Carotid Endarterectomy (CE) Trainer
Part No: 60620

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

Skills
• 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
• Vessels will withstand a fluid flush test to demonstrate the integrity of the repair
• Lightweight and portable
• Mock Blood Flow System supplied to allow user to connect CE to Mock Blood Flow Kit (Available separately. Part No: 60650. Consists of Mock Blood Giving Set and Mock Blood)

Package supplied
• 1 CE Trainer Skin 60622
• 1 CE Trainer Soft Tissue 60621
• 1 CE Trainer Fat Layer 60625
• 1 CE Trainer Base 60623
• 4 CE Artery (with hypoglossal nerve) 60624
• 3 CE Graft Patches (8mm x 76mm) 60626
• 1 Mock Blood Flow System
• 1 bag of clips

IMPORTANT
Use only Limbs & Things Mock Blood with the CE Trainer: it has a neutral water base enabling easy flushing and stain removal. Blood from other manufacturers will compromise the model if used.
Remove the Soft Tissue to expose the artery and hypoglossal nerve (white cord running diagonally over the carotid artery).

Carefully remove the artery from the blood flow connectors on either end of the tray.

Mock Blood Flow System
Once disconnected, pull the artery out from underneath the hypoglossal nerve.

Reverse these stages in this section to attach a new carotid artery and to prepare the CE Trainer for use again.

NB: If the hypoglossal nerve has been damaged it can be replaced. To do this remove the Fat Layer from the Tray, remove the old nerve and then feed the ends of the replacement nerve through the holes, passing from the top of the Fat Layer to the underside. Finally, tie off each end of the nerve to secure it in position.

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)

The Pump consists of:
- syringe
- valve
- primary tube (with connector for attaching to Flow Tubing)
- secondary tube

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.
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.

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

The direction of flow is controlled by the syringe.

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

Unlock the connector by depressing the metal clip.

The connector is reset and ready to use when the pin pops out.
Connecting the Mock Blood Flow System

1. Place the CE Trainer on the work surface. Place the Flow Tubing on the work surface so that the connectors match up with those on the Trainer Base (as shown).
2. Ensure the connector is firmly attached: it should ‘click’ when properly engaged. See page 7 if the connector fails to attach.
3. Then attach the dual Flow Tubing connectors to the distal (upper) end of the Base.
4. NB: Please note that if you purchased the CE 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.)
   Attach the white plastic connector on the end of the blood bag tube to the open end of the Flow Tubing.
   Engage the white clamp on the tube leading from the bottom of the blood bag.
   Open the cap on top of the blood bag.
   Insert the large funnel.
   NB: Use only Limbs & Things Mock Blood with the CE Trainer: it has a neutral water base enabling easy flushing and stain removal. Blood from other manufacturers will compromise the model if used.
5. 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.
6. Attach the Pump to the remaining connector on the Flow Tubing.
   Release the white clamp on the tube at the bottom of the blood bag. Mock Blood will start to fill the Flow Tubing.
7. To draw the Mock Blood through the rest of the Flow Tubing and into the Carotid Artery, 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.

8. 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 and out of the pump via the secondary tube.

9. Repeat stages 7 & 8 until all the air has been removed and blood is drawn into the syringe. Expel any Mock Blood from the syringe back into the bottle for storage. The Trainer is ready to use.

10. Remove the Soft Tissue. Clamp off the artery using the blue clips.

11. Remove the artery and pull it out from under the hypoglossal nerve. Remove the Fat Layer.

If the Fat Layer is covered in Mock Blood wash it under cold running water until it is removed. Allow the Fat Layer to dry naturally before storing.
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. (The Base can hold 500ml of water).

NB. Ensure the white clamp on the tube at the bottom of the blood bag is open.

When the two distal ends of the Flow Tubing 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. Empty the Base out into a sink.

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 5. 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.

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