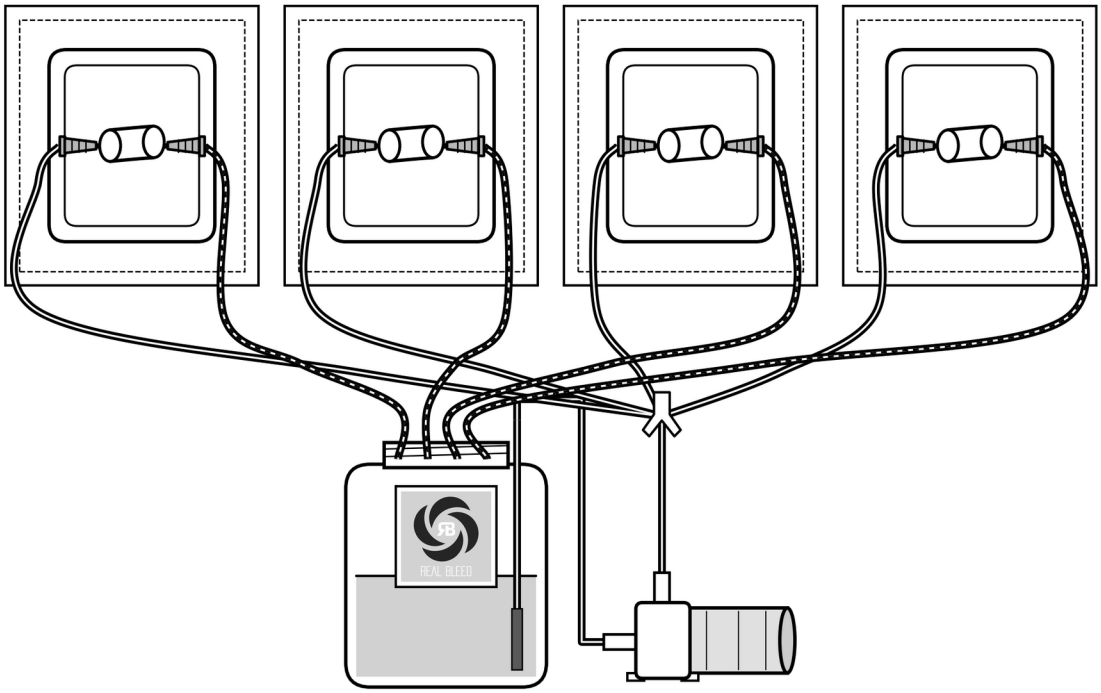
REAL BLEED™

Instructions for Use

Surgical Simulation Kit · 4 Stations



STOP! Please watch the setup instruction video first.

Scan to watch the setup video.
https://www.realbleed.com/instructional.html

For training and educational use only. Not for human use.
Patent Pending

Train on the real thing before the real thing.

Real Bleed™ by Gamma Global LLC · www.realbleed.com

1. Welcome

Welcome to the Real Bleed™ experience. Your Real Bleed™ Surgical Simulation Kit is designed to support 4 stations with 4 specimens. It allows high-pressure perfusion of harvested organs and vessels, creating a realistic surgical training environment with active bleeding simulation.

A single pump continuously circulates fluid through all four stations and returns it to the basin. This makes a self-sustaining, rolling system: there is no need for refills after setup.

The kit ships packed inside the basin.

STOP! Watch the video first

Please watch the step-by-step setup instruction video at www.realbleed.com before you set up the system.

How to read the drawings

All drawings in this guide are black and white. The tubing colour codes are shown as lettered dots:

- **B** (open circle) = **BLUE DOT = DELIVERY**: fluid from the pump to the specimen.
- **R** (filled circle) = **RED DOT = RETURN**: fluid from the specimen back to the basin. Return lines are drawn with a dashed centre line.

2. Intended Use

Real Bleed™ is a surgical simulation system for **training and educational use only**. It is **not for human use**.

It is used by residents, fellows and industry representatives to practise skills such as suturing, anastomosis, and the use of surgical hemostats and sealants on surrogate tissue, for example porcine aorta and carotid, and organs.

What your room needs

- A standard electrical outlet (an extension cord is included in the kit).
- A sink.

Training disclaimer

Real Bleed™ training covers operating our simulation systems, integrating them into your program, and guidance on simulating specific surgical disciplines with surrogate tissue. Surgical training and instruction are provided by your institution; Real Bleed™ does not provide surgical training, medical instruction, or certification.

3. Warnings and Precautions

WARNING

- For training and educational purposes only. Not for human use.
- Reuse: see Reuse and warranty below.
- Contains sharp items. Handle with caution.
- Use proper personal protective equipment (PPE). Wear eye protection.
- Always monitor pump pressure and tubing for leaks.
- Do not use any needles with the system other than those provided by Real Bleed™. Aftermarket needles and connectors can let sediment and particles into the system, affecting the pump and tubing.
- Be sure to flush the pump after use (see Section 9).
- Real Bleed™ is not responsible for any damages resulting from its use.

Reuse and warranty

Real Bleed™ components may be reused with Real Bleed™ color solution if they are cleaned, dried and inspected after every session. How many times a part can be reused depends on handling, cleaning and storage, and is not guaranteed. Inspect every part before use and replace any that are worn, cracked, kinked, clogged or leaking. If real blood or any biological fluid is used, all components that touch it are single-use and must be disposed of after the session according to local regulations. Reuse after contact with real blood, use of non–Real Bleed™ needles or connectors, or failure to flush the pump after use voids the warranty.

4. Kit Contents

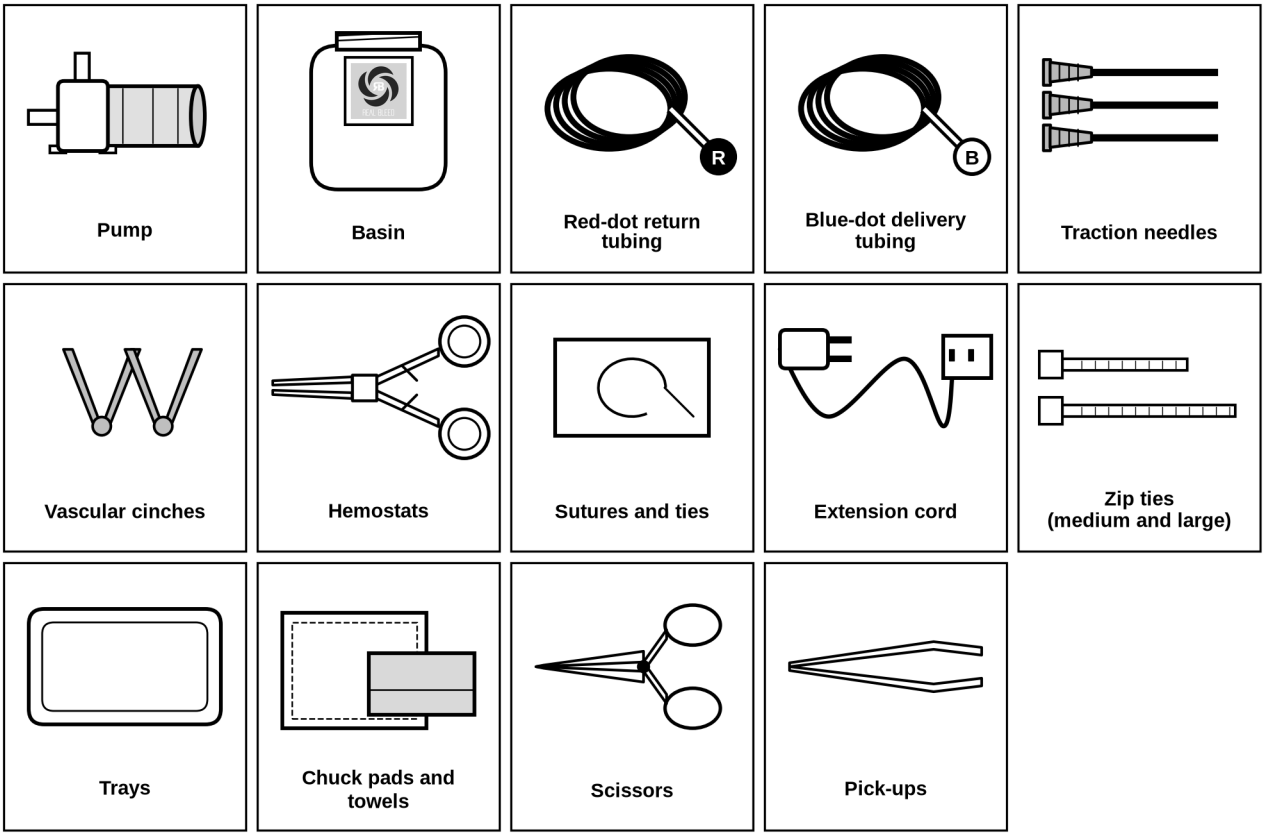


Figure 1. Kit contents.

Pump	Single pump that circulates fluid to all four stations.
Tubing, red dot (return)	Splint pack. Carries fluid from each specimen back to the basin. Its male end feeds the pump.
Tubing, blue dot (delivery)	Delivery pack. Carries fluid from the pump to each station. Has integrated line clamps.
Basin	Holds the fluid. The kit ships packed inside it.
Traction needles	Establish the entry and exit points for fluid circulation.
Vascular cinches	V-shaped metal clips for sealing holes and branches.
Hemostats	
Sutures and ties	
Extension cord	
Zip ties (medium, large)	Secure the specimen onto the traction needles.
Trays	
Chuck pads and towels	
Scissors	Snip zip-tie tails flush.
Pick-ups	

Additional materials you may want (not included)

- Graft or patches
- Micro sutures
- Vascular tray and tools
- Headlamp or loupes
- Surgical tape, laps or gauze
- Additional plastic basins
- Eye protection
- Gown and face mask
- Extra gloves
- Bulb syringe
- RealBeam tabletop lighting boom (available at www.realbleed.com)
- Timer
- Surgical staplers or clips
- Soft cooler for tissue transport
- Re-use accessory kits (available at www.realbleed.com)

A replacement motor is available from Real Bleed™. The old motor must be sent in.

5. System Overview

Fluid travels in one closed loop:

1. The splinted ends of the red-dot pack sit on the floor of the basin. Its male end feeds the pump's red connection.
2. The pump pushes fluid out through the blue-dot delivery pack, which divides the flow to every station.
3. At each station, the blue-dot line connects to the **entry** traction needle. Fluid runs through the specimen.
4. The red-dot line on the **exit** traction needle carries the fluid back to the basin.

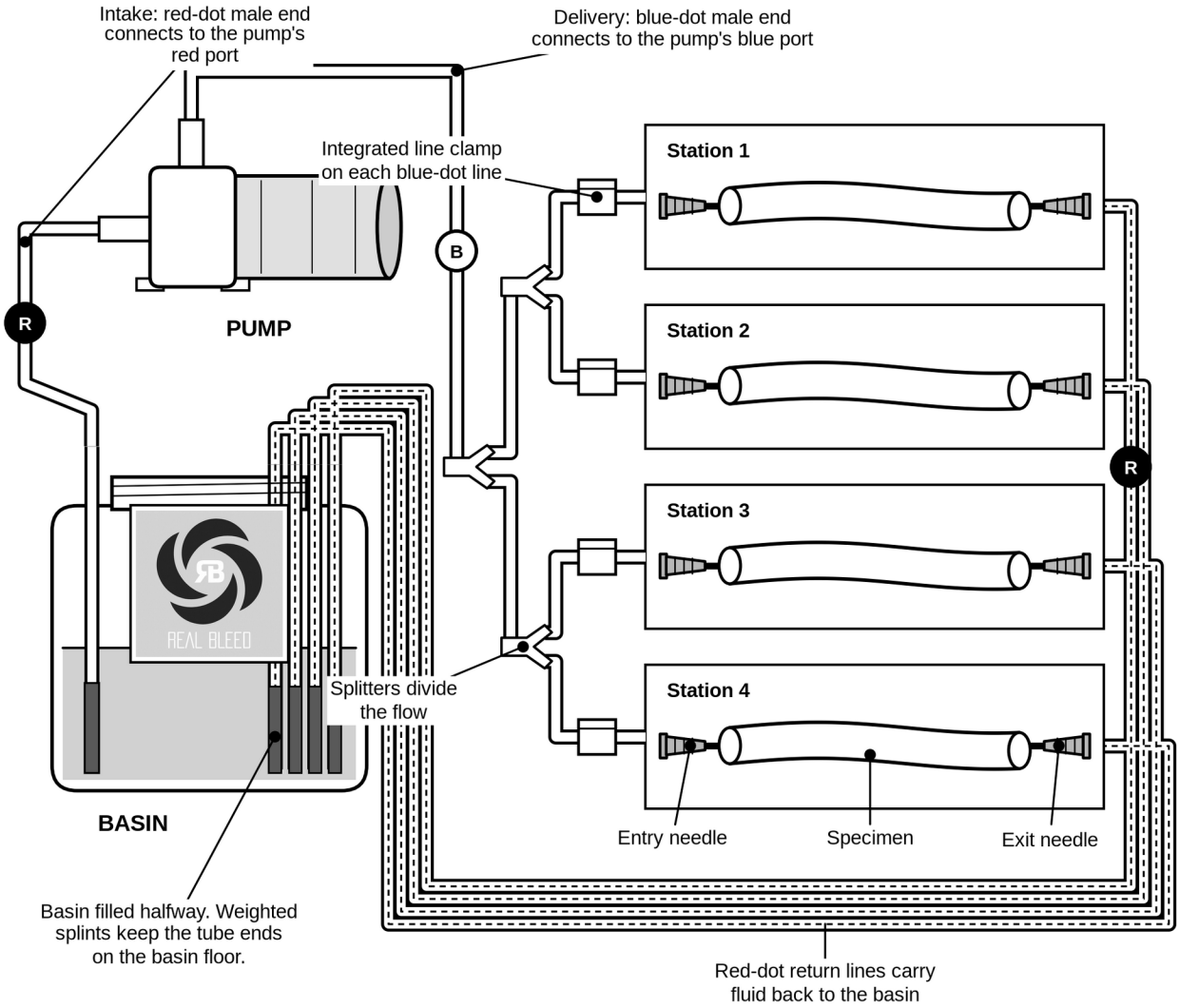


Figure 2. Flow overview: basin, pump, delivery (B) and return (R) lines for four stations.

6. Setup

STOP!
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Setup video
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Step 1: Set up stations and specimens

1. Arrange your stations using chuck pads and trays.
2. Lay out specimens securely.

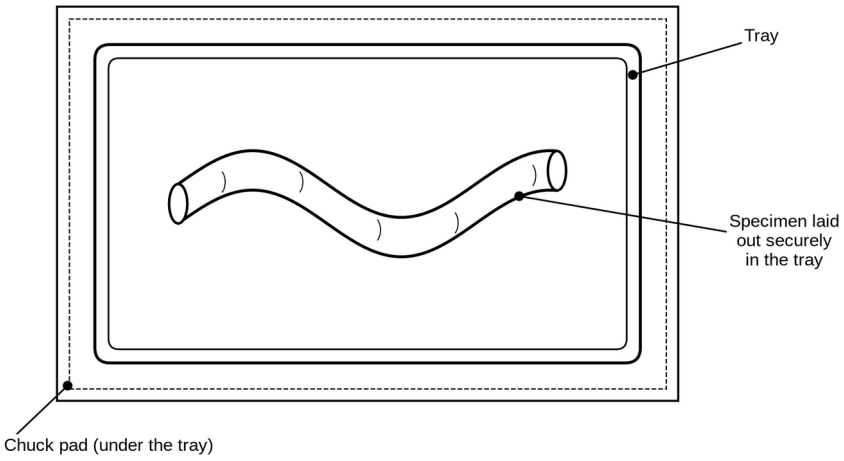

Figure 3. One station: chuck pad, tray and specimen.

Step 2: Prepare the basin

1. Fill the basin halfway with water, and add Real Bleed™ color solution, or use real blood if applicable.

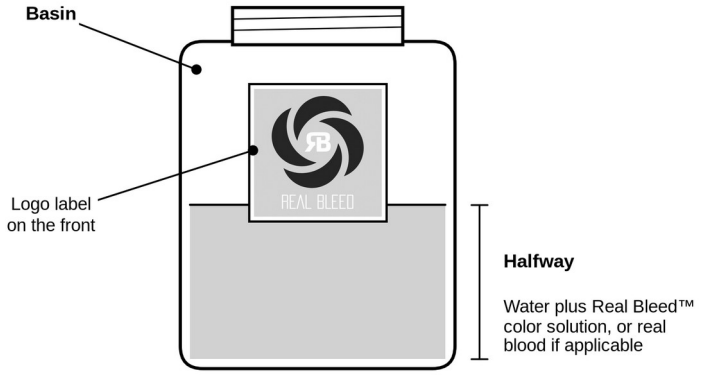

Figure 4. Basin filled halfway.

Step 3: Position the components

1. Place the basin in a central location.
2. Place the tubing splints in the basin, with the opposite tubing ends outside the basin. The splints keep the tube ends straight and weighted on the basin floor so they stay submerged.
3. One of the splinted tubes has a male end. Connect it to the pump's **red** female connection.
4. Position the female red-dot ends one at each station. These return fluid to the basin. You will connect them to the specimens in Step 5.
5. Connect the separate delivery tubing pack to the pump: its male connector has a blue dot. Connect it to the pump's **blue** female connection.
6. Lay out the delivery tubing so that a female blue-dot end is at each station. Each station should now have one female red end and one female blue end: one for return, one for delivery.

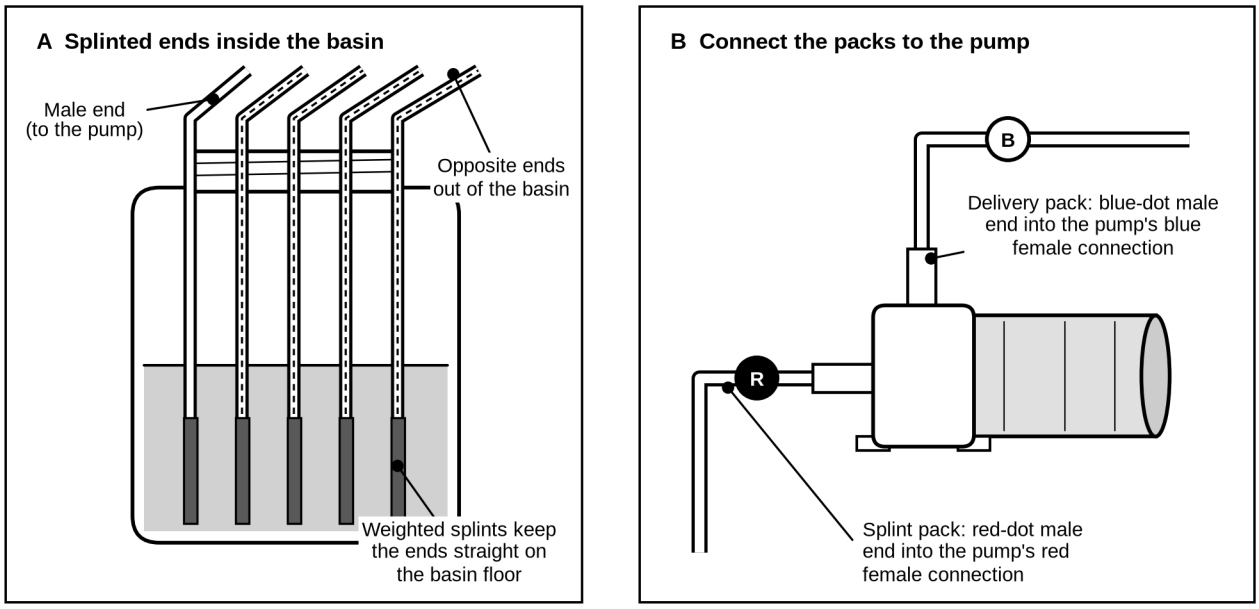

Figure 5. (A) Splinted tube ends in the basin. (B) Connecting both packs to the pump.

Step 4: Secure the traction needles in the specimen

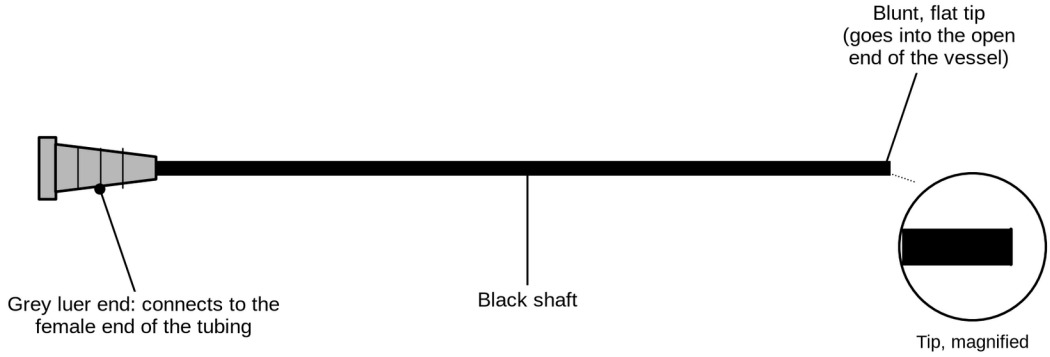

Figure 6. Traction needle: grey luer end, black shaft, blunt flat tip.

1. Identify the entry and exit points for the traction needles, and lay the vessel flat.
2. Insert the blunt, flat tip of the traction needle into the open end of the vessel. Slide the vessel about 3/4 of the way up the shaft, so only about 1/4 of the black shaft is visible near the grey luer end.
3. Slide a zip tie underneath the vessel. Place it high, near the open end of the vessel, over the section where the vessel and needle overlap. Close it hand-tight.
4. Cross-clamp the hemostat crosswise on the zip-tie tail, about halfway along the tail, with the tail inside the jaws. This gives you a grab point to gain traction on the tail.
5. Put one hand on the hemostat and zip-tie junction and the other hand on the zip-tie head (knob) against the vessel. Pull tight enough to create a watertight seal.
6. Release the hemostat and snip the tail flush with the scissors.
7. Repeat at the opposite end of the vessel.

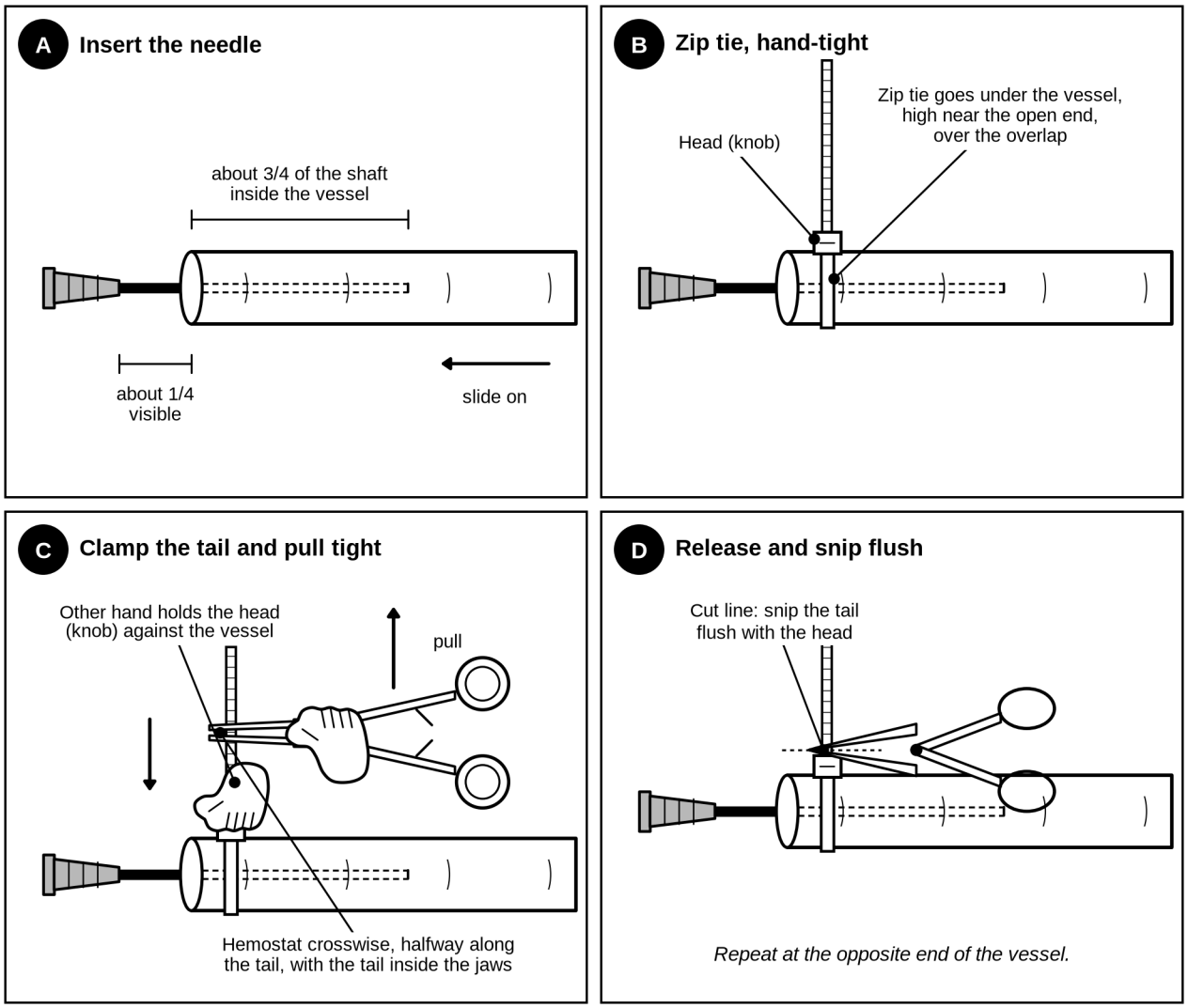

Figure 7. Securing the vessel on the traction needle: (A) insert, (B) zip tie, (C) clamp the tail and pull tight, (D) release and snip flush.

Step 5: Connect the system

1. Attach the red-dot (return) and blue-dot (delivery) tubing to the two grey traction needles on the specimen. The blue line delivers fluid to the specimen; the red line returns it to the basin.
2. Make sure the entry needle is connected to the blue-dot line that leads from the pump.
3. Plug in the pump and switch it on with the inline switch (use the extension cord if needed). Check that fluid runs through the delivery tubing and briefly into the specimen.
4. This is only an initial test that the system is set up properly. For full operation, the specimens must first be sealed (Step 6).

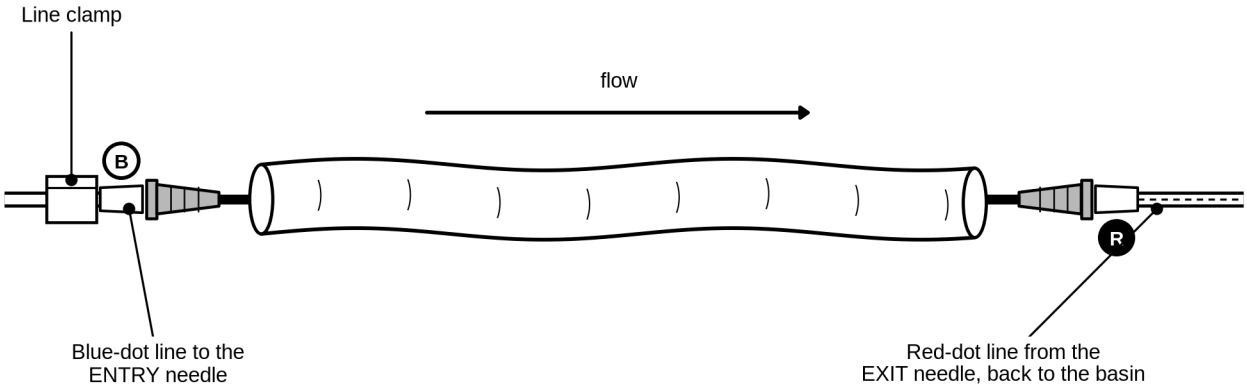

Figure 8. Station connection: blue-dot line to the entry needle, red-dot line from the exit needle.

Integrated line clamps. Not ready to run all stations, or want more pressure at one station? Use the integrated clamps on the blue-dot delivery lines to close the lines to unused stations, or to force more pressure to individual stations. Use them to control the pressure or stop the flow completely.

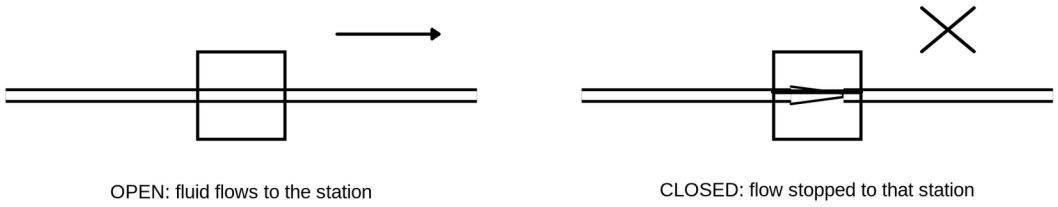

Figure 9. Line clamp open and closed (generic clamp shown).

Step 6: Close and seal the specimen

1. Use vascular cinches, suture ties and zip ties to close all openings.
2. Use any other surgical techniques to close openings or defects and bring the specimen under pressure. This is good practice for working with tissue and ligating vessel branches. Once everything is closed, the circulation runs as a closed loop.
3. **Vascular cinch:** place the open V-shaped clip over the vessel or branch, so it sits inside the V. Use finger pressure to squeeze the mouth closed over the defect for a quick closure.

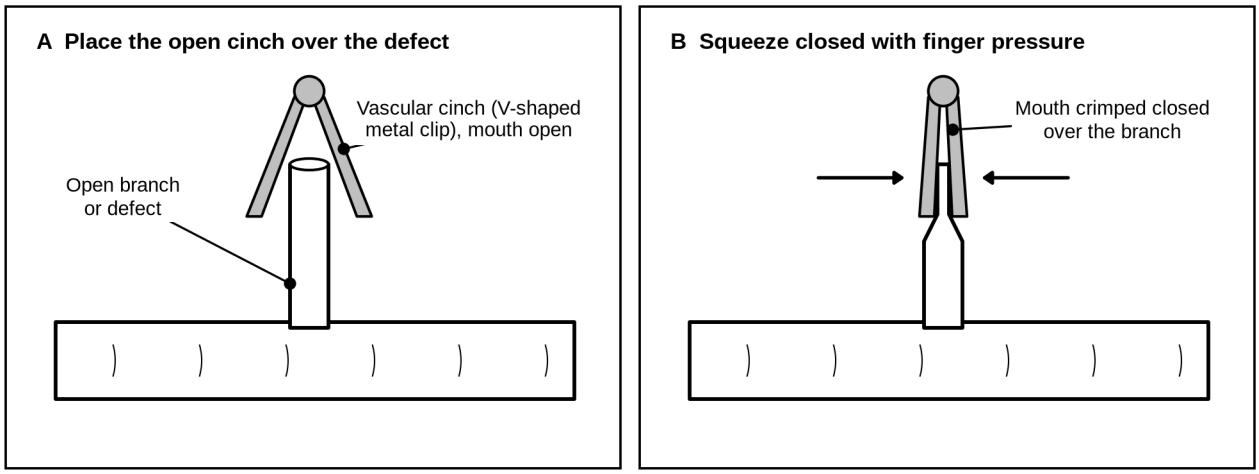

Figure 10. Vascular cinch: (A) open over the branch, (B) crimped closed.

4. The specimen will come under pressure with slight leakage; this is normal. If there are major defects, the fluid goes into the station tray instead of out through the return tubing.
5. As the obvious defects are closed and pressure rises, the system begins to expose hidden defects.

NOTE

The system does not need to run at all times. Only run the pump when needed: for testing for leaks, identifying defects, or simulating a specific surgical situation. During repairs the pump can stay off, simulating a clamp. Turn the pump off before opening the vessel.

7. Running a Session: the Real Bleed™ Challenge

Enhance the training with a hands-on, competitive exercise:

- First, assemble a fully closed circulation with no leaks while the pump is on.
- Lab partners take turns creating trauma, cuts or surgical abrasions.
- The opponent must diagnose and repair the bleed against a timer, with limited tools.
- Raise the difficulty as you go. This simulates real-world surgical intensity for skill refinement.
- To repair: locate the leak, stop the flow, repair, and retest.

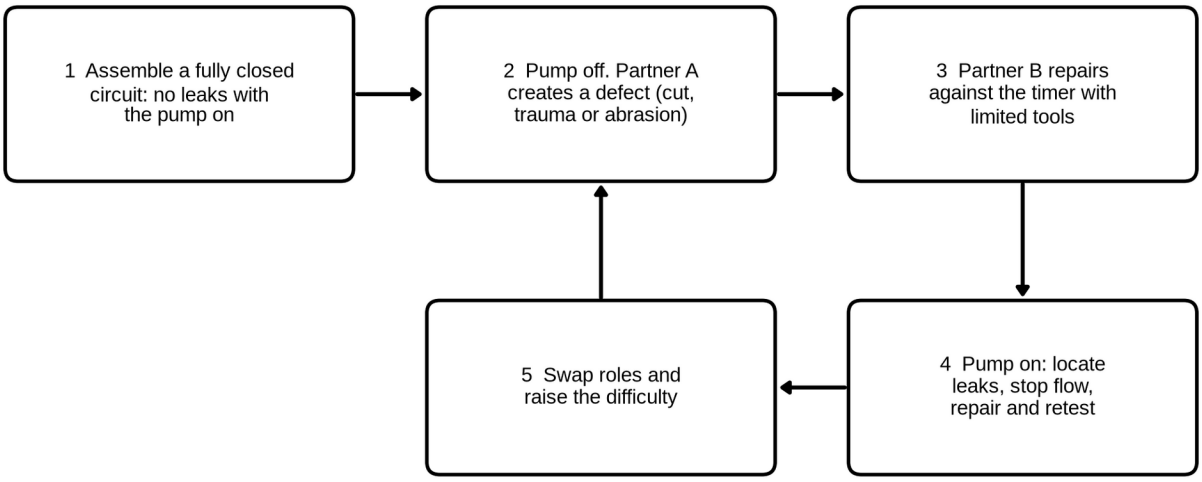

Figure 11. The Real Bleed™ Challenge cycle.

8. Troubleshooting

What you see	What it means	What to do
Slight leakage when the specimen is under pressure	Normal.	Continue.
Fluid collects in the tray instead of returning to the basin	A major defect in the specimen.	Turn the pump off, locate the defect, close it with cinches, ties, zip ties or sutures, then retest.
New leaks appear as pressure rises	Hidden defects being exposed.	Locate, stop the flow, repair and retest.
Leak where the vessel meets a traction needle	Suggested: the zip tie is not tight enough or not over the overlap.	Suggested: repeat Step 4. Check the vessel is about 3/4 up the shaft and the zip tie sits high over the overlap, pulled tight.
A station is not in use	Its delivery line is still open.	Close the integrated clamp on its blue-dot line, or cross-clamp the line with a hemostat.

Not enough pressure at a station	Flow is shared with other open stations.	Close the clamps on the other blue-dot lines to force more pressure to that station.
Sediment or particles in the tubing or pump	Aftermarket needles or connectors may have been used.	Use only needles and connectors provided by Real Bleed™.
Tube ends lift out of the fluid	Suggested: a splint has moved or the fluid is low.	Suggested: put the splinted ends back flat on the basin floor and keep the basin about half full.
Pump does not run	Suggested: no power.	Suggested: check the plug, the extension cord and the inline switch. A replacement motor is available from Real Bleed™ (the old motor must be sent in).

9. After Use: Shutdown, Flush, Cleaning and Storage

For reuse, see Reuse and warranty in Section 3. The steps marked Suggested are recommendations for cleaning and storing the reusable components.

Flush the pump (required)

1. Turn the pump off and disconnect it from the tubing.
2. Run the pump for 2 to 3 seconds to clear any standing fluid from inside the pump.

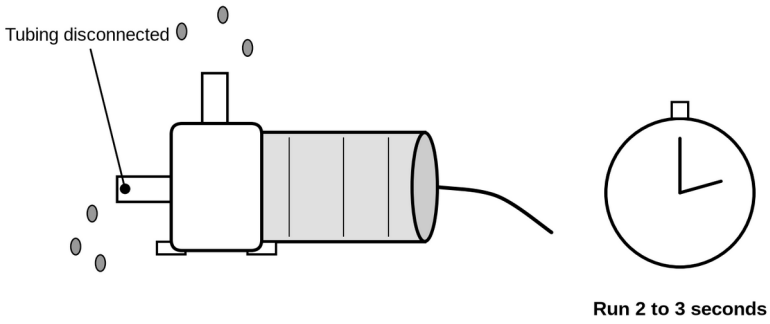

Figure 12. Flushing the pump after use.

Clean and store

1. Suggested: switch the pump off and unplug it before cleaning.
2. Suggested: dispose of the specimens and any real blood according to your facility's rules. If real blood or any biological fluid was used, dispose of all components that touched it instead of cleaning them.
3. Suggested: empty the basin into the sink.
4. Suggested: rinse the basin, the outside of the pump and the other reusable components in warm water with mild detergent. Keep the motor and cord out of the water.
5. Suggested: let every part air-dry completely.
6. Suggested: store the dry parts inside the basin at room temperature, the way the kit ships.

Re-use accessory kits are available at www.realbleed.com.

10. Contact

Real Bleed™ by Gamma Global LLC
355 NE 20th Ave Unit 3, Deerfield Beach, FL 33441
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Email: info@realbleed.com
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