush well with water.
 - May contain pigments that stain clothing; wash immediately with cold soapy water.
- Fluid is not intended for human consumption. If accidental ingestion occurs, drink a glass of water and consult a physician.

Service and Repair

- The CAE Blue Phantom training models are not user-serviceable. Only a trained technician may open or disassemble the product.
- Unauthorized use or handling of the model may void the warranty.
- If you have a problem with your product, contact CAE Customer Support.

Introduction

This user guide describes the features, use, and care of the following training models:

- CAE Blue Phantom Lumbar Puncture and Lumbar Epidural Ultrasound Training Model (BPLP2101)
- CAE Blue Phantom Lumbar Puncture and Thoracic Epidural Ultrasound Training Model (BPLP2102)
- CAE Blue Phantom Lumbar Puncture and Cervical Epidural Ultrasound Training Model (BPLP2103)

These models are intended as platforms for the practice of spinal epidural and lumbar puncture procedures.



Lumbar Puncture and Lumbar Epidural Ultrasound Training Model



Lumbar Puncture and Thoracic Epidural Ultrasound Training Model



Lumbar Puncture and Cervical Epidural Ultrasound Training Model

Anatomy

CAE Blue Phantom training models are constructed using our patented Simulex™ ultrasound tissue which has imaging characteristics that mimic human tissue. The models contain skeletal components so the user will encounter the same imaging landmarks as in a human patient.

The models have tubes that have a female Luer lock connector designed to work with syringes that have a male Luer lock connector. The tubes are used to fill or drain the epidural spaces and spinal cistern.

You will see either two or four tubes exiting the model. The table below shows the tube configuration of your specific training model. Half of the tubes are filled with CAE Blue Phantom Clear Ultrasound Refill Solution to simulate cerebral spinal fluid (CSF). The remaining tubes are empty and serve as drains for injected fluids. The CSF and drain tubes are identified with labels. Do not remove the labels.

Model Nr	Description	Tube Configuration
BPLP2101	Lumbar Puncture and Lumbar Epidural	1 CSF Tube + 1 Drain Tube
BPLP2102	Lumbar Puncture and Thoracic Epidural	2 CSF Tubes + 2 Drain Tubes
BPLP2103	Lumbar Puncture and Cervical Epidural	2 CSF Tubes + 2 Drain Tubes

Models are delivered with minimal fluid. Users must infuse additional fluid to prepare the model for use. More information can be found in the *Using the Training Model* section of this guide.

The lumbar puncture training models have palpable iliac crests and spinous processes, along with the following anatomy:

- Cervical spine (C2-C7; BPLP2102 only)
- Thoracic spine (T1-T7; BPLP2103 only)
- Lumbar spine (L1-L5)
- Ligamentum Flavum
- Epidural space
- Dura
- Subarachnoid membrane
- Subarachnoid space with cerebral spinal fluid (CSF)

Equipment Overview

The following items are included with your shipment:

- Ultrasound training model
- Clear ultrasound refill fluid

Introduction

The following additional items are required for training but not included in your purchase:

- Ultrasound system with appropriate transducer
- Ultrasound gel
- Lumbar puncture and epidural equipment per local protocol

CAE Blue Phantom training models are compatible with any diagnostic ultrasound system. General frequency ranges for diagnostic ultrasound imaging are 2-20MHz.

Optional accessories or consumables for your model are available to purchase on the CAE website:

- BPLP2204 Accessory lumbar obese tissue insert
- BPLP2201 Lumbar replacement tissue insert
- BPLP2202 Thoracic replacement tissue insert (BPLP2103 only)
- BPLP2203 Cervical replacement tissue insert (BPLP2102 only)
- BRS182-CLEAR Clear ultrasound refill fluid
- BRS180-RED Red ultrasound refill fluid (used to simulate bloody CSF)
- BPLP2105 Soft storage case

Using the Training Model

This section has information and instructions about the setup and use of the training model and any specific training procedures.

Setup

Follow the guidelines below to unpack and set up your CAE Blue Phantom training model.

1. Open the shipping carton:
 - Use extreme caution with sharp tools, such as a box cutter, to avoid damage to the training model.
2. Unpack the equipment:
 - Remove the training model from its shipping container. For heavier models, use proper lifting techniques to prevent bodily injury.
 - Review the equipment, accessories, and supplies to make sure all necessary pieces are present. See the *Equipment Overview* section of this guide for a list of items included with this model.
3. Set up for training:
 - Put the model on a stable patient bed, stretcher, or table.
 - Prepare your ultrasound system and equipment.
 - Gather any procedural equipment and supplies.

Fluid Setup

Training models are shipped with minimal fluid in any vessels and fluid spaces. Before first use of the training model, you must add fluid.

During periods of non-use, fluid may evaporate from inside the model. Air may also be accidentally injected during training and practice. See the *Care and Maintenance* section for instructions on removing air.

The fluid contained in the training model is specially formulated for optimal performance of the model. Use only CAE Blue Phantom's simulated fluid solutions. Using other fluids can affect the imaging quality, may promote fungal or bacterial growth, and will void your warranty.

CAUTION

Use refill fluid as directed. Not intended for human consumption. If accidental ingestion occurs, drink a glass of water and consult a physician. May irritate eyes; flush well with water. Keep out of reach of children.

Using the Training Model

The model has one tube to fill the cerebrospinal (CSF) fluid. You can simulate bloody CSF by draining the clear fluid and replacing it with CAE Blue Phantom Red Ultrasound Refill Fluid (available as an option for purchase from the CAE Healthcare website). See the *Care and Maintenance* section for instructions on draining fluid.

To fill the simulated CSF fluid, use one of these methods:

Method A: Syringe Fill (also to remove air)

1. Stand the model upright.
2. Remove the cap of the amniotic tube.
3. Fill a syringe half-full and connect it to the tube.
4. Hold the tube up and tap it to move any air bubbles upwards.
5. Aspirate the air before filling for optimal imaging.
6. Inject 10 ml of fluid.
7. Remove 5 ml of fluid along with any air.
8. Repeat steps 4 through 7 until all the air is removed.
9. Remove the syringe and replace the cap.

Method B: Quick-Fill port for high volume use

1. Connect an IV bag containing CAE Blue Phantom fluid to the amniotic tube.
2. Hang the IV bag no more than 12 inches (30 cm) above the training model to avoid overfilling.

NOTE: A clear sign of overfill is the appearance of small dimples of simulated blood on the surface of the model at the sites of previous cannulations. To correct overfill, see the *Troubleshooting* section.

3. As users withdraw CSF fluid, it is refilled continuously from the IV bag.

Training

This section provides information about using your model for training and practice.

Ultrasound Scanning

Note: CAE Blue Phantom products do not teach ultrasound procedures or techniques. Refer to your institution or training program for more information.

To scan with your training model and conduct a simulated ultrasound-guided procedure:

1. Place the model in the appropriate position for scanning.
2. Place ultrasound gel on the transducer or on the training model in an adequate quantity so that the transducer slides effortlessly on the model. Add more gel as needed.
3. Adjust the ultrasound system controls per your training protocol and the manufacturer's instructions. Optimize the image with the ultrasound controls as needed.

Ultrasound-guided Procedures

Your CAE Blue Phantom training model is a realistic platform for complete lumbar puncture and spinal epidural procedural training. For these procedures, use your normal protocol and equipment, and follow your institution's policies and guidelines.

⚠ CAUTION

Do not use antiseptics, such as iodine, on your training model. This can cause permanent damage to the model.

During training, users may inject fluids such as simulated anesthetics. Any injected fluids will be automatically expelled into the corresponding drain tube. For more information on emptying the drain tube, see the *Care and Maintenance* section of this user guide.

To increase the CSF pressure, use a syringe to infuse an additional 15 ml of CAE Blue Phantom fluid into the CSF Tube. Withdraw any added fluid with the syringe before storing the model.

Users may withdraw fluid from the model to obtain manometer measurements. To maintain the fluid level, any fluid that is withdrawn must be refilled.

Refill the fluid using one of the filling methods described in the *Fluid Setup* section of this guide. A third way is for users to refill fluid by simply re-injecting it:

- During use, the user immediately injects any withdrawn fluid back into the model at the injection site.
- Take care not to inject any air into the model when using this method.

NOTE: This method cannot be used with full catheter placements.

THIS PAGE INTENTIONALLY LEFT BLANK

Care and Maintenance

With proper care, your training model will remain in optimal condition and ready for use.

Storage and Transport

Follow these guidelines to properly store or transport your model:

- Storage temperature degree range: 45 to 85 °F (7 to 29 °C)
- Store the model as is, or in a CAE Blue Phantom storage case (if available for your model).
- Do not store in contact with other models or hard objects as the pressure can damage the Simulex tissue. Do not stack multiple training models on top of each other.
- Ensure any tubes are not pinched or compressed under the model. This will damage the tubes and void the warranty.
- When models with inserts are stored standing up for long periods of time, gravity may cause the insert to deform slightly. Remove the insert and let it sit for a few days to regain its shape.
- Store the model with some fluid in any vessels and fluid spaces. If these become dry, it will damage the model and cause poor ultrasound imaging.
- If fluid was infused into the model during training, remove excess fluid after each training session. If you store the model with too much fluid inside, it can cause damage.
- Transport the model securely so it does not fall.
- Do not carry by the tubes or use them as handles as this will damage the model.

Cleaning

To maintain the product skin for the lifespan of the product, clean the exterior of the model after each use. Follow these steps:

1. Mix one cup of tap water with ¼ teaspoon of mild liquid soap (such as dish soap).
2. Gently clean the model exterior with the soap mixture and a soft, non-abrasive sponge or cloth.
3. Rinse lightly with clean water.
4. Dab or pat with a clean, soft, lint-free cloth to dry the product after cleaning. Do not wipe or rub the skin, which can damage it.
5. After the model has dried completely, lightly coat the external surface of the model with baby powder and dust off any excess.

Emptying Drain Tubes

The drain tubes are designed to collect and expel injected local anesthetics and CAE Blue Phantom fluid in the normal course of training. You should empty the drain tubes after each training session. To do this:

1. Unscrew the blue end cap off of the Luer lock connector. Do not lose the cap.
2. Let the contents drain out of the tube.
3. Place the blue end cap back onto the Luer lock connector.

Replacing the Tissue Insert

To replace the insert, you will need:

- Replacement insert
- 1:4 soap and distilled water mixture
- Clean, lint-free cloth

Follow these steps:

1. Position your training model in the upright position.
2. Disconnect the insert tube from the hand bulb using the silver quick disconnect button.



Quick-Disconnect - Hand Bulb

3. Lubricate the opening(s) around the tube(s) with the soap and distilled water mixture. Apply enough lubrication so the tube slides out easily. Do not inject the soap and distilled water mixture directly into the tubing.
4. Gently lift up and pull the insert and tube(s) out completely.

▲ CAUTION

The attachment point of the tube to the Simulex tissue is delicate. Do not apply stress to the connection or it can tear. Do not pull hard on tubes or use them to carry the insert.

5. Place the tube(s) of the new insert into the correct openings.
6. Guide the tube(s) through the openings until the tissue insert fits into the space.
7. Adjust the insert as needed so it aligns with the surface of the model.
8. Dry with the clean, lint free cloth as needed.

Troubleshooting

This section provides information to identify and fix problems that may occur with the product.

Fluid Overfill

You can overfill fluid spaces and vessels if you inject too much fluid. Overfill does not usually result in permanent damage, but you should correct it as soon as possible.

Withdraw excess fluid to alleviate overfill, or, with the Quick Fill method, make sure the IV bag is not hanging any higher than 12 inches (30 cm) above the training model.

Removing Air

Fluid can evaporate from the model during shipment or during extended periods of non-use. Air may also enter through accidental injection during fluid filling or training use. This may cause the Simulex tissue to stick together in some areas, preventing fluid from circulating. Remove any air from the model for optimal performance.

To remove air:

1. Fill a syringe with fluid and connect it to the tube.
2. Infuse fluid, and tilt the model up at least 6-10" so any air rises to the top.
3. Let the model sit for at least one hour to allow any air to rise.
4. Use the syringe to slowly pull the fluid out of the model.
5. Watch for air bubbles and let them rise to the top (back) of the syringe.
6. Slowly push fluid back in without pushing the air in.
7. Repeat steps 4-6 three to four times.
8. Empty the syringe into a container and use it to remove any additional fluid, then disconnect it.

NOTE: When all the fluid is removed, the syringe will be under vacuum. Do not put excessive force on the syringe or the tissue may rupture.

9. If there is still air, fill any fluid spaces or vessels with fluid and let the model sit overnight, then repeat the procedure.

THIS PAGE INTENTIONALLY LEFT BLANK



Healthcare

For more information about CAE products, contact your regional sales manager or the CAE distributor in your country, or visit caehealthcare.com.

Tel +1 941-377-5562 or 866-233-6384

For customer support, please contact CAE.

Customer Support Headquarters - United States

Monday - Friday from 7:00 a.m. to 6:00 p.m. ET

Phone 1-866-462-7920

Email: srqcustomerservice@cae.com

Customer Support - Canada

Monday - Friday from 8:00 a.m. to 5:00 p.m. ET

Phone 1-877-223-6273

Email: can.service@cae.com

Customer Support - Europe, Middle East, and Africa

Monday - Friday from 8:00 a.m. to 5:00 p.m. CET

Phone +49 (0) 6131 4950354

Email: international.service@cae.com

Customer Support - United Kingdom and Ireland

Monday - Friday from 9:00 a.m. to 5:00 p.m. GMT

Phone +44 (0) 800-917-1851

Email: uk.service@cae.com

Customer Support - Latin America

Monday - Friday from 9:00 a.m. to 5:00 p.m. BRT/BRST

Phone +55 11 5069-1510

Email: la.service@cae.com

Customer Support - Asia Pacific

Monday - Friday from 8:00 a.m. to 5:00 p.m. CET

Phone +49 (0) 6131 4950354

Email: ap.service@cae.com