

Abdominal Aortic Aneurysm (AAA) Repair Trainer User Guide



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Abdominal Aortic Aneurysm (AAA) Repair Trainer

Part No: **60610**

For practising open techniques associated with AAA surgery.
Designed in collaboration with St Mary's Hospital Vascular Unit, London, UK for use by Higher Surgical Trainees (HST).

Skills

- AAA Repair Trainer enables practise of the following: common iliac aneurysm, internal iliac aneurysm and juxtarenal repair
- Management of pre-incised skin & soft tissue using the correct surgical instruments to provide adequate access to the relevant vessel
- Identification of the internal structures around the vessel
- Maintaining access and conducting delicate manoeuvres within a confined space
- Anastomosis of arterial grafts
- Fluid flush test

Features

- Anatomically accurate vessels with relevant soft tissue landmarks
- Realistic tissue response
- Aorta includes 3 aneurysms: aortic, iliac and internal iliac
- Vessels will withstand a fluid flush test to demonstrate the integrity of the repair
- Internal 'organs' supplied. When filled with water they replicate the obstructive mobility of organs within the abdominal cavity accurately
- Lightweight and portable
- Mock Blood Flow System supplied to allow user to connect AAA to Mock Blood Flow Kit (Available separately. Part No: **60650**. Consists of Mock Blood Giving Set and Mock Blood)

Package supplied

- 1 AAA Trainer Skin **60612**
- 1 AAA Trainer Base & Anatomical Insert **60615**
- 1 AAA Trainer Vena Cava **60614**
- 3 AAA Trainer Internal Organs **60613**
- 2 Replacement AAA **60611**
- 2 AAA Bifurcated Graft (18mm dia) **60616**
- 1 Mock Blood Flow System
- 1 bag of clips

IMPORTANT

Use only Limbs & Things Mock Blood with the AAA Repair Trainer: it has a neutral water base enabling easy flushing and stain removal. Blood from other manufacturers will compromise the model if used.

Components



AAA Trainer Skin
Part No: **60612**



AAA Trainer Base
Part No: **60615**



AAA Anatomical Insert
(fits in AAA Trainer Base)



Vena Cava
(attaches to Anatomical Insert)
Part No: **60614**



AAA Trainer Internal Organs
Part No: **60613**



Replacement AAA
Part No: **60611**



AAA Bifurcated Graft
Part No: **60616**



Mock Blood Flow System

Mock Blood Flow System: Overview

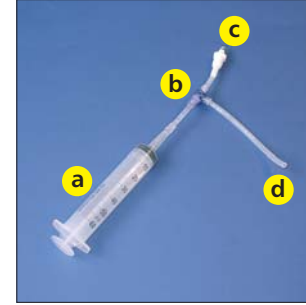
1



The Mock Blood Flow System consists of:

- Flow Tubing (connects vessels to the Pump and Mock Blood Giving Set)
- Pump (for managing Mock Blood within the Flow Tubing and attached vessel)

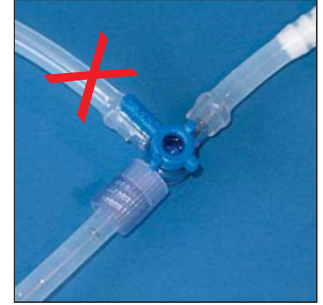
2



The Pump consists of:

- syringe **a**
- valve **b**
- primary tube **c** (with connector for attaching to Flow Tubing)
- secondary tube **d**

3

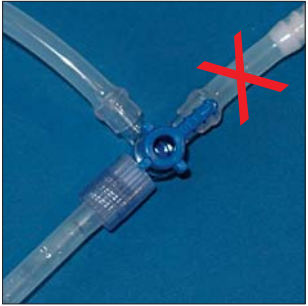


To manage Mock Blood directly to and from the Flow Tubing (and the vessel), align the 'OFF' arm of the valve with the secondary tube. (Red cross indicates tube which is closed off.)

The direction of flow is controlled by the syringe.

Mock Blood Flow System: Connectors

4



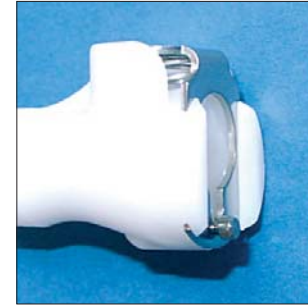
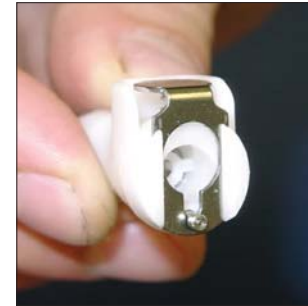
To manage Mock Blood to and from the secondary tube align the 'OFF' arm of the valve with the primary tube. (Red cross indicates when managing large tube which is closed off.)

The direction of flow is controlled by the syringe.

The maximum capacity of the syringe is 60ml so stages 3 & 4 will need to be combined several times when managing large amounts of Mock Blood.

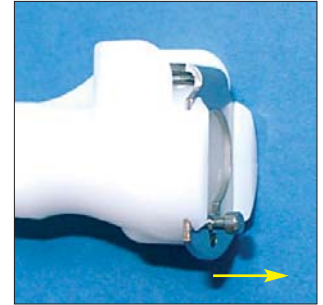
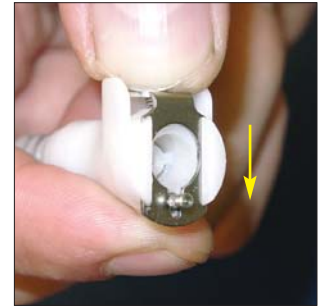
4

1



Connector in the locked position, preventing items from being attached to it.

2



Unlock the connector by depressing the metal clip.

The connector is reset and ready to use when the pin pops out.

5

Should any of the Mock Blood Flow System connectors fail to attach they will need to be 'reset'.

Preparing AAA Trainer: Wet simulation (fluid)

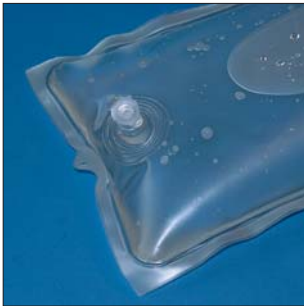
1



Open the nozzle at the end of the Internal Organ.

Insert the funnel firmly into the nozzle. Ensure that it fits snugly to avoid any fluid leaking during filling.

2



Fill the Internal Organ with approximately 3 litres (5 pints) of water.

Close end cap of nozzle.

3



Push down gently on the end of the Internal Organ to provide enough space for the nozzle to be hidden within.

Push the nozzle downwards ensuring that the end cap is flush with the surface of the Internal Organ.

4



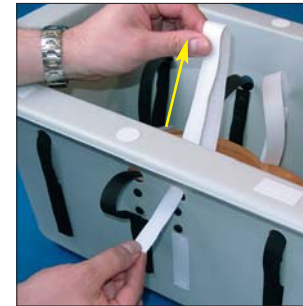
Place AAA Trainer Base on the work surface. Remove all contents except for: Anatomical Insert, Vena Cava and AAA.

Ensure the Anatomical Insert, Vena Cava and AAA are in position. Ensure the AAA is securely attached to the blood flow connectors.

Velcro straps are used for securing certain parts of the Trainer in position:

- black straps retain Internal Organs
- white straps retract the Trainer Skin

5



Before the Internal Organs can be fitted the white straps need to be repositioned. Lift up the straps from either side of the Base.

Pull the straps entirely through the holes.

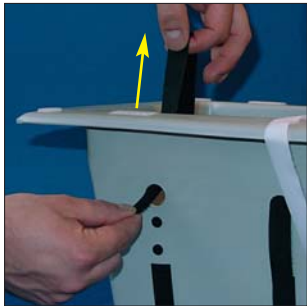
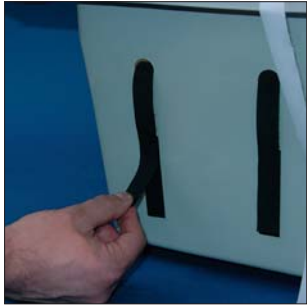
6



Pull the straps up and over the top edge of the Base, attaching them to their corresponding Velcro dots.

Finally, secure the ends of the straps back on the sides of the Base.

7



To fit the Internal Organs the black retaining straps need to be undone. Lift up the straps from one side of the Base.

Pull the straps entirely through the holes.

8



Drape the three straps across the top of the Base, as shown.

Fold the Internal Organ into an L shape ensuring that the long part fits the long side of the base. (Short part fits on the distal end.) Secure the Internal Organ in position by feeding the straps back over and through their corresponding holes in the Base.

9



Repeat stages 1 to 8 when preparing and fitting another Internal Organ on the other side of the Base. Ensure that the short part of the Internal Organ fits in the proximal end.

10



A third Internal Organ can be added to one side to simulate a greater degree of bowel obstruction when performing the procedure.

11



Place the Flow Tubing on the work surface, next to the Trainer Base, as shown.

Attach the dual Flow Tubing connectors to the distal (lower) end of the Base.

12



Ensure both connectors are firmly attached: they should 'click' when properly engaged. See page 5 if the connectors fail to attach.

Then attach the single connector to the proximal (upper) end of the base.

13

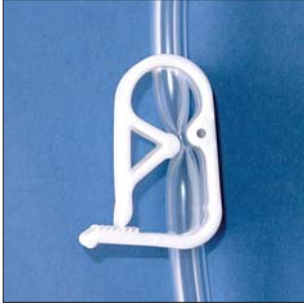


NB: Please note that if you purchased the AAA Trainer by itself you will need to purchase a Limbs & Things Mock Blood Flow Kit (Part No: **60650**) to connect the Trainer to a blood supply. (The Mock Blood Flow Kit is supplied as standard with the Arterial Procedures Trainer.)

Introduce the Mock Blood Flow Kit.

Attach the white plastic connector on the end of the blood bag tube to the open end of the Flow Tubing.

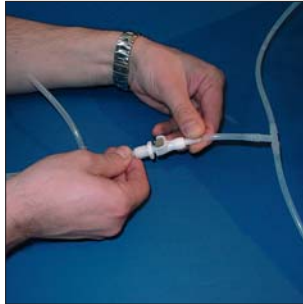
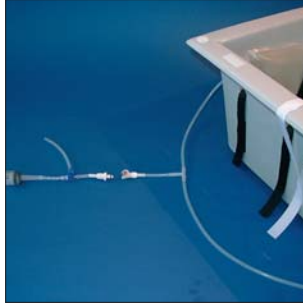
14



Engage the white clamp on the tube leading from the bottom of the blood bag.

The AAA requires priming before Mock Blood can be introduced. This involves creating a vacuum inside the AAA so that it fills more easily and less air is introduced into it.

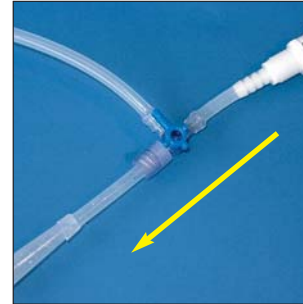
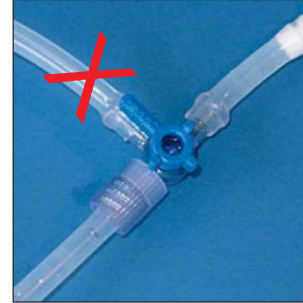
15



Attach the Pump to the remaining connector on the Flow Tubing.

Ensure it is firmly attached.

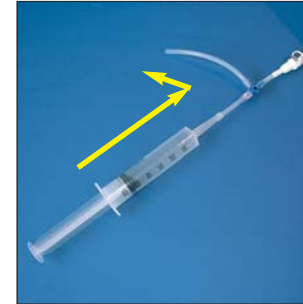
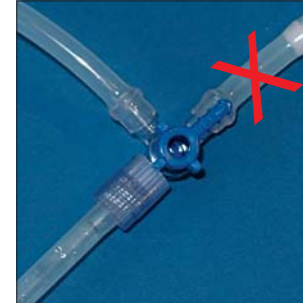
16



Now align the 'OFF' arm of the valve with the secondary tube. The red cross indicates the tube which is closed off.

Slowly pull the plunger allowing air to fill the syringe.

17



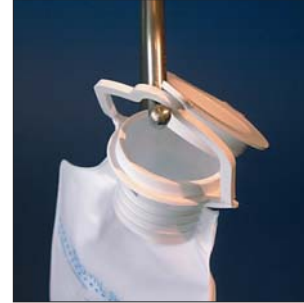
Align the 'OFF' arm of the valve with the primary tube. The red cross indicates the tube which is closed off.

Slowly push the plunger expelling air from the syringe.

Repeat stages 16 & 17 until the AAA has collapsed.

NB: Leave the Pump attached, align the 'OFF' arm of the valve with the primary tube and ensure the plunger of the syringe is fully depressed.

18



Open the cap on top of the blood bag.

Insert the large funnel.

NB: Use only Limbs & Things Mock Blood with the AAA Repair Trainer: it has a neutral water base enabling easy flushing and stain removal. Blood from other manufacturers will compromise the model if used.

Preparing AAA Trainer: Dry simulation (air only)

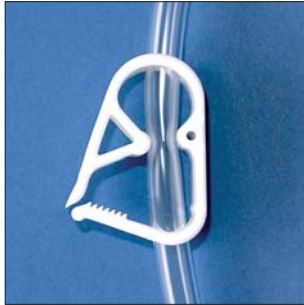
19



Support the funnel and neck of the blood bag carefully with one hand.

Slowly pour 500ml (0.8 pints) of Mock Blood into the blood bag.

20



Release the white clamp on the tube at the bottom of the blood bag and allow the AAA to fill.

This will take several minutes. To speed up the process, the Base can be placed on the floor whilst leaving the blood bag and stand on the work surface.

You may find that a small amount of air is trapped in the AAA and the Flow System.

21



To facilitate air removal, raise the proximal end of the Base by approximately 45 degrees. This allows the air to rise up through the AAA and collect at the highest point.

To remove the air carry out the instructions in stages 16 & 17. Repeat as necessary.

Disconnect the Pump and attach the Trainer Skin. See 'Setting up AAA Trainer Skin' page 19.

1



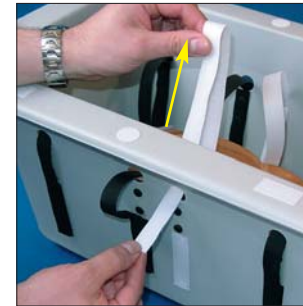
Place AAA Trainer Base on the work surface. Remove all contents except for: Anatomical Insert, Vena Cava and AAA.

Ensure the Anatomical Insert, Vena Cava and AAA are in position. Ensure the AAA is securely attached to the blood flow connectors.

Velcro straps are used for securing certain parts of the Trainer in position:

- black straps retain Internal Organs
- white straps retract the Trainer Skin

2



Before the Internal Organs can be fitted the white straps need to be repositioned. Lift up the straps from either side of the Base.

Pull the straps entirely through the holes.

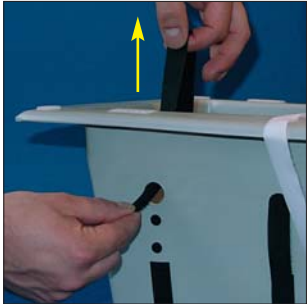
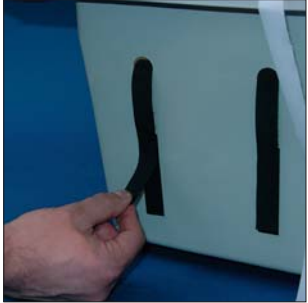
3



Pull the straps up and over the top edge of the Base, attaching them to their corresponding Velcro dots.

Finally, secure the ends of the straps back on the sides of the Base.

4



To fit the Internal Organs the black retaining straps need to be undone. Lift up the straps from one side of the Base.

Pull the straps entirely through the holes.

5



Drape the three straps across the Base, as shown.

The Internal Organs can now be inflated and positioned. Three are supplied but only two will be used for the dry simulation.

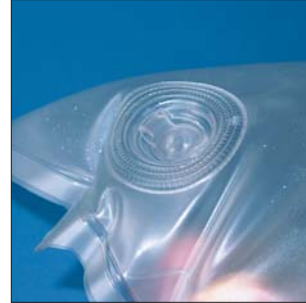
6



Inflate each Internal Organ by blowing through the nozzle. Squeeze the base of the nozzle whilst inflating to keep the valve open.

Do not over fill. As a guide, lay them flat on the work surface and press down evenly with both hands. A gap of about 2 cm between your hands and the work surface is ideal.

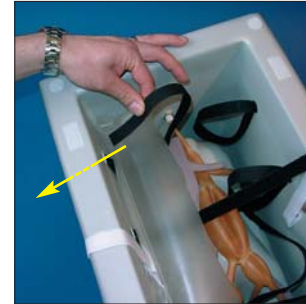
7



Once correctly filled close the cap and push the nozzle fully into the Internal Organ.

Fold the Internal Organ into an L shape ensuring that the long part fits the long side of the base. (Short part fits on the distal end.)

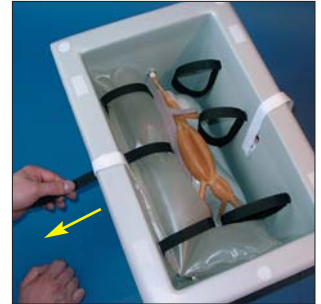
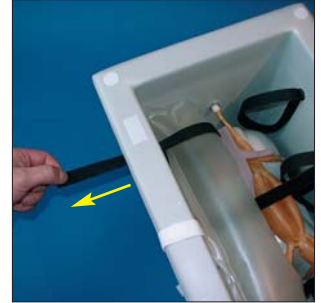
8



Push the Internal Organ carefully down against the inside wall of the Base, ensuring that all three straps are supporting its underside.

Secure the Internal Organ in position by feeding the straps back through their corresponding holes in the Base.

9



Pull the straps through the holes.

Tighten the central strap first, allowing it to gently squeeze the Internal Organ.

10



Secure this position by fastening the strap to the outside of the Base. Repeat this process for the other straps.

Ensure each strap is engaged along the entire length of the corresponding velcro strip.

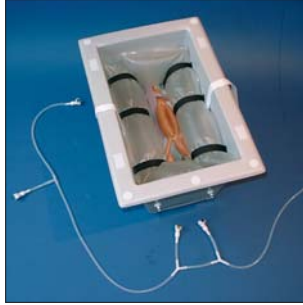
11



Repeat stages 4 to 10 on the opposite side of the Base, ensuring that the short part of the Internal Organ fits in the proximal end

Check that the Internal Organs are obscuring the blood flow connectors on the AAA.

12



For added visual realism the AAA can be filled with air. Place the Flow Tubing on the work surface so that the blood flow connectors match up with those on the Trainer Base.

Attach the dual Flow Tubing connectors to the distal end of the Base.

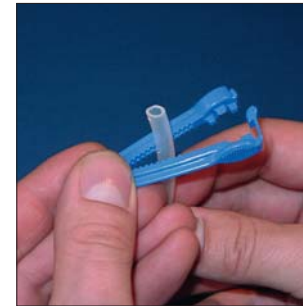
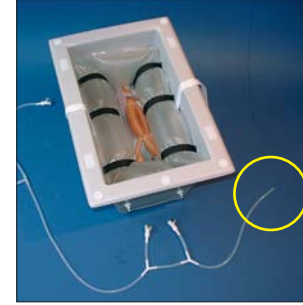
13



Ensure both connectors are firmly attached: they should 'click' when properly engaged. See page 5 if the connectors fail to attach.

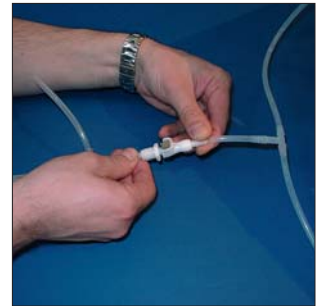
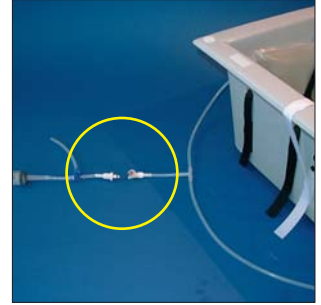
Then attach the single connector to the upper (proximal) end of base.

14



For the purposes of a dry simulation, the open end of the Flow Tubing should be clamped off using the blue clip provided.

15

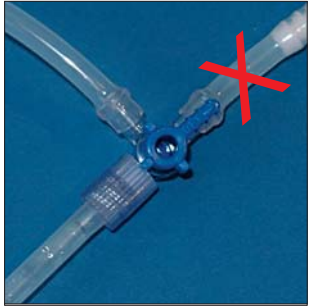


Attach the Pump to the remaining connector on the Flow Tubing.

Ensure it is firmly attached.

Setting up the AAA Trainer Skin

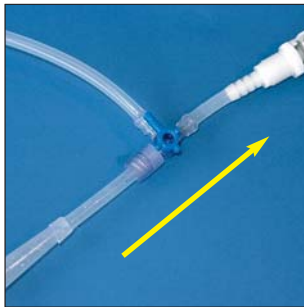
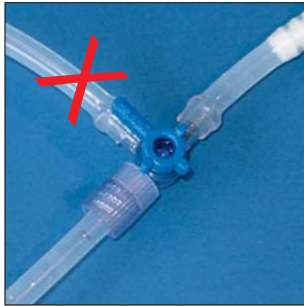
16



Align the 'OFF' arm of the valve with the primary tube. The red cross indicates the tube which is closed off. (See pages 3 & 4)

Slowly draw back the plunger allowing air to fill the syringe.

17



Now align the 'OFF' arm of the valve with the secondary tube. The red cross indicates the tube which is closed off. (See pages 3 & 4)

Slowly push the plunger allowing air into the Flow Tubing and the AAA.

18



Repeat stages 16 & 17 several times until the AAA looks realistically distended.

Attach the AAA Trainer Skin. See page 19.

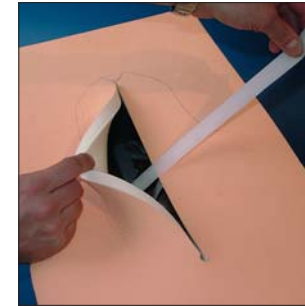
1



Having set up the Internal Organs and filled the AAA, ensure the white retracting straps are inside the Base.

Place the Skin on top of the Base ensuring correct orientation (rib plate and costal margins placed at proximal end).

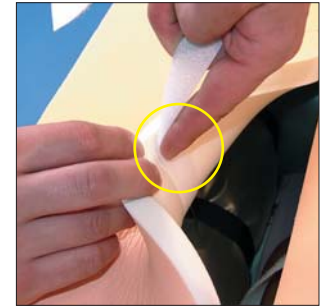
2



Pull back the Skin and retrieve one of the retracting straps.

Locate the white Velcro® dot on the underside of the Skin.

3



Pull the retracting strap tightly, fastening it to the Velcro® dot.

Pull the strap carefully up and away from the Base.

4

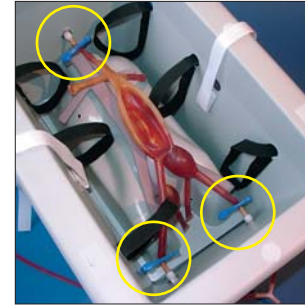


Fasten the retractor strap to the outside of the Trainer.

Repeat this process for the other side. The Trainer is now ready for use.

Removing the AAA

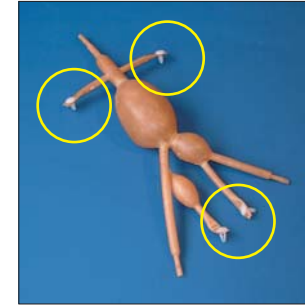
1



Detach the Flow Tubing from the Base.

Clamp the distal and proximal ends of the AAA using the blue clips provided.

2



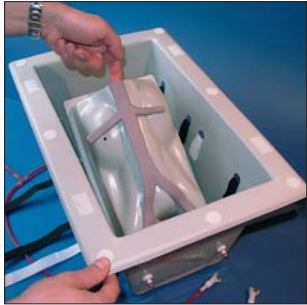
Carefully detach the AAA from the blood flow connectors inside the Base.

Remove the Anatomical Insert from the Base and push out the four AAA retaining clips from the underside.

Empty any remaining Mock Blood from the AAA into the Mock Blood bottle. Remove and keep the blue clips and discard the AAA.

Cleaning the Mock Blood Flow System

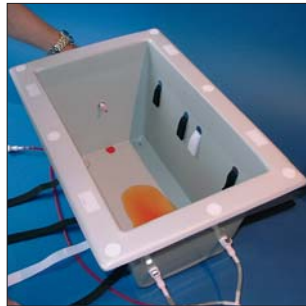
1



Remove the Anatomical Insert ensuring that the AAA and Internal Organs have been removed first.

Pull all the straps through their holes and fasten them tightly to the outside of the base.

2

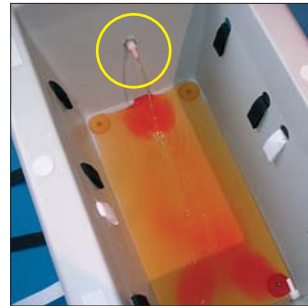
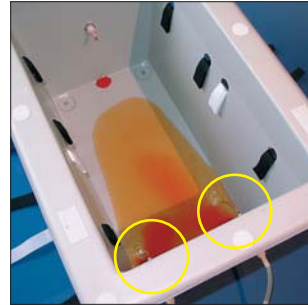


Pour any remaining Mock Blood back into the bottle for storage. Rehang the blood bag and fill with 500ml (0.8 pints) of water.

Attach the Flow Tubing to the Base allowing the water to flush through.

NB. Ensure the white clamp on the tube at the bottom of the blood bag has been released.

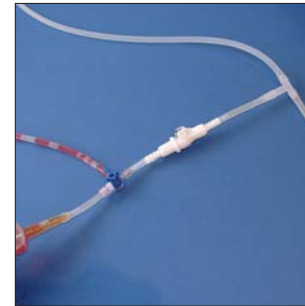
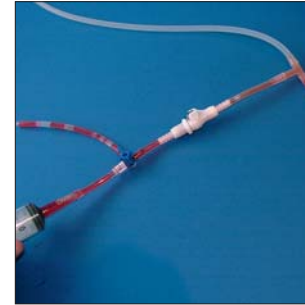
3



When the two distal ends of the Mock Blood Flow System run completely clear of blood, disconnect them.

This provides greater pressure to the proximal end which is still connected. Once the fluid is clear disconnect this end.

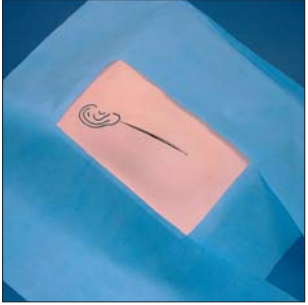
4



Any remaining Mock Blood can be removed from the Flow Tubing by using the Pump. See stages 3 & 4 of 'Mock Blood Flow System: Overview' page 3. Repeat stages as necessary.

Excess Mock Blood can be poured back into the bottle for storage. Rinse out the blood bag and the Base. Wipe the base dry and hang the blood bag up to dry. Rinse out the Pump and allow to dry.

Surgical setup



For enhanced realism all Limbs & Things arterial trainers can be covered with surgical drapes.

Notes