PinniFred

Seal Research and Veterinary Training Aids

Version 1.01

User Manual

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PinniFred was designed, manufactured and hand built at the Sea Mammal Research Unit, University of St. Andrews, Scotland

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Welcome to Team PinniFred,

Thanks for joining our expanding group of users that believe in carrying out tuition with PinniFred.

PinniFred is a unique training tool designed for seal veterinary, conservation and research staff.

We believe that by learning with PinniFred you will quickly improve the knowledge, skills and competency of staff, as well refining procedures, which will undoubtably improve animal welfare.

PinniFred was conceived, designed and built by hands-on seal research and husbandry staff with many years' experience.

Using our familiarity with the species our ambition has been to create a training tool that is sufficiently realistic and robust to enable users to develop competencies in essential skills without the use of live animals.

The model allows users to spend time learning the features and feel of key anatomical structures, and enables users to repetitively carry out skills until intimately familiar with the processes involved.

PinniFred enables the tuition of:

- Manual handling techniques
- Familiarisation of key anatomical features
- Intubation and ventilation
- Insertion of a stomach tube
- Assisted feeding
- Accessing the extradural vein for:
    - Administration of substances
    - Withdrawal of blood

We firmly believe that by using PinniFred products users will quickly gain confidence and competence , and most importantly by refining skills will maximise the welfare of the animals under your care.

We hope you enjoy learning with PinniFred.

Team PinniFred
Sea Mammal Research Unit

PinniFred parts and assembly

1.Skeleton: *The skeleton is comprised of individual vertebrae that are labelled on their ventral surface to enable identification (e.g. L1 = first Lumbar process, T13 = 13th thoracic process).*

Each vertebra is an exact replica.

Lay the skeleton dorsal side down on the inside of the imitation fur and offer up to the C-spine.

Pass the 6mm rope, attached to the cervical spine, through the corresponding hole in the first pair of ribs.

Sleeve the 2 part black rope clip on the rope, pull tight and clip together to hold in place. Feed the remaining rope through the rope jams on T5 and T7

2. Dorsal blubber layer: *The 30mm thick blubber layer is representative of the blubber thickness in a healthy weaned grey seal.*

The blubber is comprised of 3 components which mimic skin, self healing blubber and a thin muscle layer.

Sleeve the blubber layer between the skeleton and fur layer. Place the rear end in first and ensure it is level with the base of the tail. Slide the tapered end between the silicone neck and the fur layer. Ensure that the sides meet the hemlines on the fur layer.
NB: This may require two or more people

2a. Ensure that the additional gel pad is located directly in line with the blood vessel

PinniFred parts and assembly

3. Oesophagus : *The oesophagus tapers down to a non return valve. When fluid is administered correctly the non return valve will seal and prevent water from egressing from the mouth.*

The stomach will hold up to 300ml of fluid.

Using a set of pliers squeeze the large spring clip open and place over the open end of the silicone stomach tube.

Offer this up to the base of the oesophagus and sleeve over ensuring that the non return valve maintains its shape.

Open the spring clip and move the silicone tube over the rigid tube move up as far as the adjoining trachea pipe will allow.

Ensuring the lugs are oriented towards the side, release the spring clip to hold the stomach tube in place.

4. Trachea: *The trachea is representative in size of a 15 day old grey seal.*

Please use size 7 intubation tube or smaller.

Using pliers sleeve a small spring clip down the end of the reinforced lung bag tubing.

Sleeve the tube inside the lung bag and retain with the spring clip

Sleeve the opposite end of the silicone tube up the trachea until it meets the internal step.

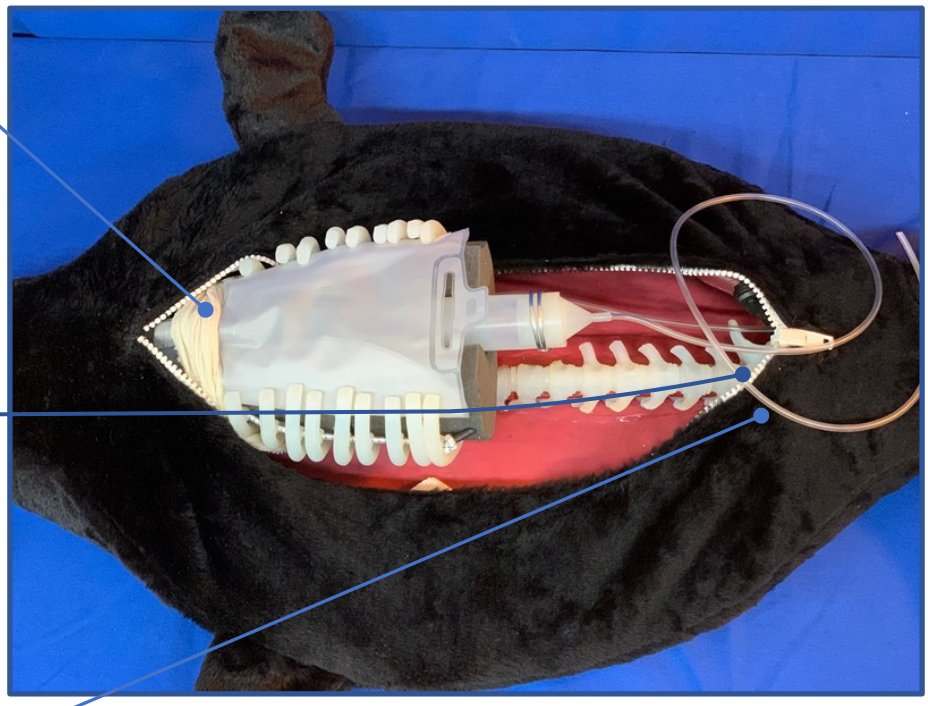
Using 2 x cable ties to clamp the tube inside the trachea.

Ensure that the ends are oriented towards the side and trim the excess cable tie.

PinniFred parts and assembly

5. Diaphragm Tube sleeve

Slide the diaphragm tube sleeve over the tail, ribs and lung bag.



6. Skeleton

Sleeve the end of skeleton down inside the fur fabric, ensuring that the tail vertebrae are tucked away into the tail pocket.

7. Hip joints

The artificial joints allow a realistic degree of movement and provide additional strength to allow manipulation by the ankles.

a.

Disconnect the pin.

Offer the ball socket and u shaped sleeve together.

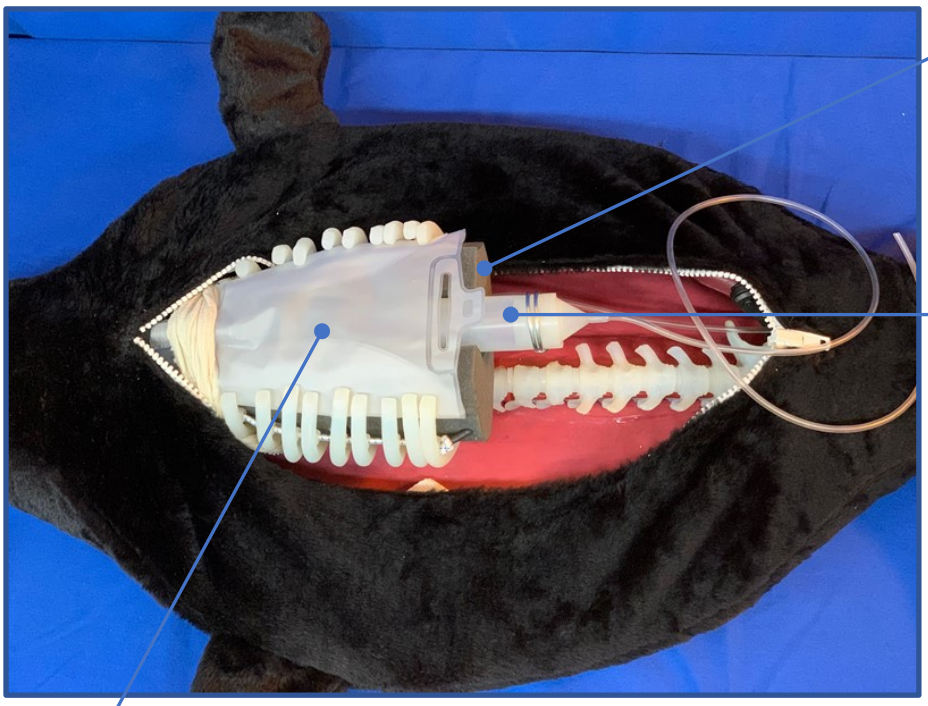
b.

Push the pin through the socket and sleeve

c.

Clip the open cylinder down to secure the joints in place.

PinniFred parts and assembly



8. Chest cavity infill

Insert the chest cavity infill, ensuring that the recess for the stomach tube is facing towards you.

9. Stomach tube

Lay the stomach tube along the recess in the chest cavity infill.

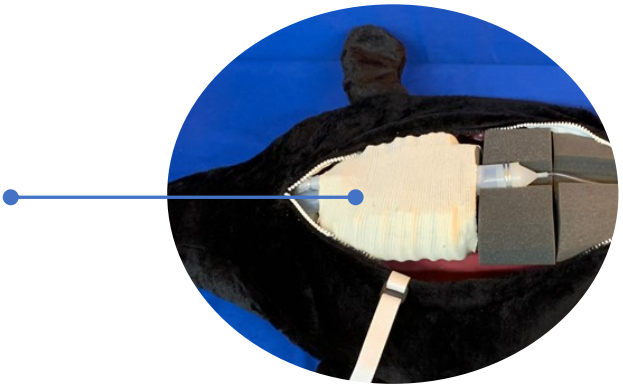
If it not already attached, insert the stomach tube reducer funnel into the tube and hold in place with a large spring clip as per previous method.

10. Lung bag

Tuck the edges of the lung bag under the ribs.

Once in place pull the diaphragm tube sleeve back over the lung bags. This should encompass the ribs and will hold the lung bag in place.

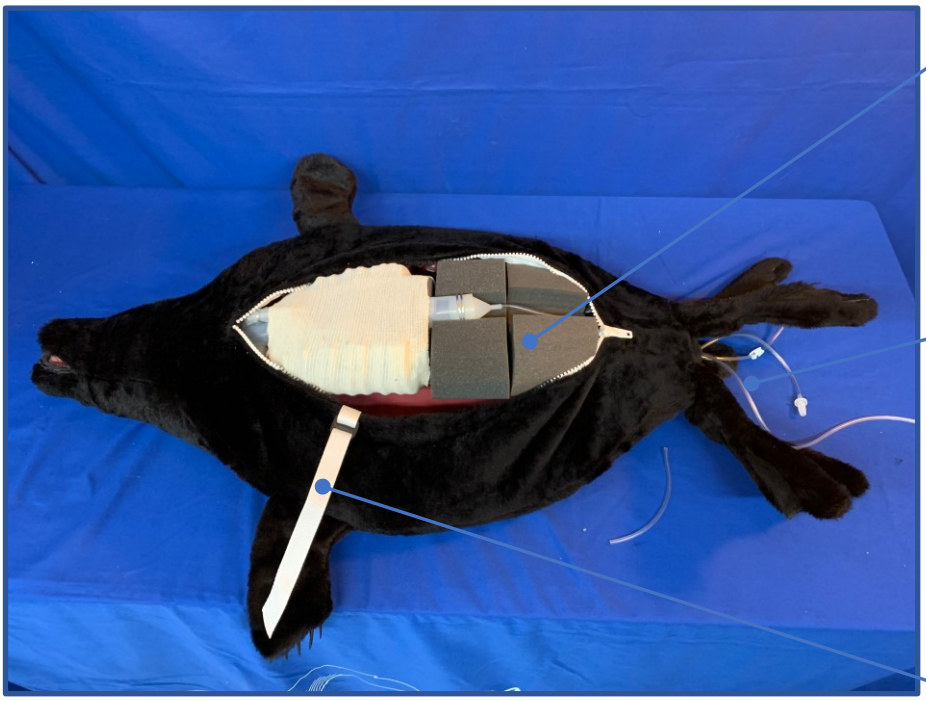
This will act against the lungs on inflation and result in rise and fall motions.



11. Blood vessel tubing

Run both of the blood vessel tubes out of the anal opening.

PinniFred parts and assembly



12. Abdominal infill

Insert the abdominal cavity infill, ensuring that the stomach tube recess is facing you.

13. Stomach drain

Run the stomach tube drain out of the anal opening.

NB: For identification :the stomach drain is longer than the blood vessel tubing.

14. Fore flipper strap

Ensure that the fore flipper strap is outside the body

15. Ventral blubber layer

Lay the ventral blubber layer in place, ensuring that the rear end is tucked all the way down to the base of the tail.

The sloped top end should sleeve between the fur layer and the silicone surrounds of the neck area.

Ensure that edges are square with the dorsal blubber layer.

16. Fore flipper strap

Feed the fore flipper strap through the loop on the opposing flipper.

Pull tight and feed the strap through the buckle to secure.

16. Zipper

Pull opposing zips together to take the strain from the zip before closing.

NB: This may require 2 people

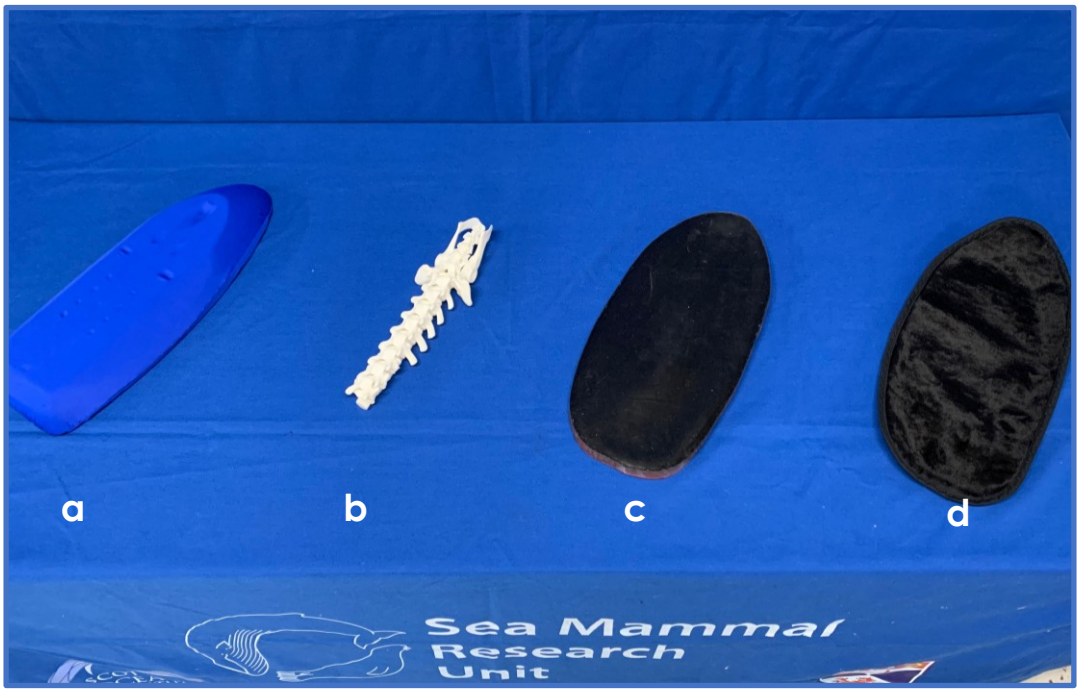
PinniFred parts and assembly

Congratulations..

The main body of PinnIFred is now complete.

Please read on to complete the set up and for instructions on use.

Reveal parts and assembly

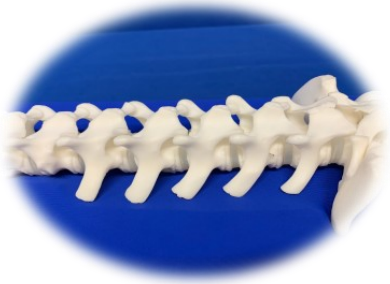


a. Reveal pad

Formed foam pad which holds the spinal processes in place

b. Spinal processes

Precise replica spine from upper thoracic, lumbar and pelvic bones to the sacral processes. These are the key vertebral processes and landmarks to become familiar with for accessing the extradural vein.



c. Reveal blubber layer

Replica Blubber layer comprising of an imitation skin layer, self healing gel blubber layer and thin muscle layer.

The blubber layer is 10mm thinner than the PinniFred blubber layer to make locating the spinal processes less challenging. At 20cm thick the blubber layer is representative of juvenile seal in moderate condition.

The additional gel pad on the ventral surface locates over the imitation vein in the lumbar processes to aid in preventing excessive leakage.

d. Imitation fur

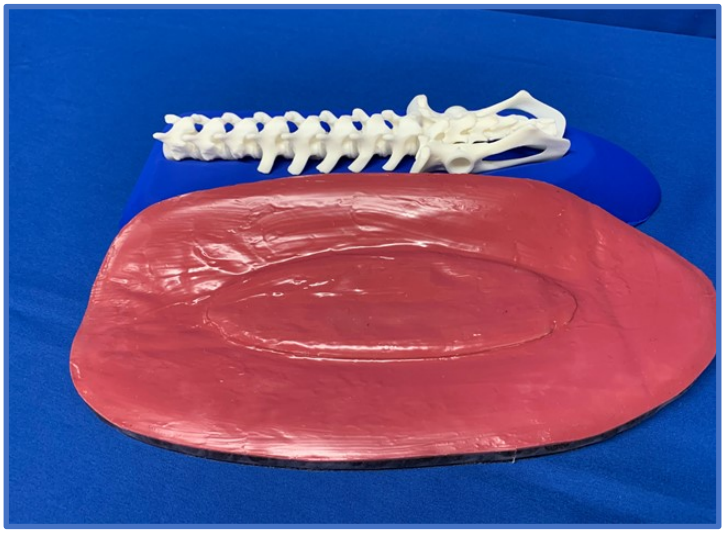
Imitation fur provides a real feel for tuition of palpating the spinal processes.

Reveal parts and assembly

1. Reveal pad

Key the spinal column into the reveal pad. Once in the correct orientation the spinal column will sit slightly above the base until the blubber is added

NB: The spinal process will come with blood vessel pre-inserted. For removal and replacement of blood vessel see section: "replacement of blood vessel"

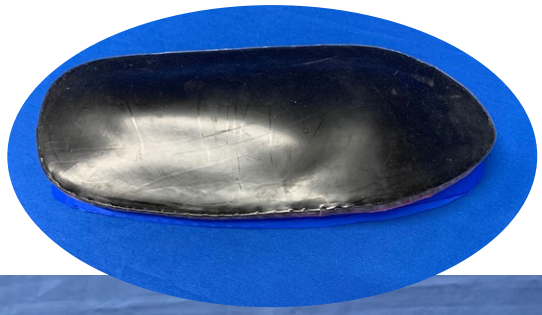


2. Blubber layer

Place the blubber layer on top of the spinal column, ensuring that the outline shape matches the reveal pad.

Place muscle side down with the additional gel pad central to the spine.

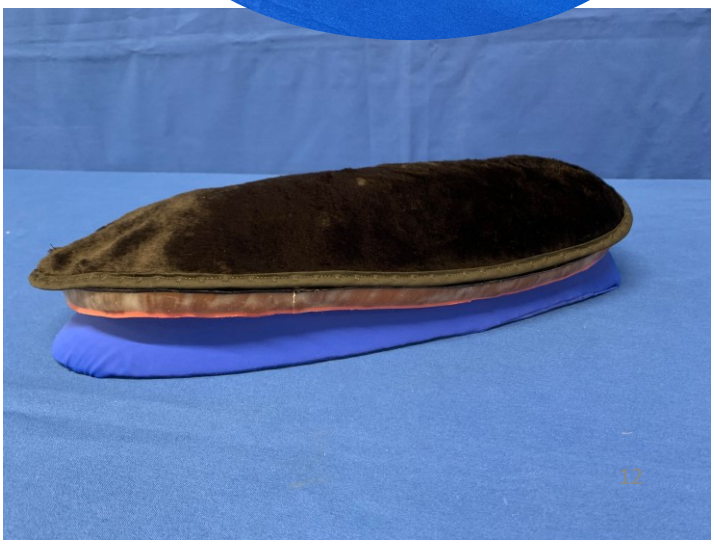
The reveal will look as below.



3. Imitation fur layer

Lay the imitation fur over the blubber layer, with pelage side facing upwards.

For blood vessel filling and attachment instruction see "*accessing extradural vein*"



Intubation for ventilation

The structures of the head, mouth, teeth, trachea and oesophagus have been faithfully recreated in PinniFred to accurately display the anatomy of a juvenile seals' mouth. The anatomical accuracy and real feel provide a unique resource to train intubation.

Once the intubation tube is engaged in the trachea artificial ventilation can be provided. The subtle rise and fall of the chest provided by the imitation lungs provides visual confirmation of correct intubation placement and successful ventilation.

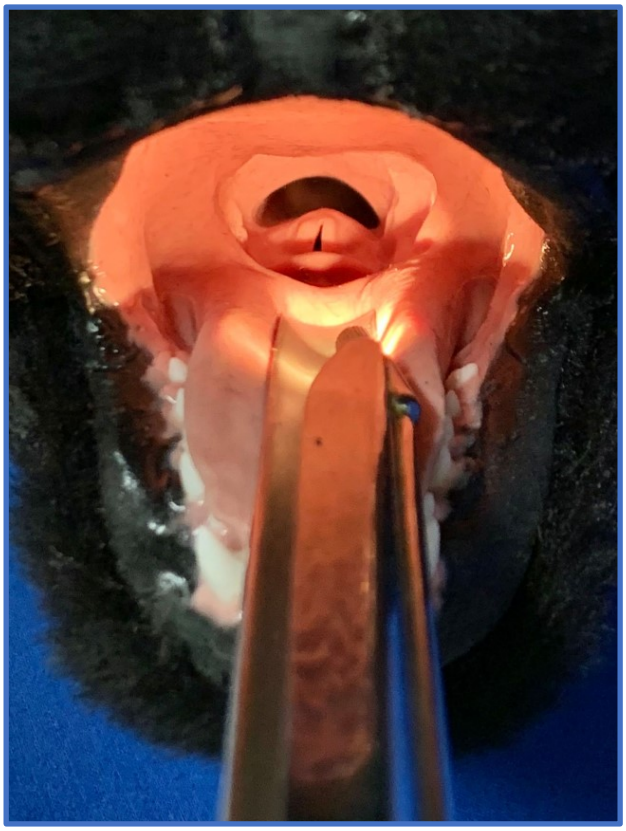
Important information

Please read before use

1. ALWAYS apply a liberal amount of lubrication to the mouth internals prior to tuition of intubation.

This will prevent any unnecessary damage to the model as well as providing a realistic feel.

We recommend KY jelly or ultrasound gel.



2. ONLY use a size 7 intubation tube or smaller.

This is the appropriate size for the model and animal of this size. A larger tube will be difficult to engage in the trachea and may cause damage.

A size 7 intubation tube has been provided.

3. Protect your hand as you would when intubating a live animal - PinniFred's teeth are realistically sharp!

We recommend using a butchers glove with the middle finger removed.

This provides suitable protection whilst still allowing the user to feel the opening of the trachea with the ungloved finger

4. Always clean down PinniFreds mouth internals after use.

This will prevent build up of lubricating products that may effect the future use of the model.

Warm soapy water and a non abrasive sponge is best.

Accessing the extradural vein

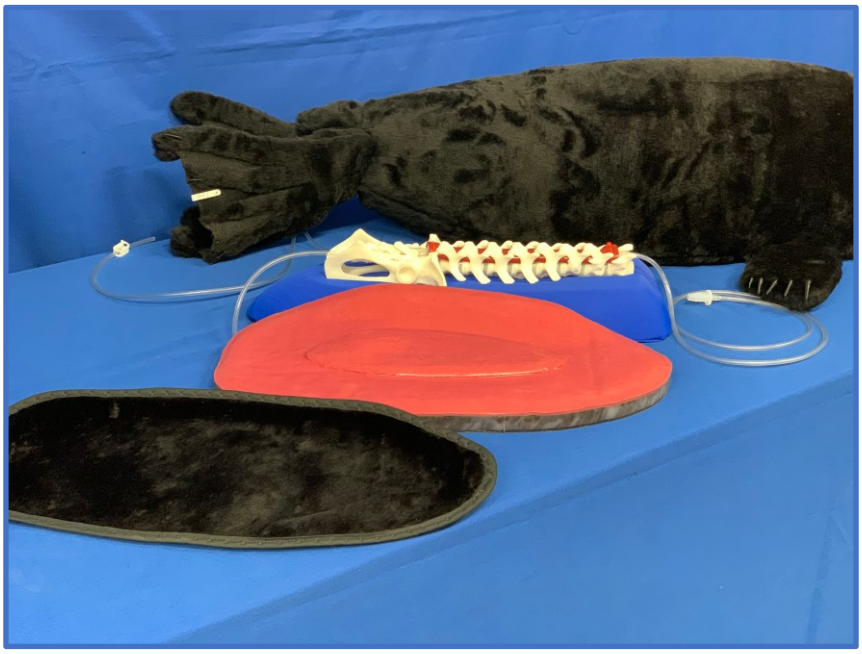
The precise replica vertebral processes, imitation fluid filled vein and self healing blubber layer in the reveal form a unique and realistic resource for the tuition of accessing the extradural vein.

The vertebral processes are exact replicas of a juvenile grey seal, in both size and form.

The imitation vein filling the extradural sinus is accurate in size and provides further visual reference of the target areas.

The vein is pressurised with fluid, enabling it to be punctured for injection of substances, IV anaesthesia training, as well as withdrawal of fluid by syringe or vacutainer for training of blood collection. The vein is self healing, but will require to be replaced after repeated use. (see replacement / repair of veins).

The imitation blubber layer provided with the reveal is 20mm thick and represents a an animal in moderate condition. The imitation blubber layer in PinniFred is 30mm and represents a healthy animal. Both blubber layers have an additional gel pad that should be located directly over the lumbar processes, which provides an additional seal to prevent fluid loss and improve performance when collecting fluid with a vacutainer.



Using the reveal, training can be provided to become familiar with the skeletal landmarks involved in locating the appropriate intervertebral spaces. During tuition users can immediately evaluate their skills and accuracy.

To gain knowledge, skills and confidence, we recommend initial training be carried out on the reveal before progressing onto the PinniFred model.

Accessing the vein in PinniFred is intentionally challenging due to the relatively thick blubber layer and relatively small intervertebral spaces. Repeated practice of this skill will provide a strong basis of knowledge, understanding, skill and muscle memory.

Accessing the extradural vein

Connection instructions:

Applicable to PinniFred and reveal

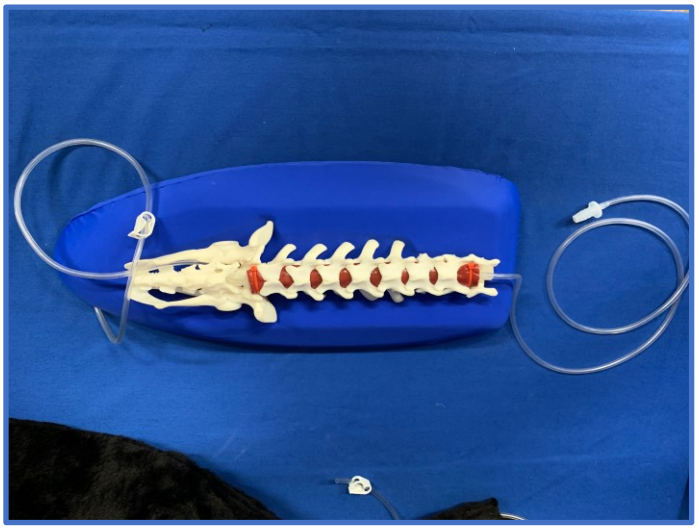
1. Connect the threaded connector to the water reservoir bag.

2. Connect the end of the water reservoir tubing to the large straight connector on the blood vessel tubing.

NB: This is a friction fit, so should push into place. The silicone tube may need immersion in warm water to assist entry if difficult.

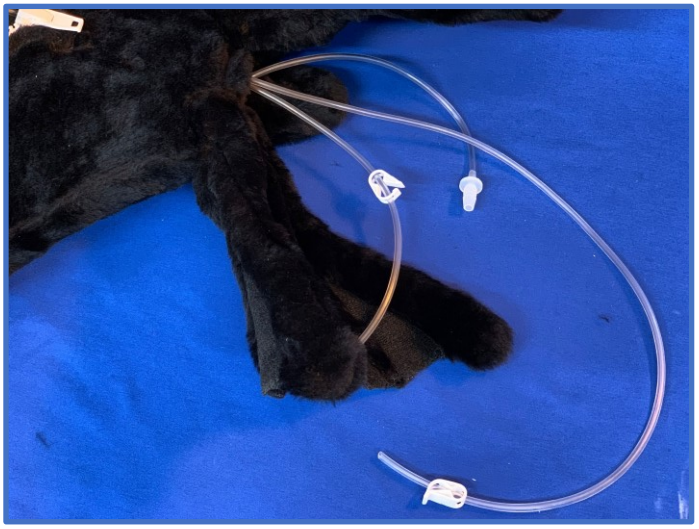
3. Ensure that the white clamp valve is closed tight on the vein drain tube.

NB: This is the shorter of the 2 drain tubes in PinniFred



4. Fill the fluid reservoir with water. Open the black clamp valve on the reservoir bag tubing.

5. Raise the drain tube and slowly open the white clamp valve on the drain tube until all air has passed through and the tube is water filled.



6. Close the white clamp valve and control the pressure with the black clamp valve.

You can now access the fluid filled extradural vein.

To drain: Close the black clamp valve and empty the reservoir. Open the black clamp valve and white clamp valve to allow any liquid remaining in the vein to drain. Freely.

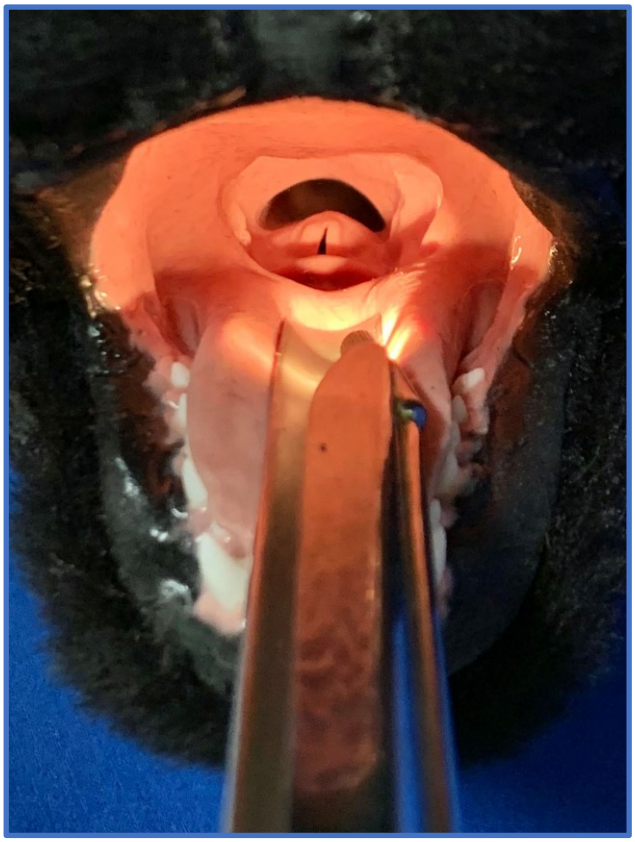
Insertion of a stomach tube

The structures of the head, mouth, teeth and oesophagus have been faithfully recreated in PinniFred to accurately represent the anatomy of a juvenile seals' mouth. The anatomical accuracy and real feel provide a unique resource to train the insertion of a stomach tube.

Once the stomach tube is engaged in the oesophagus fluid can be inserted and placement confirmed by the egress of fluid from the stomach drain tube. A non return valve will prevent any fluid from returning upwards towards the mouth

Important information

Please read before use



1. ALWAYS apply a liberal amount of lubrication to the mouth internals prior to tuition of stomach tubing.

This will prevent any unnecessary damage to the model as well as providing a realistic feel.

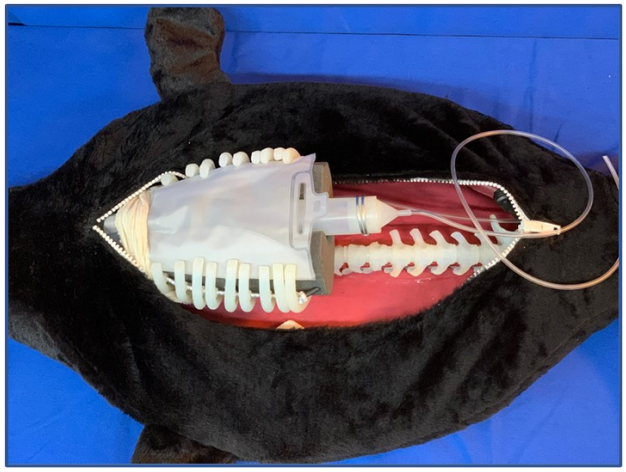
We recommend KY jelly or ultrasound gel.

2. Use a smooth ended stomach tube

This is best practice and will ensure that the oesophagus is not damaged during use. Do noy use excessive force to insert the tube.

3. Protect your hand as you would when carrying this out on a live animal - PinniFred's teeth are realistically sharp!

We recommend using a butchers glove.



4. Ensure the white clamp valve on the drain is open before filling with fluid.

The drain valve is the longer of the tubes exiting the anal opening

5. Clean down after use.

Clean the mouth and stomach tube with warm soapy water using a non-abrasive sponge after use.

This will prevent build up of lubricating products that may effect the future use of the model.

Spares and repairs

Additional blood vessels

- For the replacement of used blood vessels
    - See sections (replacement / repair of blood vessels)

Large clamp valves

- For use on water reservoir tubing

Small clamp valves

- For use on reveal and PinniFred vein drain tubing

Water reservoir connector

- For use between water reservoir and small tubing

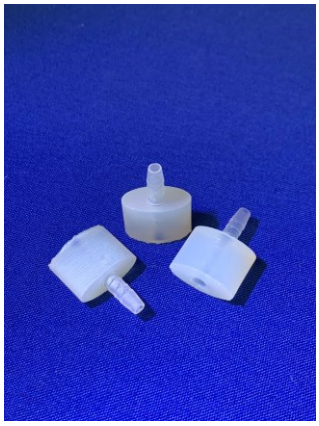
Spares and repairs

Straight connector

- For in line connection between fine tubing and extension tubing

Silpoxy silicone repair

- For the repair of used blood vessels
- For the repair of silicone based parts



Blood vessel – tubing connectors

- For the connection between blood vessels and thin silicone tubing

Cable ties

- For clamping blood vessels to adaptors
- For clamping trachea tubing)

Additional silicone tubing

- To replace any damaged tubing
- To add length to existing tubing.

Replacing blood vessels

The blood vessels are designed to be self sealing. However, after a period of repeated puncture blood vessels will lose their ability to self seal andl leak fluid.

You have been supplied with several additional blood vessels, as well a spares kit that will enable the blood vessels to be repaired and re-used.

Use the following instructions to remove and replace blood vessels.

Steps 1 – 7 apply to PinniFred only.

1. Turn PinniFred upside down and undo the zip completely.

2. Undo the fore flipper connection strap

3. Remove the ventral blubber layer

4. Remove the abdominal foam inserts

Replacing blood vessels

5. Expose the hip joint and disconnect at both sides

a.

Expose the hip joint

b.

Unclip the sleeve

c.

Split the pins from the joints

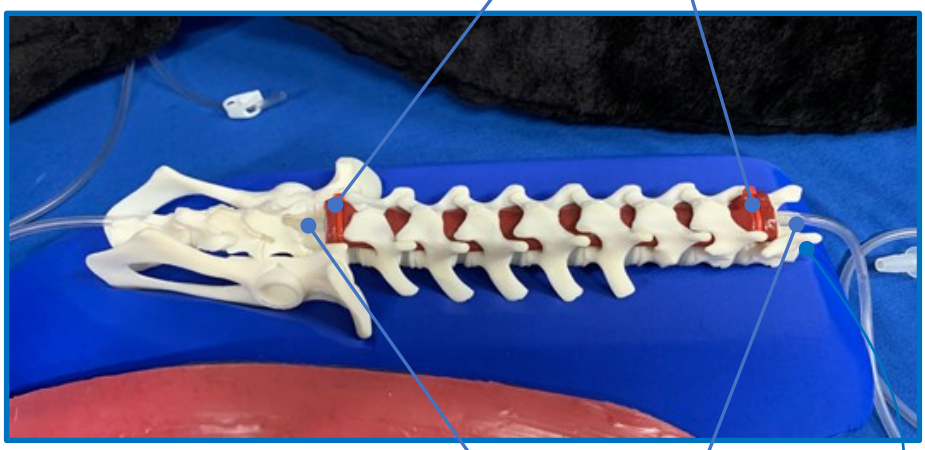
6. Carefully bend the skeleton out of the tail pocket

7. Bend the spinal column towards the head and remove to the outside of the imitation fur.

The following steps apply to both PinniFred and PinniFred reveal

Replacing blood vessels

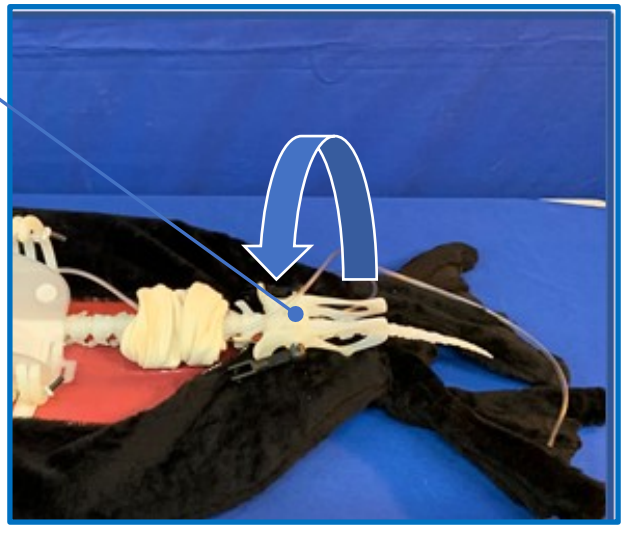
8. Cut the cable ties holding the blood vessel inserts in place. Take care not to cut through the wall of the blood vessel



9. Remove the blood vessel inserts from each side of the blood vessel, keeping the tubing connected to both inserts.

10. Reveal: Undo the nylon nut holding T13 vertebral process in place and slide off the vertebral processes until the blood vessel is free enough to remove from the spine.

11. PinniFred: Undo the pelvis by rotating it anticlockwise on its threaded rod. Once separated remove the spinal processes from the Lumbar spine until the blood vessel is free enough to remove from the spine.



NB: Please repair and re-use blood vessels .

Replacing blood vessels

Installing a new / repaired blood vessel

12. PinniFred: Remove all the vertebral processes up to and including T14. Sleeve the blood vessel through T13 leaving roughly 1cm proud at the innermost end

12. Reveal: Remove all the vertebral processes up to and including L4. Sleeve the blood vessel through L5, leaving roughly 1cm proud at the innermost end,

13. Sleeve the insert into the end of the blood vessel that you have passed through the process. Ensure that the insert end is roughly level with the end of the blood vessel.

14. Once level hold in place by clamping a cable tie down over the blood vessel and insert. Ensure that the cable tie clamp is located to the side and trim the excess.

15. Sleeve the remaining processes and spacers onto the threaded rod, passing the blood vessel through each vertebral sinus as you do this.

16. Once the blood vessel has passed through all the vertebral spaces ensure that the blood vessel and insert on the starting end is lodged into the extradural sinus.

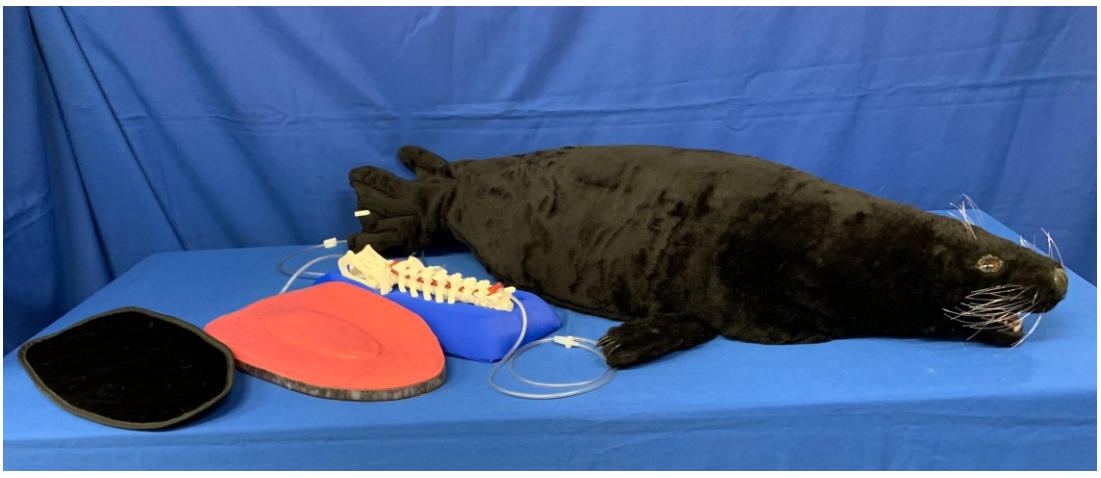
17. Sleeve the insert into the terminal end of the blood vessel. Ensure that the insert end is level with the end of the blood vessel.

18. Once level hold in place by clamping a cable tie down over the blood vessel and insert. Ensure that the cable tie clamp is located to the side and trim the excess.

19. Reveal: Thread the nylon nut back onto the threaded rod and finger tighten to hold the vertebrae firmly back in place

19. PinniFred: Remove the thin tubing that is fed through the pelvis. Thread the pelvis back onto the threaded rod until firmly held against the lumbar spine. Feed the tubing back through the pelvis once in place.

20. Follow the previous guidance on assembling PinniFred and PinniFred reveal to re-assemble the models for use.



Repairing blood vessels

The blood vessels are designed to be self sealing, however after a period of repeated puncture blood vessels will lose their ability to self seal and will leak fluid.

In order to prolong the lifespan of blood vessels they can be repaired and may be used again.

Additional blood vessels

Silpoxy

Instructions:

1. Mark area of repeated puncture before removing the blood vessel from the spinal processes.

2. Remove blood vessel from the spinal process as previously described.

3. Drain any remaining liquid from the blood vessel and leave to dry.

4. Apply a thin even layer of silpoxy to the marked area and leave to dry for at least 1 hour.

5. Test the vein by closing one end and blowing air through to ensure there are no leaks.

6. If leaks persist follow apply a further thin layer of silpoxy.

7. When re-using the vein ensure that the area that has been repaired is rotated away from the point of needle puncture.

8. Blood vessels may be repaired multiple times this way.

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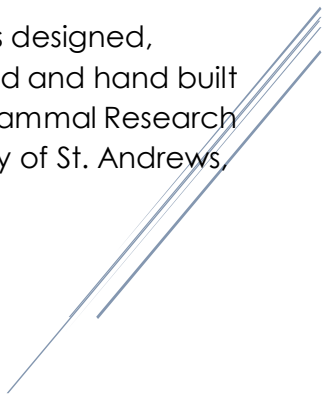
PinniFred was designed, manufactured and hand built at the Sea Mammal Research Unit, University of St. Andrews, Scotland



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