Translational Training Tools™

The 3 Ts Serving the 3 Rs

Recipes for Crafting Your Own Purpose-Specific Training Tools

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The CARE Training Team has put a significant amount of time and effort into the creation of the 3 Ts methods and tools. We are pleased to be able to share the information in this manual with you. We welcome your comments and feedback and trust that you will respect that the information in this manual is the intellectual property of Wendy O. Williams, David E. Mooneyhan and Christine M. Peterson of the Cornell Center for Animal Resources and Education (CARE).
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Thank you from Wendy, Dave and Christine.

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The Cornell University Center for Animal Resources and Education (CARE)

Training Team Mission:

Be role models for the responsible use of animals.

Emphasize the importance of minimizing pain and distress in the animals used for teaching and research; make animal comfort a priority during training classes.

Accommodate the needs of our trainees and guide them towards competency on the procedures required to accomplish their research goals.

Promote the 3 Rs (Replace, Reduce and Refine) through the use of inanimate models for hands-on training.

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PART I

1. General Concept for Training with Translational Training Tools™

Translational Training Tools™ (The 3 Ts) is a method used to provide training to individuals working with animals in research, testing and teaching settings. The 3 Ts incorporates simple, inexpensive, and effective hand-crafted tools to teach and encourage practice of non-surgical and surgical procedures, prior to conducting similar training and practice on live animals. We believe that when hands-on training is performed on a live animal too early in the trainee's learning process; the teaching exercise is potentially compromised in multiple ways. The 3 Ts tools and training methods were developed to address several of the gaps that exist in the current methods of hands-on training for individuals learning to perform techniques on live animals. Using the 3 Ts teaching methods, trainees translate the skills they have learned on the 3 Ts inanimate training tools to successful practice on a live animal.

Enhancing the learning experience while minimizing distress for the animals, trainees and trainers

A. Using the 3 Ts to address the essential steps required to perform a procedure

We structure our procedural training into steps, using the 3 Ts to address several **key learning issues** that we have identified as the most difficult concepts for trainees to grasp. The steps allow the trainee to appreciate and practice the skills required to properly execute the procedure, without having to experience the complexities of practicing on a live animal. The goal is to maximize the chances that the trainee will understand and master a skill, in preparation for practice on a live animal.

The following steps are typical of how 3 Ts training proceeds:

1. The trainer describes the procedure including relevant anatomy and conceptual information such as the biomechanics required to perform the procedure. Descriptions may include analogies, images and diagrams, and direct visualization of comparative anatomy on the **Translational Training Tools™**.
2. The trainer demonstrates the procedure on the appropriate **Translational Training Tools™**, while reemphasizing the relevant anatomy, hand positions and motions.

3. The trainee performs **supervised practice** of the procedure on a **Translational Training Tool™**, while the trainer offers guidance and support to help the trainee refine the skills. Trainers will identify learning issues and offer constructive feedback to correct any errors, before advancing the trainee to the next step of training.
4. The trainer confirms competency of the trainee's performance on the **Translational Training Tool™**; prior to moving to a more advanced tool or to training with a live animal.

B. Using the 3 Ts to as a visual aid to address key learning issues in procedural training

The tools used for the 3 Ts teaching methods are relatively simple, with overtly visible or palpable anatomical features. While more realistic tools may be useful during later stages of training, using tools that have more obvious anatomical features can be useful to address some of the conceptually challenging steps of learning a new procedure. The visible and palpable features of our **Translational Training Tools™** aid in the visualization of similar anatomy in the live animal. As the procedural steps are demonstrated on our inanimate tools, trainees have better visibility of these steps, while they occur. Subsequently as the trainees practice the procedure on these tools, their own successes or errors are visible and can be corrected more readily.

Trainees often grasp the **key learning issues** at different paces. We also have students that require more time to build their confidence as they progress through the training exercises. For many of our tools, we provide various options for tool modification to accommodate the varied needs and pace of the individual trainee. Because the tools are easy to make and of limited expense, it is feasible for us to offer many of the tools for 'take-home" practice. When the trainee feels comfortable after additional practice, he or she can return to the trainers for a competency assessment before moving to supervised practice with a more advanced tool or a live animal.

The 3 Ts can also be used for verification of competency and refresher training, to ensure that an individual has mastered the **key learning issues**.

C. Minimizing distress by using the 3 Ts training method of hands-on training

Our intention is to ensure that our trainees feel comfortable learning at their own pace. We make every attempt to avoid taking large **training leaps** that can hinder the learning process. An example of such a training leap would be to conduct procedural demonstration immediately followed with live animal practice. Too large a training leap can leave trainees feeling anxious, can put the training-animals at risk, and can leave the trainers on edge.

The steps and options we have described as part of the 3 Ts method, allow us to pace the training for individual trainees. By using the translational training tools, we minimize the distress to the animals by limiting practice on animals, until proficiency is achieve with the inanimate tools. The trainee can practice new skills without concerns that they will cause injury or undue stress to the animals. In addition, trainees can concentrate on the **key learning issues** without feeling at risk of the animal biting or harming them. Trainers feel more at ease to take the time required to adequately explain and demonstrate various aspects of the training exercise when using the **Translational Training Tools™**; thus, trainers can avoid prolonged handling of training animals during demonstrations. Overall, stress is minimized for animal, trainee and trainer when teaching with the 3 Ts methods and tools.

2. Basic Properties and Uses of Translational Training Tools™

The tools used for the 3 Ts methods have the following basic properties:

1. They are not necessarily realistic but have visible or palpable anatomy to help address the **key learning issues**
2. They effectively translate the necessary movements required to perform the procedure being taught and practiced
3. They address the key learning issues that arise when teaching a given procedure
4. They are versatile i.e. easily modified to accommodate different learning paces and address different steps or **key learning issues**
5. They are simple to make from inexpensive and readily available materials

The tools used for the 3 Ts methods can be utilized in a variety of ways. Examples of ways to use these tools are described below:

1. Demonstration of a procedure to trainees
2. Teaching the relevant anatomy and specific mechanics of a procedure to trainees
3. Demonstration of **key learning issues** and common errors that trainees encounter when practicing a new procedure
4. Demonstration of different options for various approaches, hand positions and restraint techniques for accomplishing each of the procedures
5. Trainee practice of a procedure under the supervision of a trainer
6. Trainee take-home practice of a procedure
7. Refresher training for trainees
8. Refresher practice of trainers on procedures that are not performed routinely
9. Demonstration and confirmation of competency

Remember:

A training tool does not have to look real to be effective at teaching a skill.

Translational Training Tools™

The 3 Ts Serving the 3 Rs

4. Introduction to the 3 Ts Methods and Tools for Training and Practice of Non-surgical Techniques and Procedures

For each of the procedures in this section, we will address the main skills, steps and **key learning issues** we have identified during our training sessions.

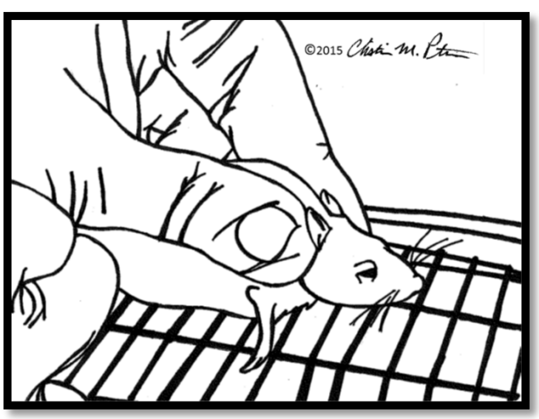
a. Mouse handling and restraint

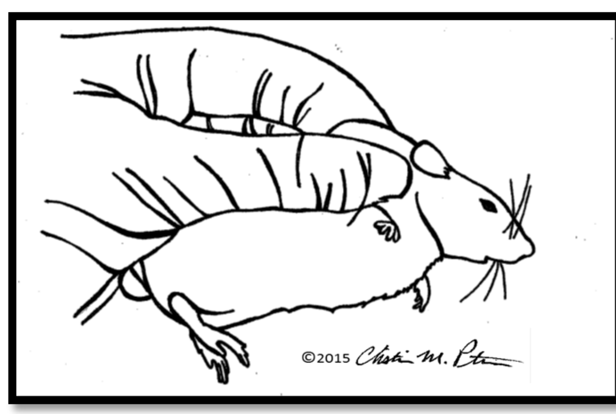
Key learning issues that we address for mouse handling and restraint practice:

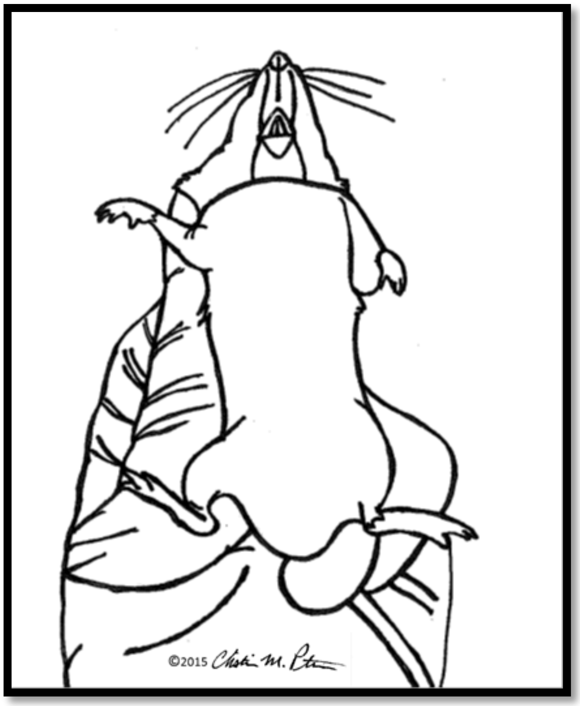
1. Picking the mouse up and out of the cage
2. Maneuvering the mouse by the tail to help position the animal in preparation for restraint
3. Using the bars of the cage top to help position the mouse for restraint
4. Placing some hand pressure on the mouse's back, to immobilize the animal while gathering the scruff into the fingers
5. Picking up only the skin of the scruff; determining how much skin one must handle to properly scruff the mouse
6. Finishing the scruff before lifting the mouse i.e. avoid scruff and lift at the same time
    a. Appreciating this step as a 2-step process
7. Positioning the tail between the fingers and the palm of the hand

Translational training tools™ for teaching and practicing mouse restraint

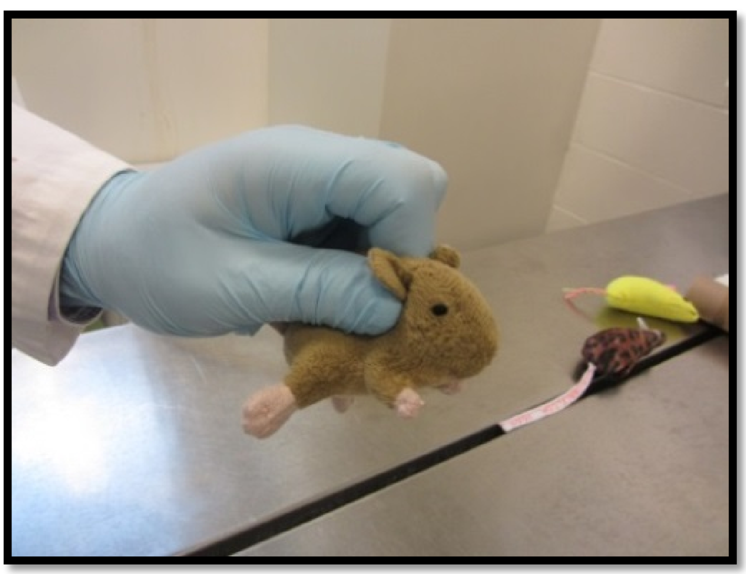
Step 1: We have a variety of pictures and images available to aid in introducing students to the concept of mouse handling and restraint.







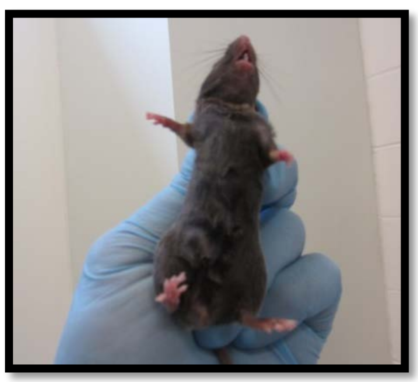
Step 2: For our first hands-on step in training, we use a small stuffed mouse to demonstrate, teach and practice how to pick up and maneuver the mouse in preparation for restraint, and practice of the basic hand position and motions required for restraining a mouse as per **key learning issues** 1 to 3 and **key learning issues** 6 and 7.



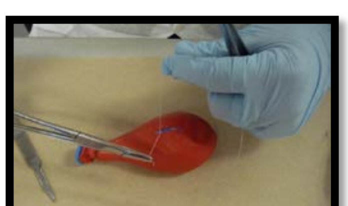
Step 3: Once the trainee is comfortable with these first steps of mouse restraint, we introduce the trainee to a translational training tool called the **FP Balloon™**, which we use to teach and practice **key learning issues** 4 and 5, and for further emphasis on key learning issues 1 to 3, 6 and 7. The FP **Balloon™** consists of two layers of balloon filled with a spongy substance. The

outside layer of the balloon mimics the skin and the inside layer of the balloon represents the tissues surrounding the body cavity.

Step 4: After confirming competency of the handling and restraint on the **FP Balloon™** using the dominant hand, we encourage practice of these skills on the **FP Balloon™** with non-dominant hand, in preparation for performing manipulations such as injections, which will occupy the dominant hand. This practice may be done first without gloves so that dexterity is not compromised to any degree. When comfortable with the procedure without glove, the trainee then practices the procedure while wearing gloves. After confirming that the trainee is competent at handling and restraining the **FP Balloon™** in the gloved, non-dominant hand, we advance to handling live mice.

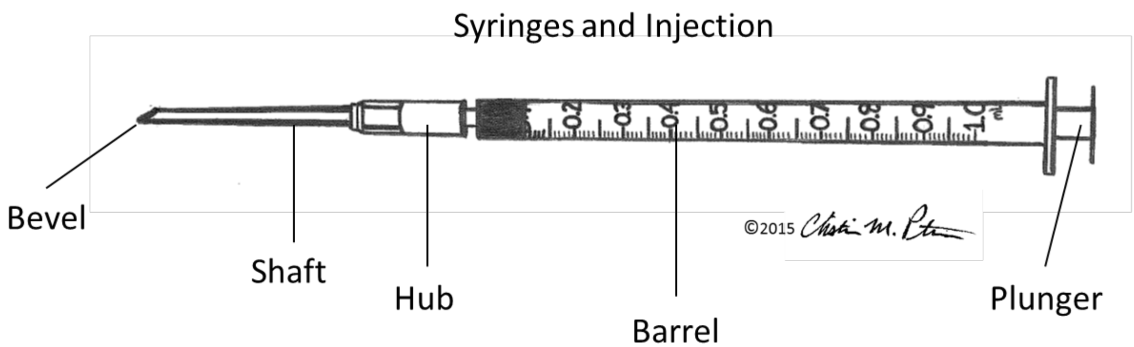


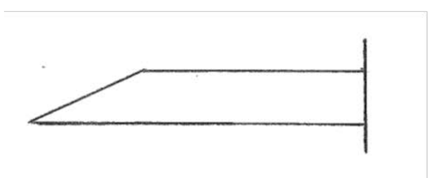
For other uses of the **FP Balloon™**, please refer to the sections on **Rodent Injection Tools** and the 3 Ts manual on **Aseptic Technique Training, Practice and Assessment** (coming soon).



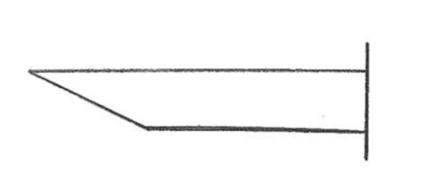
b. Basic information about needle and syringe handling

Prior to injection and venipuncture practice, trainees must be competent at handling live rodents. We then introduce our trainees to basic needle and syringe anatomy, followed by tips on safe handling and manipulations of needles and syringes. We use various images and analogies to teach many of the key concepts for safely performing procedures using needles and syringes.





Like the blade of a snow shovel, the bevel of the needle should face “up” for injection



If the bevel faces “down”, it will scrape along the tissue and may cause trauma

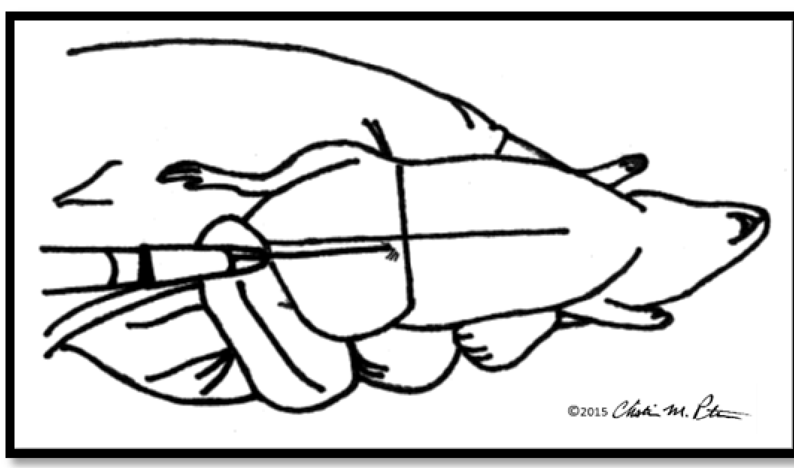
c. Rodent intraperitoneal (IP) and subcutaneous (SC) injection tools

Key learning issues identified for practicing for both IP and SC injections in rodents

1. Restraining the mouse with the non-dominant hand while preparing to administer an injection with the dominant hand
2. Proper needle placement with respect to anatomical landmarks on the animal
3. Understanding the amount of pressure required to move the needle through the tissue layers and developing the confidence to commit to moving the needle through the tissue
4. Appreciating the amount of pressure required to put on the needle for it to penetrate into the skin.
5. Appreciating the depth in which to advance the needle through the tissue layers
6. Learning to apply some back pressure on the syringe plunger, prior to depressing the plunger
7. Understanding the dexterity and hand movements required to depress the plunger on the syringe while keeping the syringe and animal steady
8. Appreciating the speed at which to deliver the injectable solution into the animal
9. Appreciating the appropriate timing for removing the needle from the animal
10. Learning to safely place the animal back in the cage and properly disposing of the needle and syringe

i. Translational Training Tools™ used for teaching and practicing IP injections in rodents

Step 1: We use visual material and analogies to help trainees understand the anatomical landmarks and general approach for injecting a substance into the peritoneal cavity or a rodent.

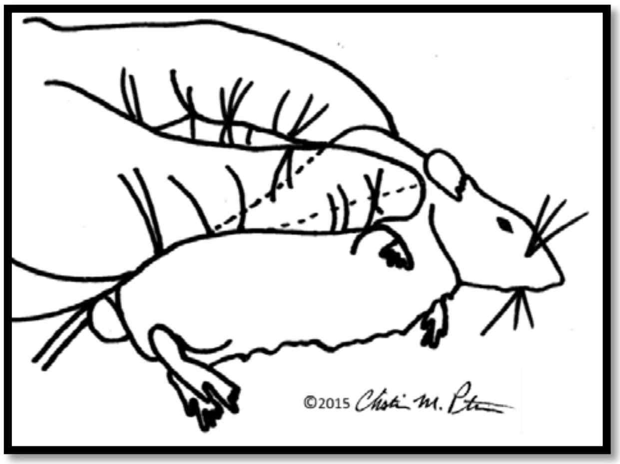


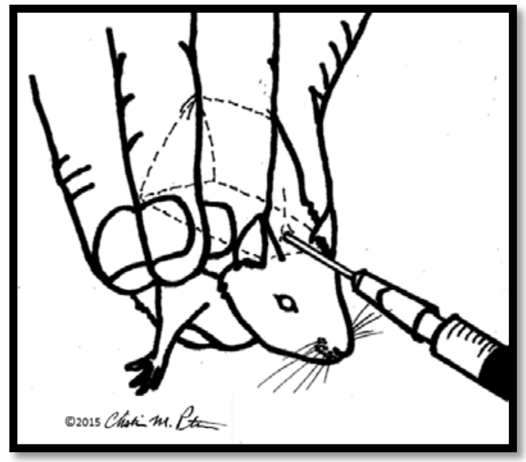
Step 2: We use the **FP Balloon™** to demonstrate, teach and practice **key learning issues** 1 through 10 described above. Note that practice may be done first without gloves. Once comfortable with the procedure, the trainee practices while wearing gloves.

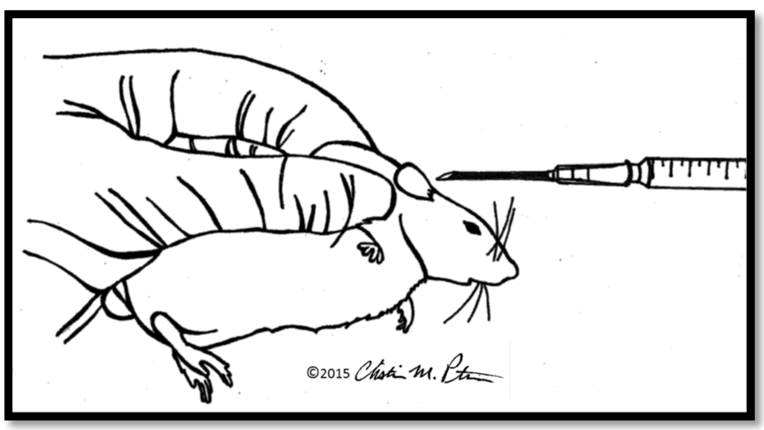
Step 3: After confirming that the trainee has grasped all learning issues and achieved competency of each of the steps for practicing IP injections using the **FP Balloon™** with gloved hands, we advance to practicing with live rodents.

ii. Translational Training Tools™ used for teaching and practicing SC injections in rodents

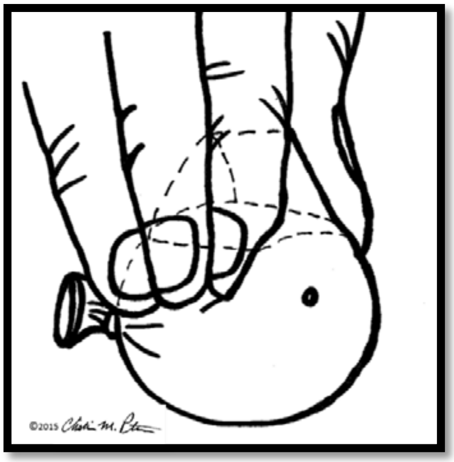
Step 1: We use visual material and analogies to help trainees understand the concept of simultaneously restraining the animal while "tenting" the skin to access the subcutaneous space.

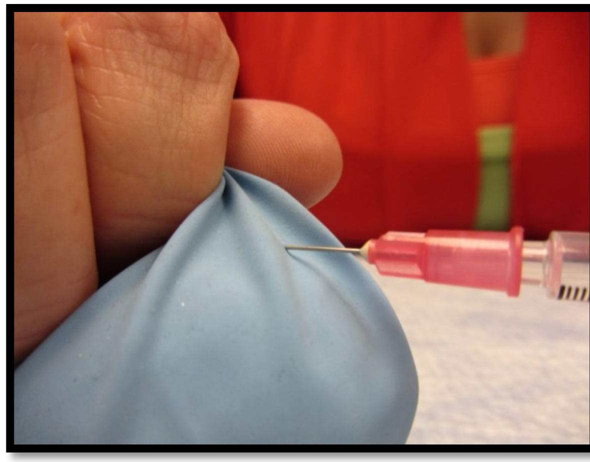






Step 2: As for rodent handling and restraint, we use the 3 Ts **FP Balloon™** to demonstrate, teach and practice the skill such as skin tenting, and to reinforce the steps and **key learning issues** 1 to 10. Note that practice may be done first without gloves. Once comfortable with the SC injection procedure, the trainee practices while wearing gloves.





Step 3: After confirming that the trainee has grasped all learning issues and achieved competency of each of the steps for practicing IP injections using the **FP Balloon™** with gloved hands, we advance to practicing with live rodents.

d. IM injections in rabbits

COMING SOON IN OUR NEXT DRAFT OF THIS MANUAL

e. **Translational Training Tools™ used for teaching and practicing venipuncture in various species**

i. **General information about 3 Ts venipuncture training**

Before attempting to train an individual on venipuncture techniques in various species using the 3 Ts methods and tools, the trainee must be confident and competent at handling and restraint of the relevant species. We also ensure adequate training has been achieved on sharps safety and on needle and syringe manipulation, as described in previous sections of this manual.

Note that many of the **key learning issues** that we address for each of the venipuncture methods will be similar to each other, as the dexterity and hand motions used to stabilized needles and syringes or catheters are similar in nature. The differences relate mostly to the different anatomical locations for the vessels used for venipuncture in the different species e.g. rodents, rabbits, pigs, dogs and cats.

Key learning issues that can be addressed for a variety of venipuncture procedures. Note that key learning issues will vary a bit based on the species and procedure (blood collection, IV injection or IV catheter placement.

1. Proper needle placement with respect to anatomical landmarks on the animal
2. Understanding the amount of pressure required to move the needle through the tissue layers and developing the confidence to commit to moving the needle into the tissue
3. Appreciating the amount of pressure to exert on the needle to guide it through the skin.
4. Appreciating the depth in which to advance the needle through the tissue layers
5. Learning to apply some back pressure on the syringe plunger, prior to depressing the plunger
6. Understanding the dexterity and hand movements required to depress the plunger on the syringe while keeping the syringe and animal steady
7. Appreciating the speed at which to deliver the injectable solution into the animal
8. Appropriate timing for removing the needle from the blood vessel
9. Safely releasing the animal from restraint and properly disposing of the needle and syringe in the sharps container

We have designed many of our tools for venipuncture practice, with externally placed blood vessels. This placement allows the trainee to clearly see the needle position relative to the blood vessel, and aids in understanding errors in needle positioning, depth and angle.

We address the first venipuncture procedure i.e. venipuncture of the rodent lateral tail vein, in the greatest depth. The venipuncture techniques in other species will follow many of the same principles as those used for teaching the lateral tail vein procedure.

ii. Rodent lateral tail vein

Before attempting to train an individual on venipuncture of the lateral tail veins, the trainee must be confident and competent at handling and restraint of the relevant rodent species, and must be proficient at proper also needle and syringe or catheter manipulation.

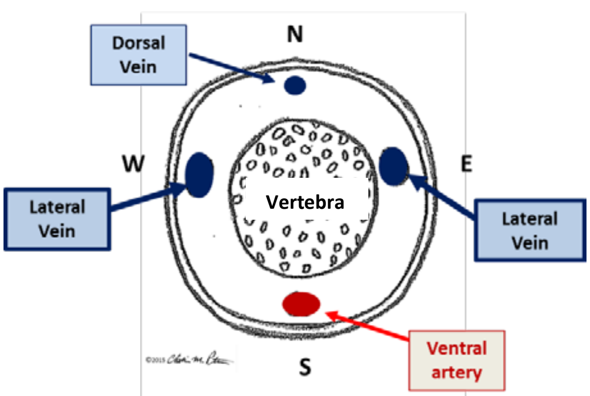
Key learning issues that we address for venipuncture practice of the rodent lateral tail veins

1. Positioning hands to properly hold the tail for each of the procedures
2. Placing the needle at an appropriate angle to the vein
3. Stabilizing the tail and the syringe throughout the procedure
4. Manipulating the plunger while stabilizing the needle and syringe within the vein
5. Guiding the needle into the vessel and directly observing what happens if the angle is placed too deep or too superficially in the lateral vein of the rodent tail
6. Observing the blood enter the hub of needle, then the syringe and gauging the amount of back pressure to apply on the plunger of the syringe (during blood collection)
7. Observing the vein 'clear' as the solution is injected into it

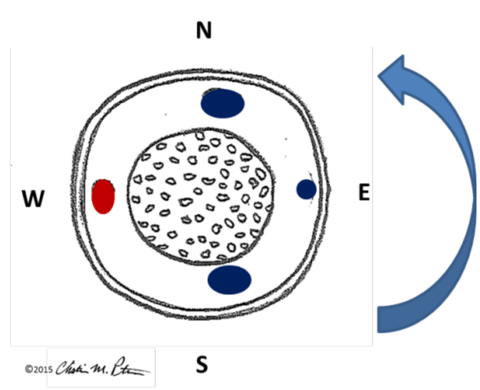
Translational Training Tools™ used for teaching and practicing tail venipuncture in rodents

Step 1: We use a diagram to show a simplified view of the venous and arterial anatomy of the tail. Because many of our trainees are not familiar with the terms: dorsal, ventral and lateral, the directions of the compass are used to help convey the positioning of blood vessels in the natural position when the animal is ventral side down. We can then indicate positional changes of the vessels as we manipulate the tail during venipuncture. In place of compass positions, referring to positions on a clock is another option to help convey the concept of blood vessel positioning during tail venipuncture.

This picture shows the position of the blood vessels of the rodent tail when the animal's body is ventral side down, with the tail is in a natural position.

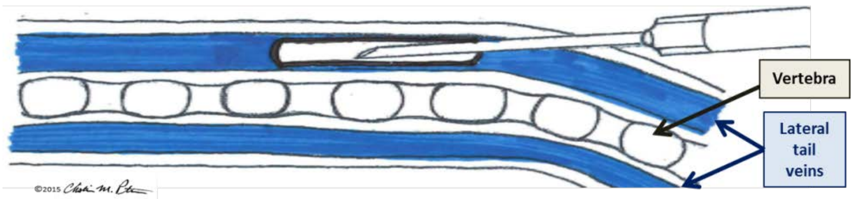


This picture shows the position of the blood vessels of the rodent tail when the animal's body is ventral side down, but the tail has been rotated 90 degrees in a counter clockwise direction.



Proper placement of the needle in the bevel-up is demonstrated using diagrams and images.

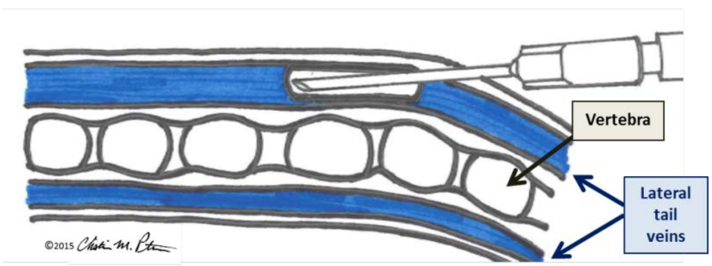
In this picture, the needle is placed in the lateral tail vein in the proper orientation, with the bevel facing up.



Note that in this picture, the tail has been rotated 90 degrees, altering the position of the lateral tail veins from east and west position to the north and south positions on the tail.

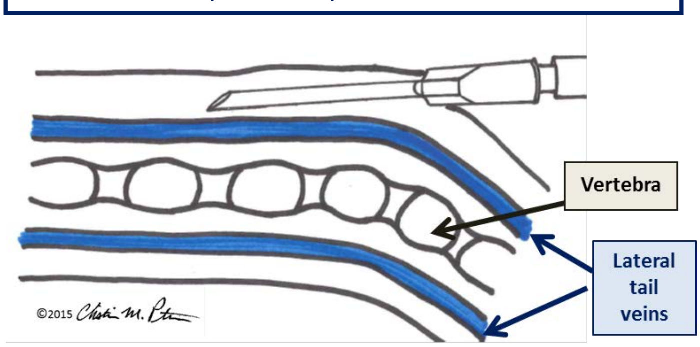
Common errors of needle placement are also addressed with diagrams and images.

In this picture, the bevel of the needle is incorrectly facing down instead of the correct orientation of bevel up. Approaching the blood vessel from this position, may cause damage to the vessel.



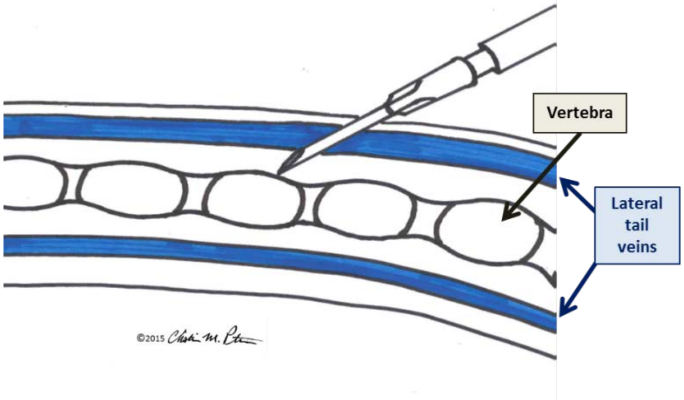
Note that in this picture, the tail has been rotated 90 degrees, altering the position of the lateral tail veins from east and west position to the north and south positions on the tail.

In the picture, venipuncture is unsuccessful because the needle is placed superficial to the lateral tail



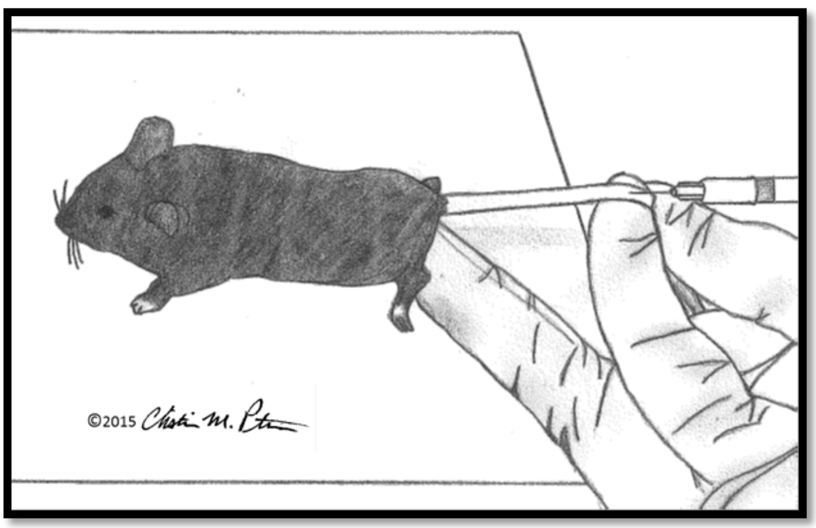
Note that in this picture, the tail has been rotated 90 degrees, altering the position of the lateral tail veins from east and west position to the north and south positions on the tail.

In this picture, venipuncture is unsuccessful because the approach to the vessel is too steep, causing the needle to penetrate through the vessel in contrast to the correct placement of the needle, bevel up, in the lumen of the vessel.



Note that in this picture, the tail has been rotated 90 degrees, altering the position of the lateral tail veins from east and west position to the north and south positions on the tail.

Images and diagrams may also be used to show the position of the mouse during blood collection.



This picture shows the hand position one might use for tail venipuncture of an anesthetized mouse. Similar images may be used to show venipuncture of a mouse in a restraining device.

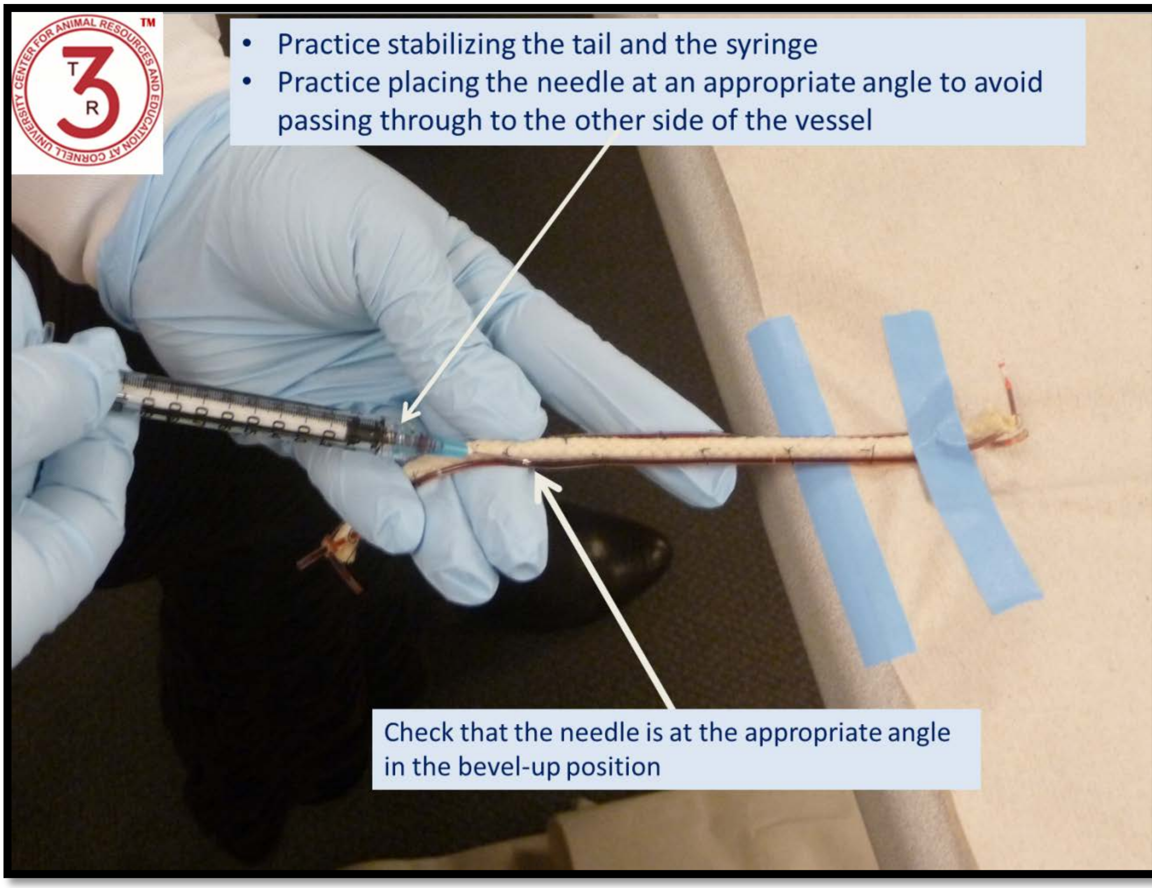
Step 2: For our first steps of hands-on training, we use a simple string or shoelace to demonstrate hand position on the tail during the procedure.

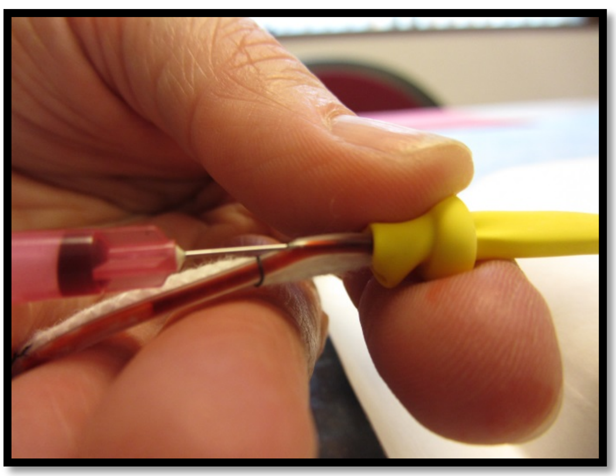
In this picture, the string is permanently attached to an examination table in our training room. You can attach the string in a similar manner in your own training space.

Step 3: We introduce the trainee to a 3 Ts tool called the **Tube Tail™** to demonstrate and practice venipuncture of the lateral tail veins. Clear hollow tubing is representative of lateral tail veins, purposefully placed on the outside of the string tail. The tubes are proportionally larger than are the corresponding blood vessels in an actual rodent tail. The design of the tool is intended to address many of the key learning issues for venipuncture of the lateral tail veins. The large transparent tubing allows the trainee to see the placement of the needle in the vessel to achieve correct needle placement in the blood vessel. References are made back to the diagrams that illustrated proper needle orientation within the blood vessels. The trainer can also use the **Tube Tail™** to demonstrate some of the common errors such as the placing the needle too superficial *or* too deeply.

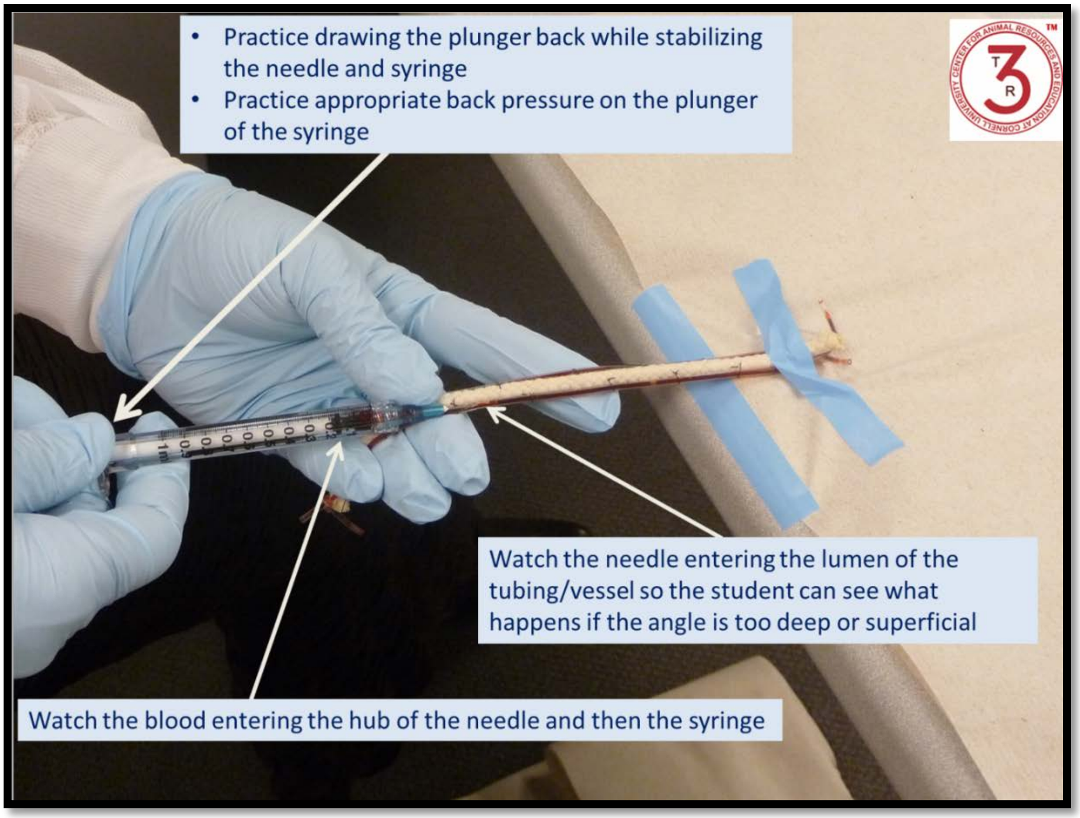
When training with this tool, we do our best to ensure the trainee understands the corresponding live animal anatomy that is represented by the various parts of the **Tube Tail™**. We compare what we see in a live rodent to the **Tube Tail™** structures that serve as a visual aid to facilitate training.

Tube Tail ™ basic version made with transparent tubing

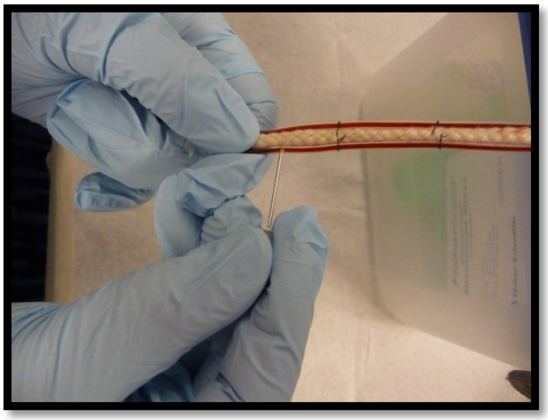


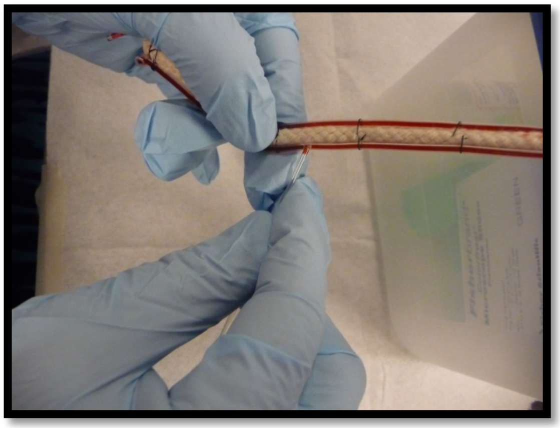


Note the needle placement in the lumen of the tubing, oriented with the bevel up.



Note that the **Tube Tail ™** can also be used for tail vein blood collection methods such as tail nick with blood collection into a micro-capillary tube.





Step 4 (optional): Depending on the trainee's competency and comfort with the procedure on the **Tube Tail ™**, various options exist for adding complexity to the tools and training exercise. It is not necessary for all of the trainees to go through every option. The options are available for those trainees that require more steps to become comfortable and gain proficiency with the tail venipuncture procedure.

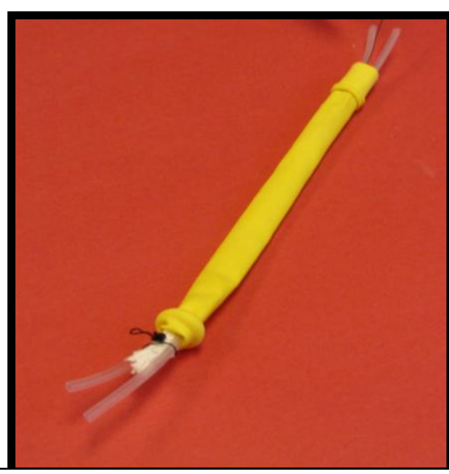
Option 1 – Replace the transparent tubing on the **Tube Tail ™** with black tubing to represent the lateral tail veins. The black tubing increases the complexity of the exercise, because the trainee can no longer see the needle within the lumen of the tubing.

Tube Tail ™ made with black tubing

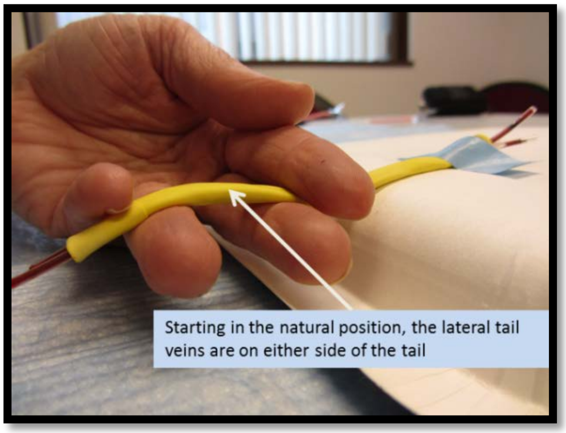
Option 2 – Replace the white string with black string to use for the main structure of the **Tube Tail ™** and use black tubing for the lateral vessels. The overall visibility of the black tubing is decreased when attached to the black tubing; thus, the tool and training exercise are a bit more difficult.

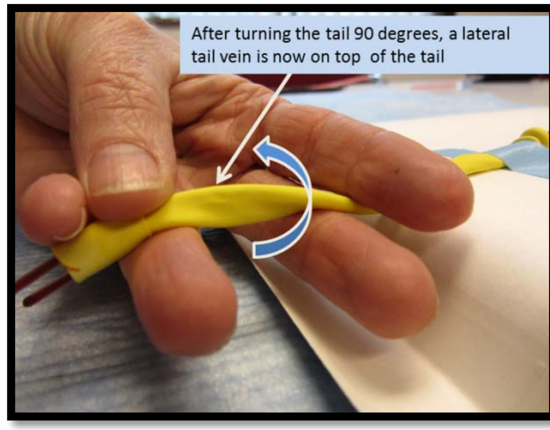
Tube Tail ™ made with black string and tubing

Step 5: We recommend covering the string and tubes to mimic skin over top of the tail veins. We use a long twisty balloon to cover the tails. Trainees can use this version of the **Tube Tail ™** to locate the vessels without seeing them as readily as with previous versions of the tool. Trainees also experience the amount of pressure required to push the needle through additional layers of tissue.

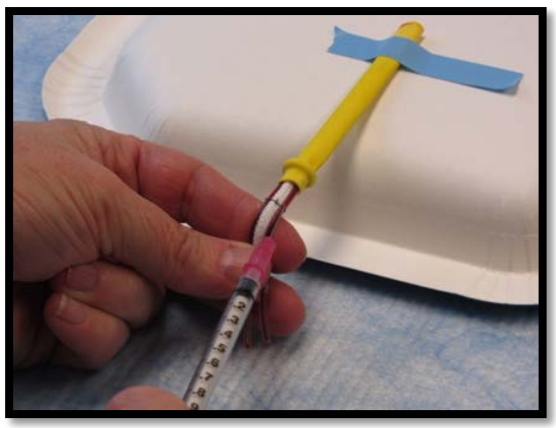


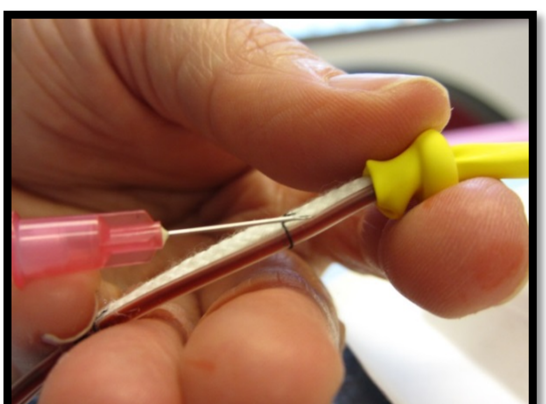
Tube Tail ™ advanced version, with a balloon to hide the blood vessels.

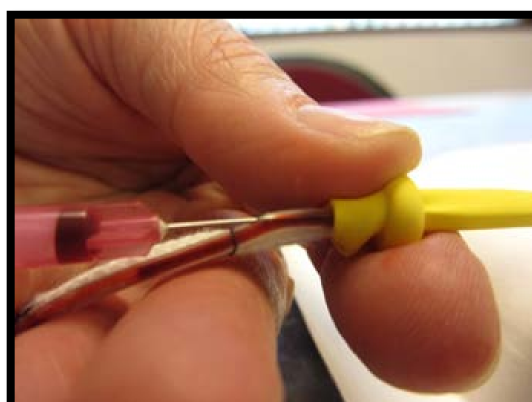




The tails can be prepared such that half of the tail is covered by the balloon, leaving the other half available to access the tubing for the earlier stages of training. Once the trainee is ready to advance to Step 5, practice can be performed on the covered part of the tail.

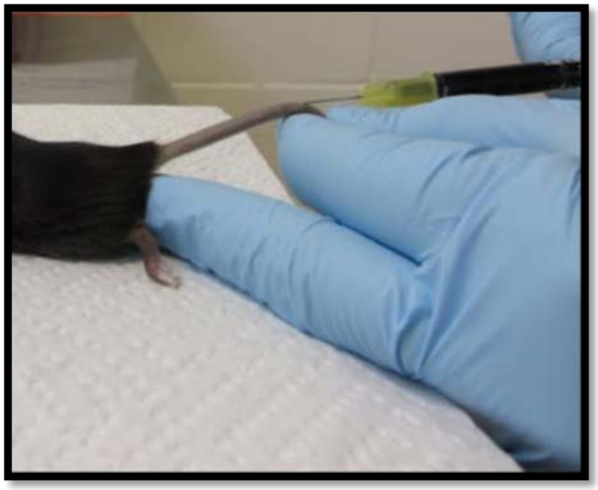






Note that practice may occur first without gloves. Once the trainee demonstrates proficiency doing the procedure on the inanimate tools with non-gloved hands, practice will continue to gain proficiency while wearing gloves, and prior to working with live animals.

Step 6: Practice with live animals.



In this picture, the animal is anesthetized. Practice will also include using rodent restraint devices during venipuncture.

iii. Rabbit Marginal Ear Vein

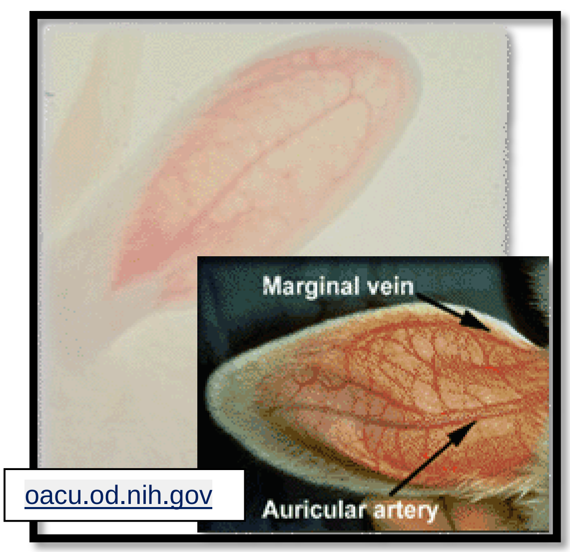
Before attempting to train an individual on venipuncture in rabbits, the trainee must be confident and competent at handling and restraint of rabbits. We also ensure adequate training has been achieved on needle and syringe or catheter manipulation, and sharps safety.

Key learning issues we address for teaching and practicing venipuncture of the marginal ear vein of the rabbit. Note that these learning issues are similar to those identified for venipuncture of the lateral tail veins in rodents. Also key learning issues will differ slightly depending on the procedure being taught i.e. IV blood collection, injections or catheter placement.

1. Positioning hands to properly hold the rabbit's ear for each of the procedures
2. Placing the needle at an appropriate angle to the vein
3. Stabilizing the ear and the syringe throughout the procedure
4. Manipulating the plunger while stabilizing the needle and syringe (or catheter)
5. Applying appropriate back pressure on the plunger of the syringe during blood collection
6. Guiding the needle into the vessel and directly observing what happens if the angle is too deep or superficial
7. Observing the blood enter the hub of needle
8. Observing the vessel 'clear' as the substance is injected into it

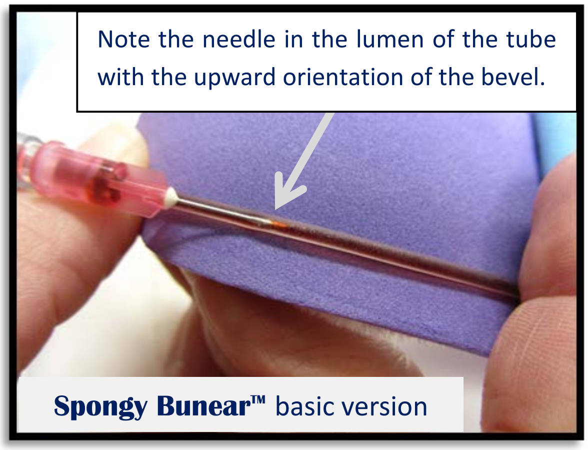
Translational Training Tools™ used for teaching and practicing venipuncture of the marginal ear vein in rabbits

Step 1: We review the position and anatomy of the blood vessels in the rabbit ear, and discuss the approach to holding the ear during the venipuncture procedure.



Step 2: We use a 3 Ts tool called **Spongy Bunear™** for our first step in hands on training. Similar to the **Tube Tail™**, we use clear, hollow tubing to represent veins on an inanimate rabbit ear model. Also similar to our methods for training on venipuncture of tail veins, the vessels of the **Spongy Bunear™** are external, easy to access and very visible. We believe the placement of the tube veins is helpful to facilitate mastering the **key learning issues** that we have addressed for venipuncture of the marginal ear vein.

Spongy Bunear™ basic version



Spongy Bunear™ basic version

Step 3: Further training is performed with a modified version the **Spongy Bunear™.** For this version of the tool, we cover the tube vein with a commercially-available, plastic cling-wrap to make the vessels less apparent yet still visible.

Spongy Bunear™ advanced version

Spongy Bunear™ advanced version

Note that the **Spongy Bunear™** can be modified for central auricular artery blood collection training and practice.

We may also mount the ear on an object such as this sponge football, to better simulate practice of handling of the ear on the rabbits head.

Step 4: After the trainee has been deemed proficient at handling the ear and performing venipuncture on the marginal ear vein of the **Spongy Bunear™** with gloved hands, we proceed with training on live animals.

iv. Pig venipuncture of the Marginal Ear Vein

Before attempting to train an individual on venipuncture of the marginal veins of the pig, the trainee must be confident and competent at handling and restraint of swine, and must be proficient at proper needle and syringe (or catheter) manipulation.

Key learning issues we address for teaching and practicing venipuncture of the marginal ear vein of the pig. The key learning issues for this procedure are fairly similar to those used for training on the rabbit marginal ear vein.

1. Proper handling of the ear and positioning the hand to place some pressure to hold off the vein
2. Palpation of the vein
3. Placing the needle at an appropriate angle to the vein
4. Stabilizing the ear and the syringe throughout the procedure
5. Managing potential movement of the ear during the venipuncture procedure
6. Manipulating the plunger while stabilizing the needle and syringe (or catheter)
7. Applying appropriate back pressure on the plunger of the syringe during blood collection
8. Guiding the needle into the vessel and directly observing what happens if the angle is too deep or superficial
9. Observing the blood enter the hub of needle (or catheter)
10. Holding off the vein to control bleeding once the needle has been removed from the vein

Translational Training Tools™ used for teaching and practicing venipuncture of the marginal ear vein in pigs

Step 1: We review the position and anatomy of the blood vessels in the pig ear, and we discuss the approach to holding the ear during the venipuncture procedure.

Step 2: We use a 3 Ts tool called **Ear Piggy Piggy™** for our first step in hands on training. Similar to the **Spongy Bunear™** we use a spongy material to create the structure of the ear. Similar to another 3 Ts tool known as the **Cephalic Tube™**, we use a long, skinny balloon to serve as the vein. The vein may be left uncovered for better visibility, though we prefer to cover the ear and the vein with a commercially-available, plastic cling-wrap.

Note that training with the **Ear Piggy Piggy™** may begin using non-gloved hands to allow for unimpeded dexterity during the early stages of learning. As the skills progress, we encourage trainees to practice while wearing gloves.

Step 3: After the trainee has been deemed proficient at handling the ear and performing venipuncture on the marginal ear vein on the **Ear Piggy Piggy™** with gloved hands, we may proceed with training on live animals.

v. Canine and Feline Venipuncture of the Cephalic Vein

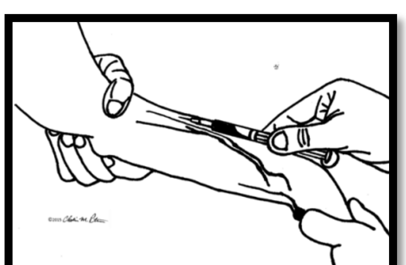
Before attempting to train an individual on venipuncture of the cephalic veins of the dog or cat, the trainee must be confident and competent at handling and restraint of the relevant species, and must be proficient at proper needle and syringe (or catheter) manipulation.

Key learning issues we address for teaching and practicing venipuncture of the cephalic vein Note that the key learning issues are addressed for both the trainee learning to restrain the animal for cephalic venipuncture and for the trainee that is performing the venipuncture procedure. Key learning issues will differ slightly depending on whether training is for IV blood collection, injection or catheter placement.

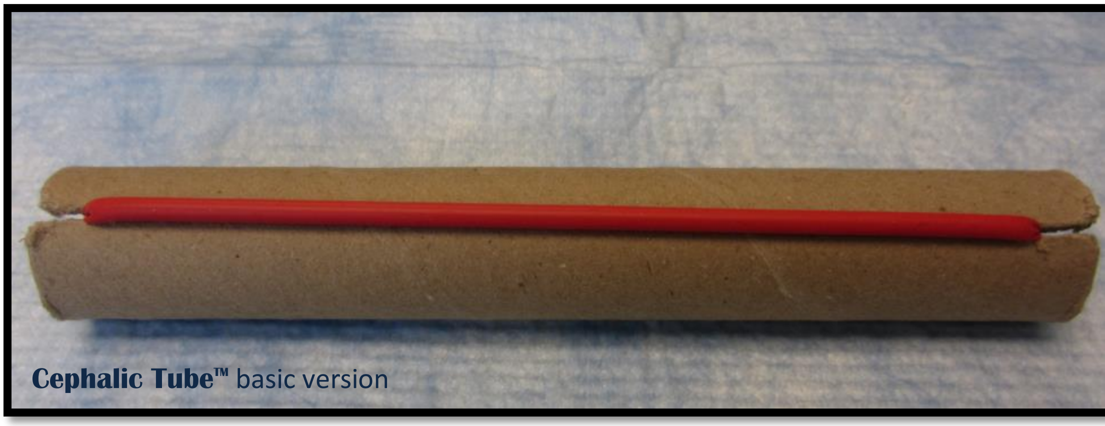
1. Learning to restrain the forelimb while holding off the blood vessel
2. Appreciating the importance of communication between restrainer and the individual performing the venipuncture procedure
3. Appreciating what the cephalic vein feels like when palpated
4. Stabilizing the cephalic vein with the thumb alongside the vessel during the venipuncture procedure
5. Placing the needle at an appropriate angle to the blood vessel
6. Dealing with potential movement of the dog limb during the venipuncture procedure
7. Manipulating the plunger while stabilizing the needle and syringe (or catheter)
8. Applying appropriate back pressure on the plunger of the syringe during blood collection
9. Guiding the needle into the vessel and directly observing what happens if the angle is too deep or superficial
10. Observing the blood enter the hub of needle (or catheter)
11. Holding off the blood vessel once the needle has been removed from the vein

Translational Training Tools™ used for teaching and practicing cephalic venipuncture in canines and felines

Step 1: We review the anatomical location of the cephalic vessel and discuss the approach to the venipuncture procedure, taking into consideration the **key learning issues** for both the restrainer and the individual performing the venipuncture procedure.

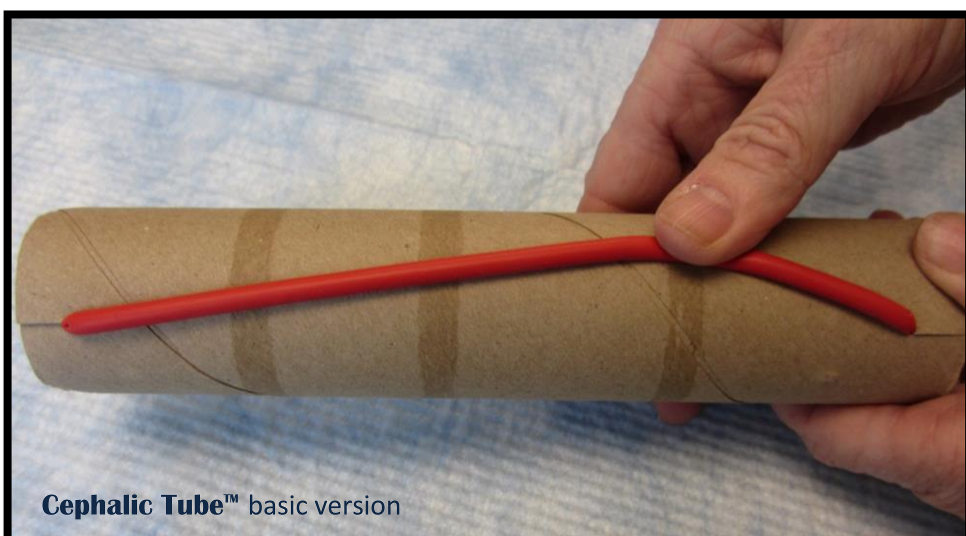


Step 2: The first hands-on step of cephalic venipuncture training is achieve through demonstration and practice of the technique using a 3 Ts tool called the **Cephalic Tube™**. This tool consists of a cardboard tube such as paper towel roll, with a long, skinny balloon serving as the cephalic vein. Note that training with this tool may begin using non-gloved hands to allow for unimpeded dexterity during the early stages of learning. As the skills progress, we encourage trainees to practice while wearing gloves.



Cephalic Tube™ basic version

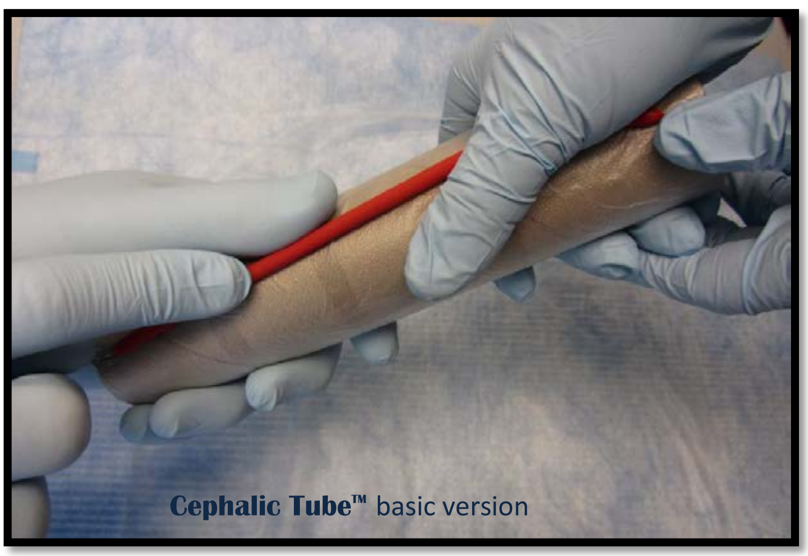
Note that the balloon blood vessel is placed loosely enough to allow for the vessel to roll a bit. The laxity of the vessel is ideal for teaching the restraining-trainee to properly hold off the vein and keep it taut to help facilitate the venipuncture process. For the individual learning to perform the venipuncture, the looseness of the vessel helps the trainee understand how mobile the vessel can be and learning to stabilize the vein during the venipuncture procedure.

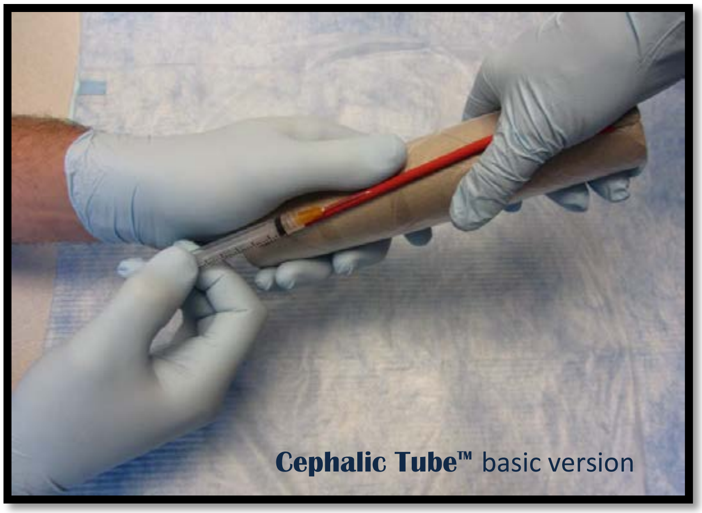


Cephalic Tube™ basic version

Note that the restraining-trainee is giving a slight twist to the vein while holding it off; thus, keeping the vein taut during the venipuncture process

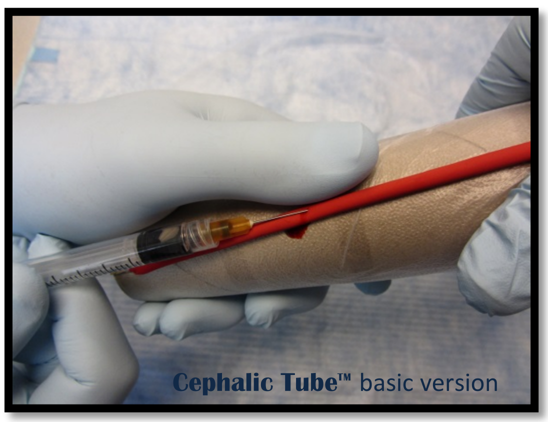
The venipuncture-trainee can become familiar with how the vein feels and behaves when palpated. Training with the **Cephalic Tube™** also provides ample opportunity for practicing communication between the venipuncture-trainee and the restraining-trainee then learning to make any necessary adjustments in restraint of the vessel.



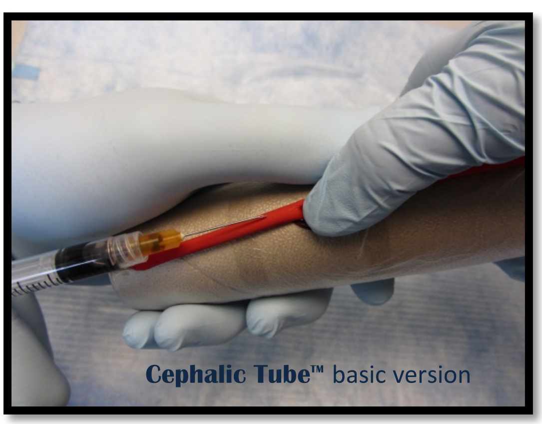


Note that the venipuncture-trainee is stabilizing the vein with the thumb.

The trainees also learn to adapt to and manage any potential blood leakage from the vein during the venipuncture procedure.

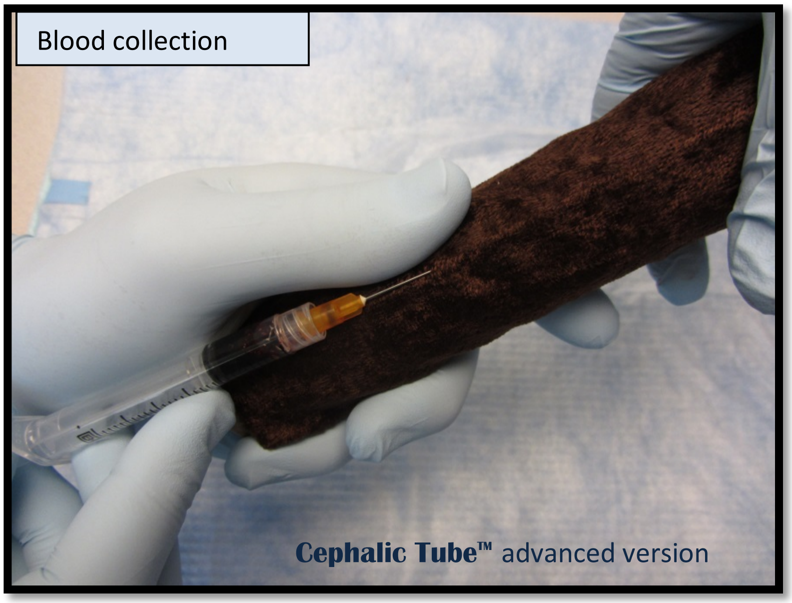


Training on communication and interactions between the two trainees will continue as the needle is removed from the vein.

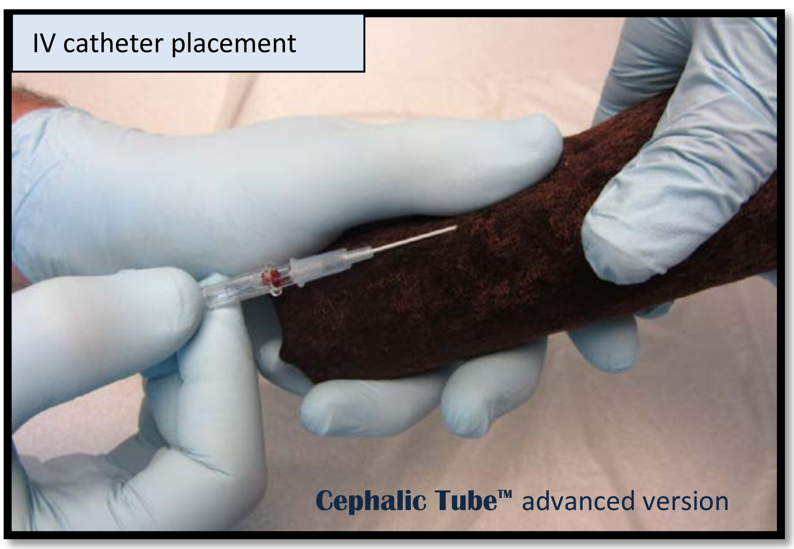


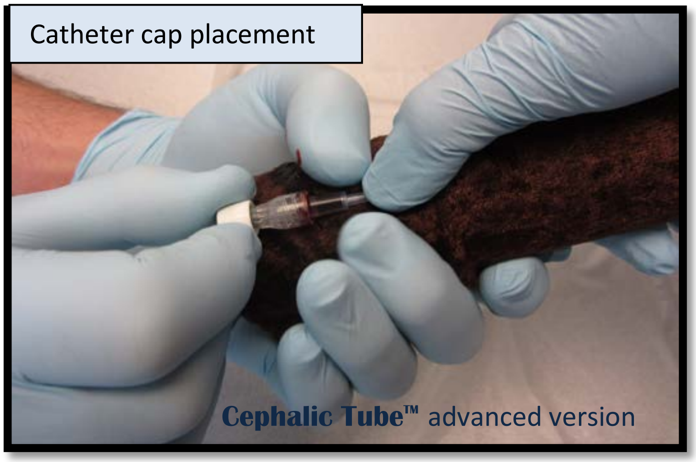
Note that the trainee who is performing the restraint is applying pressure to the vein as the needle is withdrawn from the vessel.

Step 3: Further training is performed with a modified version the **Cephalic Tube™.** For this version of the tool, we cover the cardboard tube and vein with a piece of textured fabric to mimic the animal's skin and hair. The fabric covering makes the vein less apparent but readily palpable.



Note that both the basic and the advanced version of the **Cephalic Tube™** are useful to demonstrate, teach and practice blood collection, IV injections and catheter placement procedures. All of these procedures will require the two trainees to learn to work as a team to understand the essential hand positions and motions and the interaction between the restraining-trainee and the venipuncture-trainee.





Catheter cap placement

Taping the catheter in place

Step 4: After the trainees are deemed proficient at practicing both restraint for cephalic venipuncture and venipuncture procedure on the **Cephalic Tube™** with gloved hands, we proceed with training on live animals.

f. Cardiac puncture blood collection in rodents

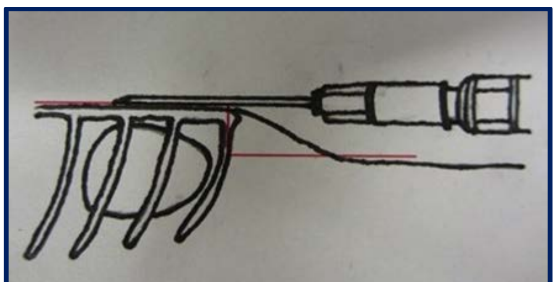
Note that in addition to the information outlined in this manual, al trainees performing cardiac puncture, will discuss the relevant regulations and guidelines that apply to this procedure. The terminal nature of the procedure is also addressed as is the necessity for appropriate anesthetic depth.

Key learning issues that we address for demonstration, teaching and practice of rodent blood collection by cardiac puncture

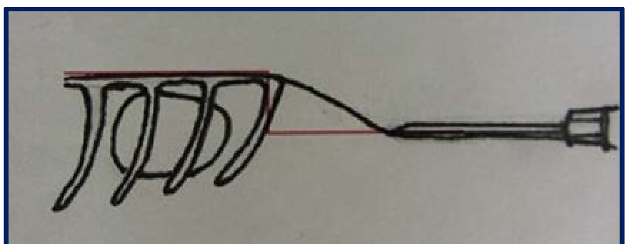
1. Correctly positioning the animal for either a ventral or lateral approach to the heart
2. Appreciating the anatomical landmarks and correctly orientating the needle relative to the landmarks
3. Understanding the need to stabilize the mouse's body; thus, minimizing the degree to which the heart shifts as the needle advances towards it.
4. Learning to reposition the needle, without removing it entirely from the thoracic cavity, should the initial attempt at puncturing the heart be unsuccessful
5. Appreciating the sensation of the needle penetrating the heart
6. Appreciating the depth at which the needle should be placed
7. Understanding the amount of back pressure to apply to the plunger of the syringe to facilitate blood collection without collapsing the heart
8. Learning to stabilize the needle and syringe while drawing back on the plunger as the blood is collected into the syringe

Translational Training Tools™ used for teaching and practicing rodent blood collection by cardiac puncture

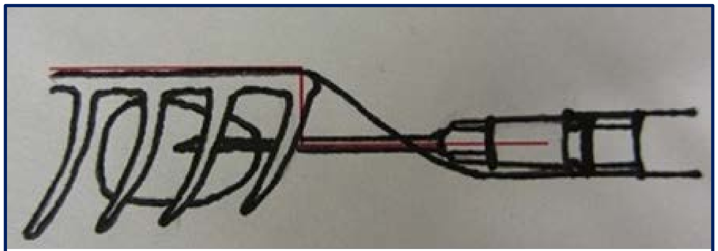
Step 1: We use a variety of pictures and images to introduce the trainees to the concept of blood collection by cardiac puncture. The anatomical landmarks and different approaches to the procedure are addressed. We have provided some examples of images used to address the ventral approach to cardiac puncture.



Place shaft of needle on sternum, bevel –side up. Syringe should be parallel to the body with the shaft of the needle resting softly on the sternum



Draw the syringe caudally until the shaft of the needle drops off the sternum and rests on the abdomen. The tip of the needle should be pointing at the xyphoid process

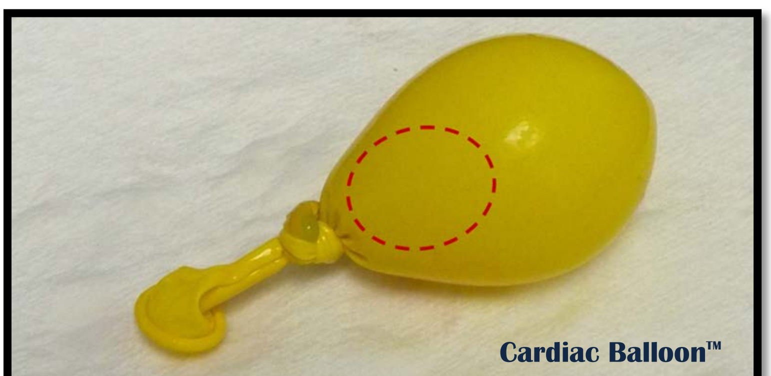


With the shaft of the needle still resting on the abdomen, advance the needle cranially while simultaneously aspirating until blood fills the needle hub

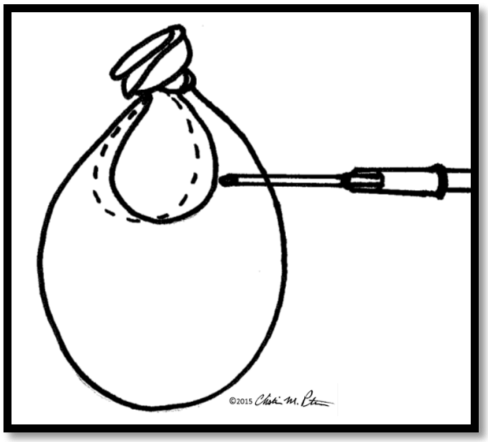
Step 2: Hands-on demonstration and practice of the cardiac puncture procedure is achieved using a 3 Ts tool called the **Cardiac Balloon™**. This tool has a small balloon filled with fake blood which represents the heart. The small blood filled balloon is placed inside a larger balloon which is then filled with a gel substance which represents the rodent body surround the heart.

It is important to note that there are some major differences between this 3 Ts tool and the corresponding anatomy of the rodent. The **Cardiac Balloon™** does not include the bony structure of the thoracic cavity such as the ribs and sternum. Another difference is that the heart of the **Cardiac Balloon™** does not have a heartbeat. In addition, the **Cardiac Balloon™** heart can be palpated as a small bladder-like structure in the center of the balloon body. Palpation of the heart in this manner would not be possible in a real animal due to the presence of the ribs and sternum. We find that these deviations from the actual rodent anatomy do not preclude the **Cardiac Balloon™** from being an effective tool to address the majority of the key learning issues that we aim to tackle in this step of training.

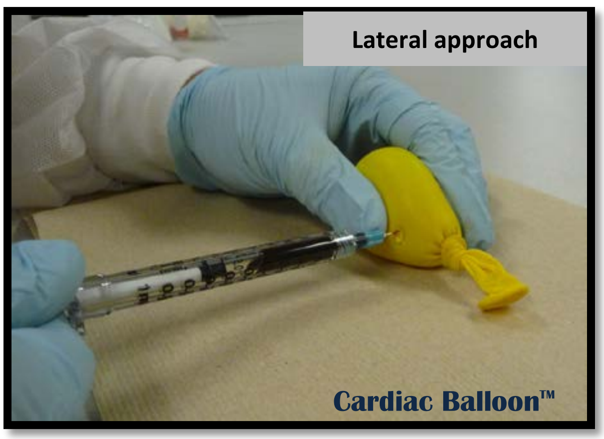
Similar to the other procedures discussed in this manual, the trainee may first practice the procedure without gloves so that dexterity is not compromised. Once comfortable with practice of the procedure on the **Cardiac Balloon™** with the non-gloved hands, we encourage similar practice while wearing gloves.

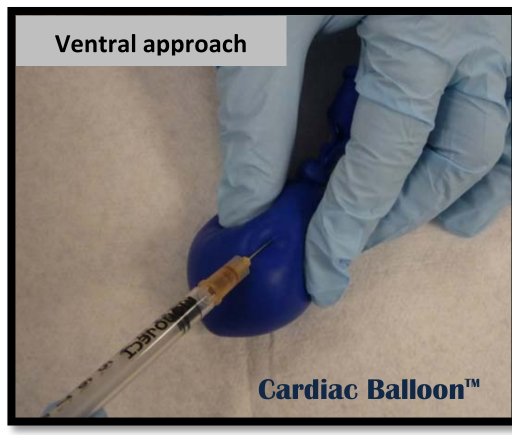


The dotted circular outline refers to the small, fake-blood filled balloon that represents the heart.



When the needle is placed against the small balloon, the balloon may swivel or move away from the needle. We use this diagram to depict what the trainee might expect when practicing this procedure in a real rodent.





Step 4: After the trainees are deemed proficient at performing the cardiac puncture procedure on the **Cardiac Balloon™** with gloved hands, we proceed with training on cadavers and eventually proceed to practice on anesthetized animals.

g. Cervical dislocation in mice

Before teaching this procedure, we discuss the regulations and guidelines for mouse euthanasia and discuss the appropriate conditions under which to perform this procedure. Trainees must be comfortable and confident in performing mouse handling and restraint, before proceeding with training on cervical dislocation.

Key learning issues that we address for demonstration, teaching and practice of cervical dislocation in mice

1. Understanding the relevant anatomical landmarks
2. Understanding the point at which the disarticulation of the vertebrae should occur
3. Appreciation of the hand position and direction of motion of the hands, as well as the pressure required to disarticulate the vertebrae
4. Processing the physical and emotional experience of disarticulating the joint
5. Palpating after the cervical dislocation procedure, to determine that the appropriate vertebral joint was indeed disarticulated

Translational Training Tools™ used for teaching, demonstration and practice of cervical dislocation in mice

Step 1: We discuss the anatomical landmarks and different approaches to the procedure.

Step 2: Hands-on demonstration and practice of the cervical dislocation procedure is achieved using a tool called the **CD Mouse™**. This tool is made from a series of interlocking beads that serve as the head and vertebrae of the mouse. With enough pressure placed between the first and second beads, the first bead will separate from the rest of the chain. We begin the hands-on training with just the string of beads used to address the concept of the tool, and how it mimics the cervical dislocation procedure. Trainees can practice the hand position and gain an appreciation for the amount of pressure required to disarticulate the beads.


'Naked' CD Mouse™


Naked CD Mouse™ disarticulated

Step 3: Once the trainee understands the basic concept of performing a cervical dislocation procedure on the 'naked' **CD Mouse™** and the trainee is aware of the appropriate landmarks, we advance to using an intermediate version of the **CD Mouse™**. For this version, the series of interlocking beads is placed inside a small balloon so that the trainee can no longer see the separation of each of the beads. The end of the balloon can serve as a tail of the mouse.

Intermediate balloon covered CD

Step 4: When the trainee can demonstrate proficiency on the intermediate **CD Mouse™** , we proceed to the advanced version of the **CD Mouse™** which has a finger puppet mouse placed over balloon-covered strand of interlocking beads. The finger puppet adds more layers which can mimic the tissue layers that lay overtop of the cervical spine of the mouse. Additional force is required to accomplish the disarticulation with this version of the **CD Mouse™**.

Advanced CD Mouse™

Different approaches to the procedure can be taught with each level of the tool from the basic to advanced **CD Mouse™**.

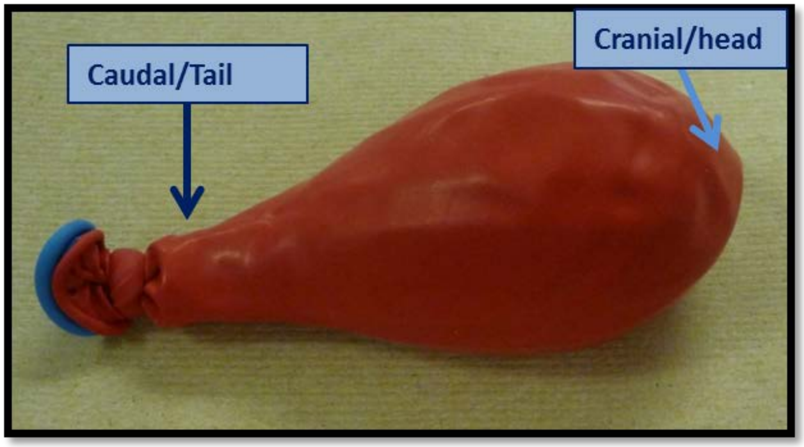
Step 5: After the trainees are deemed proficient at performing the cervical dislocation procedure on the **CD Mouse™** with gloved hands, we proceed with training on cadavers and eventually proceed to practice on anesthetized animals.

PART II – The Recipes

Table of Contents

a. **FP Balloon™**

For demonstration, teaching and practice of mouse handling and restraint; and rodent intra-peritoneal and sub-cutaneous injection; and rodent surgery practice (refer to The Joy of Training Volume 2)



Ingredients:

- 2 - 12" balloons *
- 1 - Container of 3" Fart Putty® (FP) or a similar product **
- 1 - 5 cm piece of 6 mm width pipe cleaner

Instructions:

1. Fill one balloon with the FP or a similar substance
2. Tie off the FP-filled balloon leaving a moderate degree of laxity to the balloon
3. Insert the FP-filled balloon into the second balloon
4. Tie off the outer balloon leaving a moderate degree of laxity to the balloon

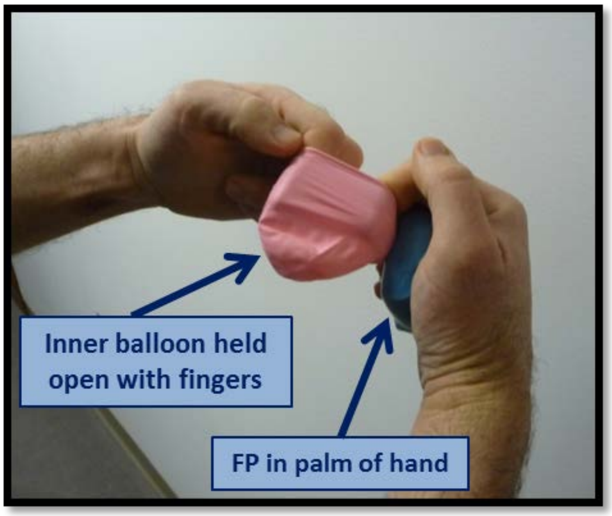
OPTIONAL STEP: After completing step 3, insert the pipe cleaner piece between the two layers of balloon. Orient the pipe cleaner piece longitudinally. The pipe cleaner is intended to mimic the spinal vertebrae.

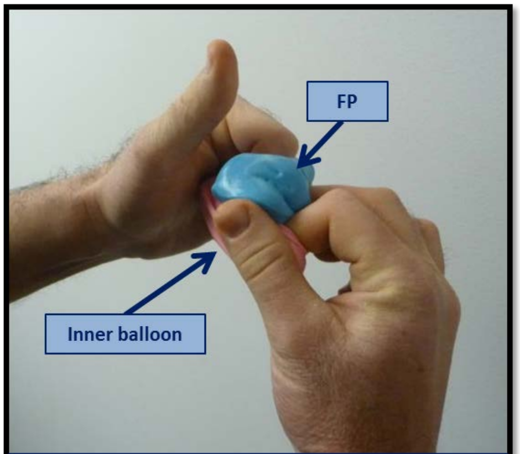
*Use 2 contrasting colored balloons if using the **FP Balloon™** for surgery practice

** Recipes are available online to make a similar product to Fart Putty®

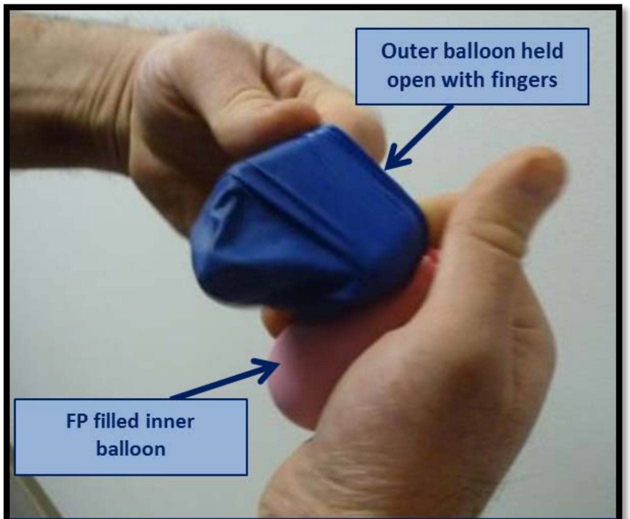
http://www.stevespanglerscience.com/lab/experiments/glue-borax-gak

Images to help guide the process of making an **FP Balloon™**

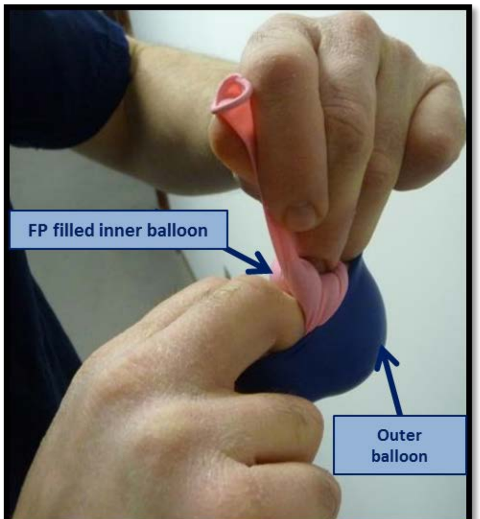




Place the FP inside the inner balloon



Prepare to place the FP-filled balloon inside the second balloon



Place the FP-filled balloon inside the second balloon

b. **IM Foosbun™**

For demonstration, teaching and practice of rabbit intra muscular injection

(COMING SOON)

c. Venipuncture Tools

i. Tube Tail™

For demonstration, teaching and practice of venipuncture of the lateral tail vein

Ingredients for making the basic version of the Tube Tail™:

- 1 - Piece of white string or shoe lace; approximately 5mm in diameter
- 2 - Pieces of hollow tubing; approximately 2mm in diameter; transparent or frosted (our preference is **Pony Bead Lacing™**)
- 1 – Piece of polyester sewing thread; approximately 30 cm long
- 1 ml of fake-blood (our preference is **Vampire Blood®**)

Supplies:

- 1 pair of scissors
- 1 sewing needle
- 1 – 21 gauge catheter tip
- 1 – syringe (3cc to 12 cc)
- A fray stop solution found in most craft stores– our choice is **Dritz Fray Check™**

ADDITONAL INGREDIENTS and SUPPLIES FOR INTERMEDIATE and ADVANCED VERSIONS OF THE Tube Tail™:

- **Hollow, black tubing**
- **Black string**
- **Long, skinny balloon (260 Q)**
- **1 cm diameter metal dowel rod about 7 cm long**

Instructions for making the basic version of the Tube Tail™:

1. Cut string to a length of approximately 4 to 6 inches
2. Apply **Fray Check™** to each cut end of the string and allow time for it to dry

3. Cut hollow tubing to a length that is about 1 to 1.5 cm longer than the string on each end
4. Thread the sewing needle with the polyester thread and tie at knot at the end of the thread
5. Insert the sewing needle into the center of one end of the string
6. Begin sewing the pieces of tubing onto either side of the string; leaving a space of about 2 cm between the stiches (see photos for details)
7. When both tubes have been sewn to either side of the string, tie the thread off at the end of the string and cut the thread distal to the knot

Shortly before using any version of the Tube Tail™ :

8. Prepare a syringe filled with fake-blood and place the catheter tip on the syringe
9. Insert the catheter tip into the tubing and inject the fake-blood down the length of the tubing

The **Tube Tail™** is now ready for use. Depending on the venipuncture procedure for which it is being used, it may be helpful to clamp or tie off one or both ends of the blood filled tubes.

OPTION 1 FOR INTETMEDIATE VERSION 1 OF THE Tube Tail™:

- **In place of the transparent or frosted tubing, sew black hollow tubing onto white string**

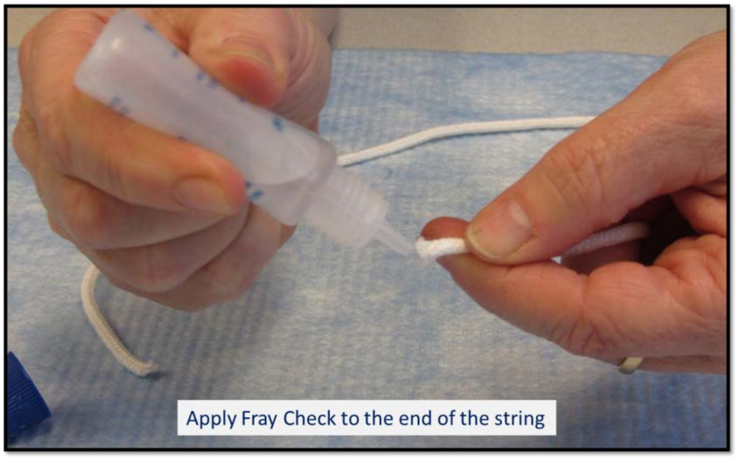
OPTION 2 FOR INTETMEDIATE VERSION 1 OF THE Tube Tail™:

- **In place of the white string and frosted tubing, use black tubing sewn onto black string**

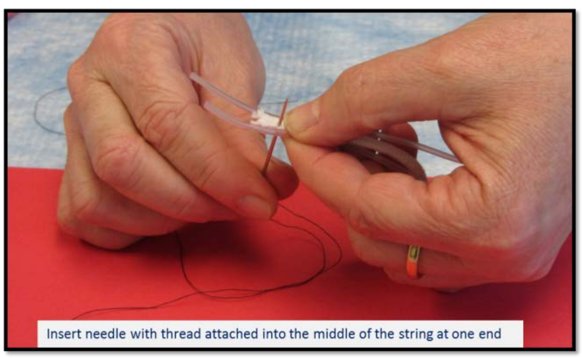
OPTION FOR ADVANCED VERSION OF THE Tube Tail™:

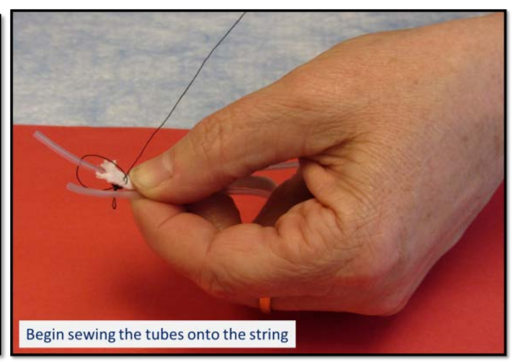
1. **Cut off the end of the balloon**
2. **Place the rolled edge of the balloon over one end of the metal dowel rod**
3. **OPTIONAL STEP: Place some clear tape over the ends of the tubing and tail tip to facilitate smoother passage through the balloon**
4. **Thread a needle with about 20 cm of thread**
5. **Attach thread to one end of the Tube Tail™ (at the taped end if step 3 was performed)**
6. **Feed the needle through the open end of the dowel and into balloon until you are able to grasp the thread at the far end of the balloon**
7. **Pull gently on the thread to feed Tube Tail™ through the dowel and into the balloon until the tail tip is visible at the opposite end of the balloon**
8. **Remove the balloon encased Tube Tail™ from the dowel**
9. **Trim the end of the balloon to a length that allow both ends of the tubes to be access for infusing fake-blood into the tubes**

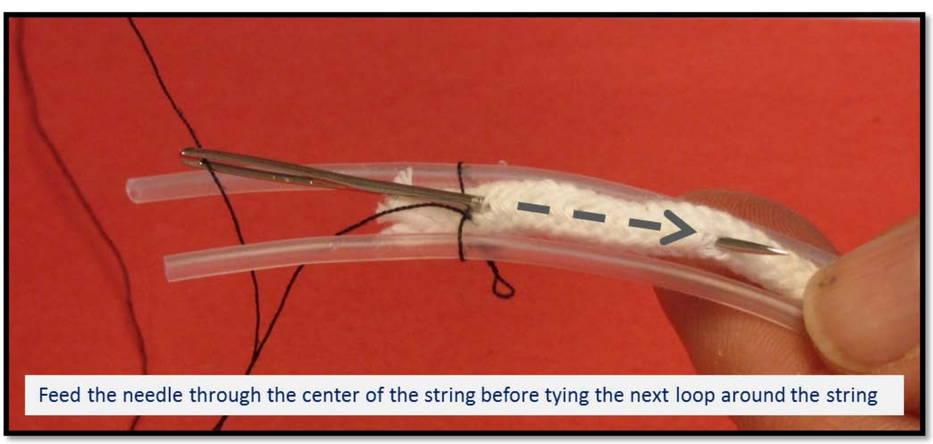
Images to help guide the process of making a **Tube Tail™**

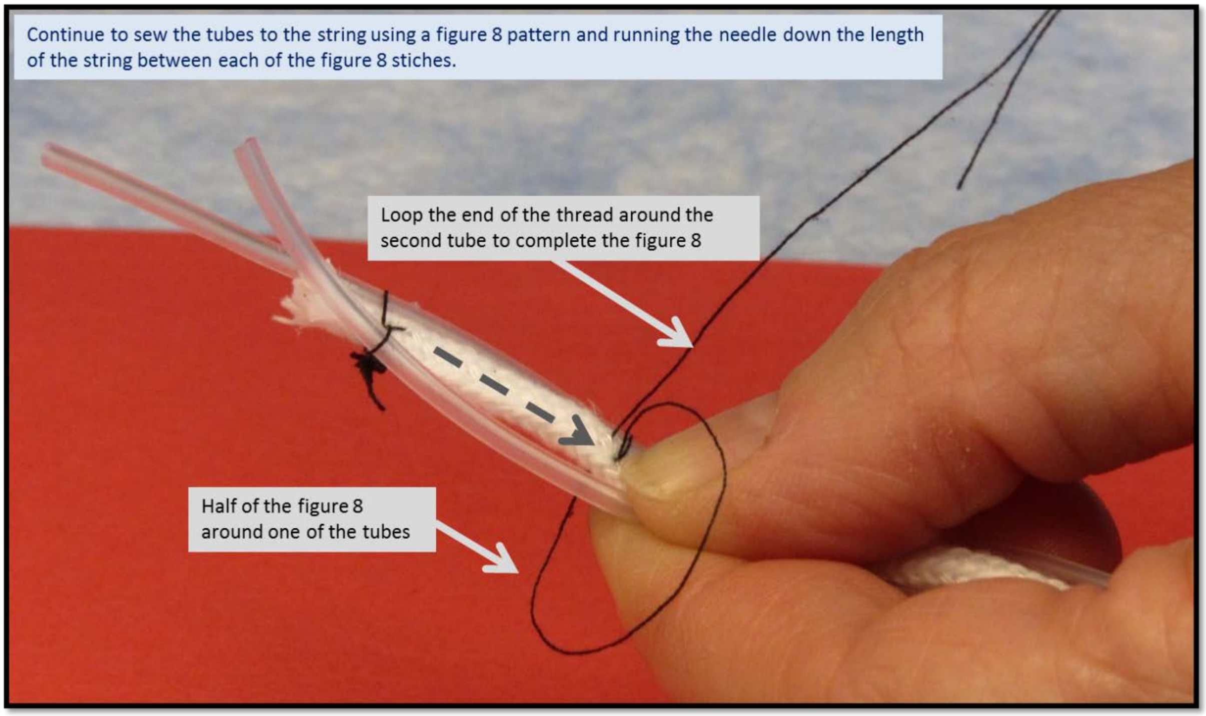

Apply Fray Check to the end of the string

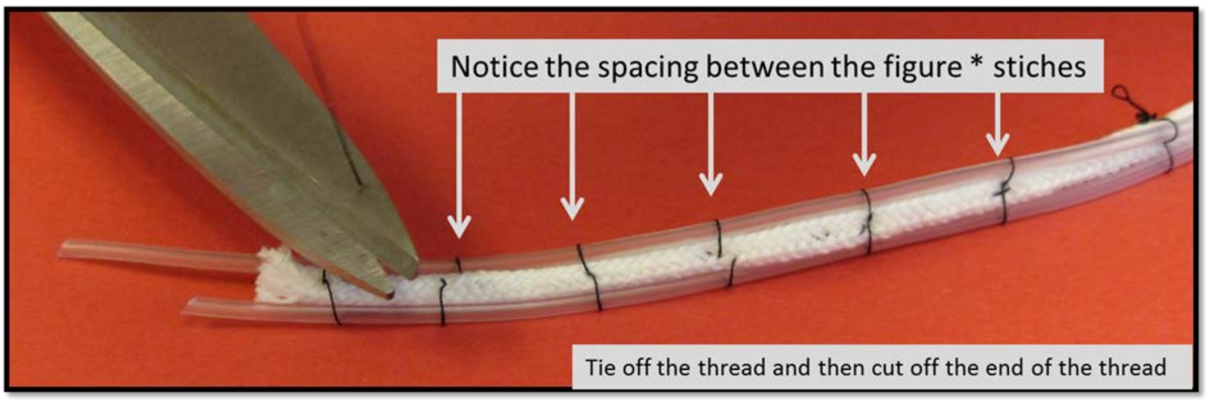

Line the tubes on either side of the string in preparations for sewing the tubes onto the string

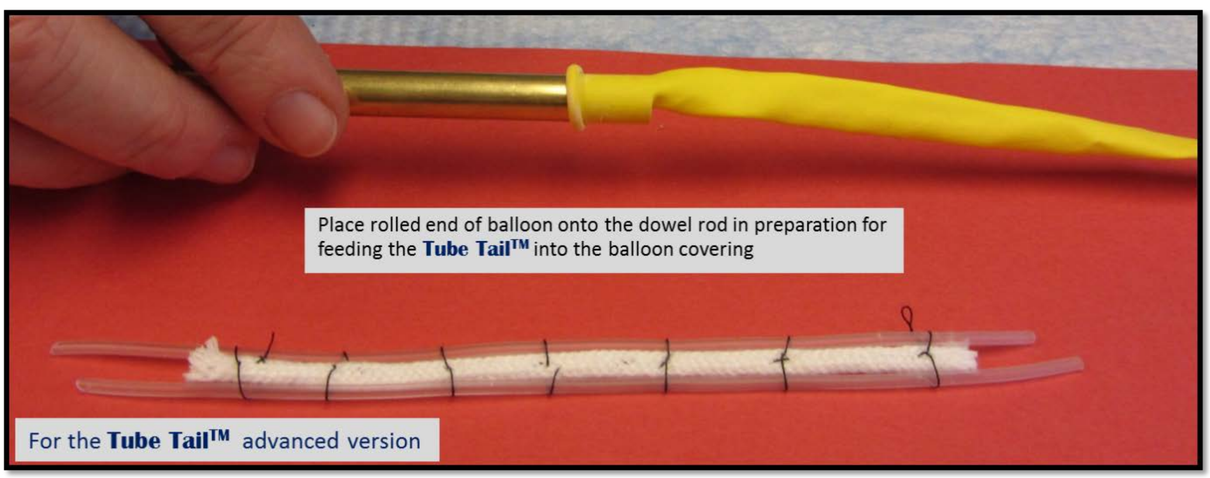

Insert needle with thread attached into the middle of the string at one end

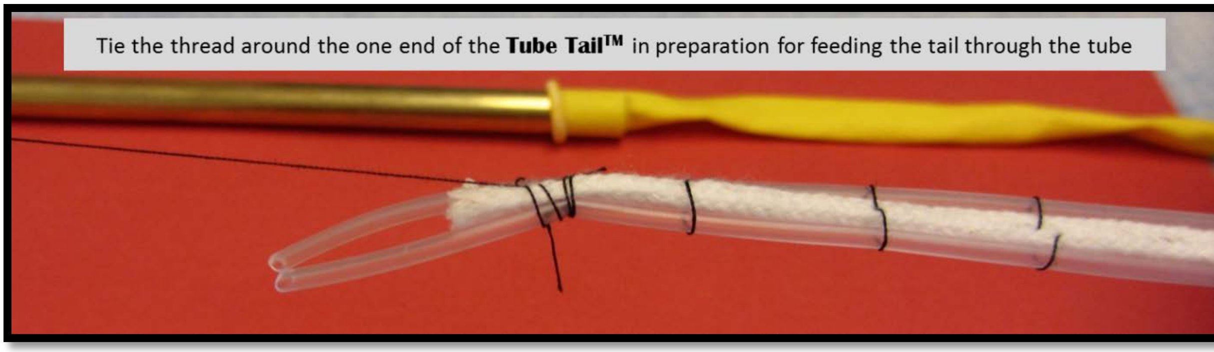

Begin sewing the tubes onto the string


Feed the needle through the center of the string before tying the next loop around the string

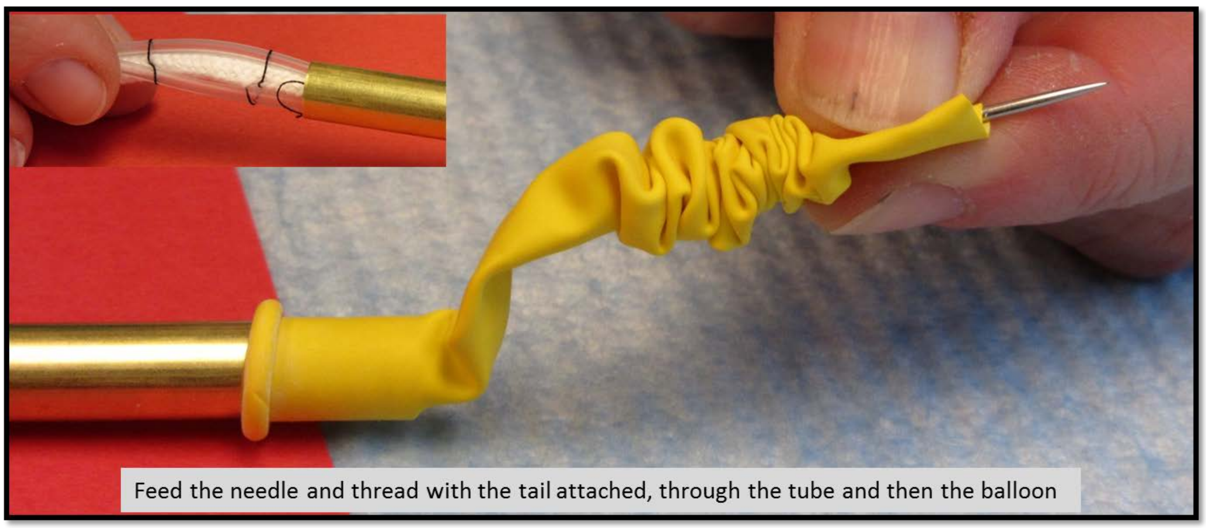

Continue to sew the tubes to the string using a figure 8 pattern and running the needle down the length of the string between each of the figure 8 stiches.
Loop the end of the thread around the second tube to complete the figure 8
Half of the figure 8 around one of the tubes


Notice the spacing between the figure * stiches
Tie off the thread and then cut off the end of the thread


Place rolled end of balloon onto the dowel rod in preparation for feeding the **Tube Tail**™ into the balloon covering
For the **Tube Tail**™ advanced version



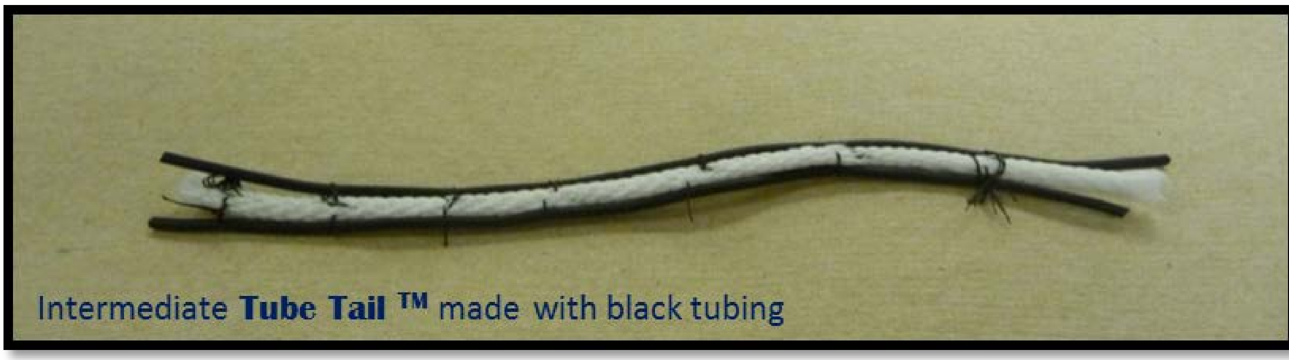
Tie the thread around the one end of the **Tube Tail™** in preparation for feeding the tail through the tube



Feed the needle and thread with the tail attached, through the tube and then the balloon

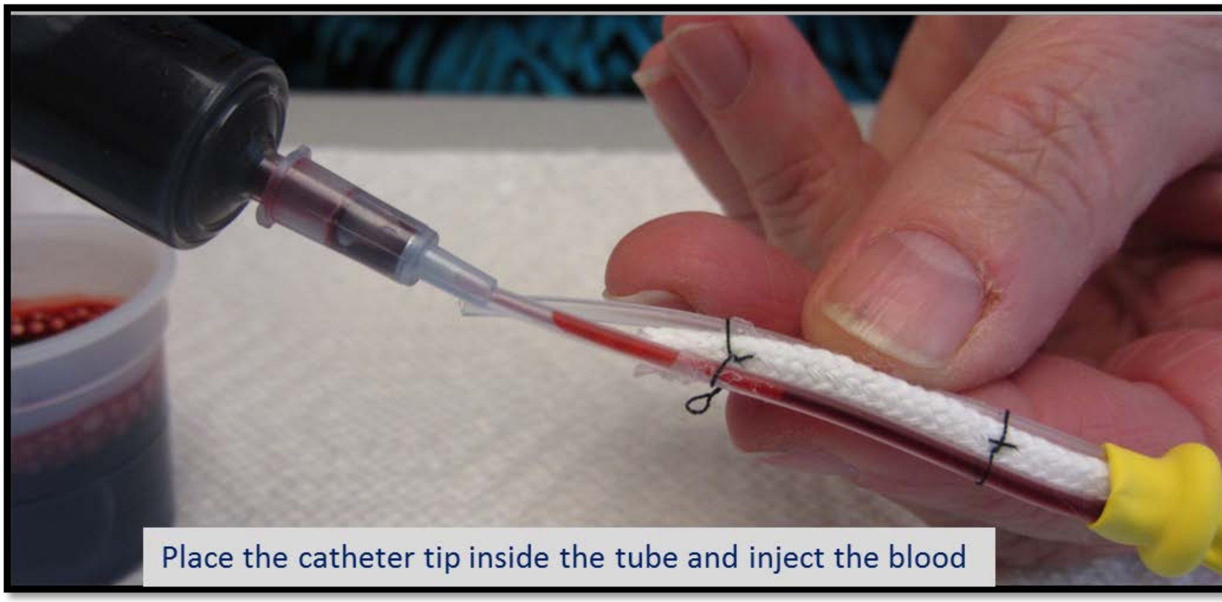
Various versions of Tube Tails ready for blood infusion into the tubes

Basic **Tube Tail**™



Intermediate **Tube Tail** ™ made with black tubing

Intermediate **Tube Tail** ™ made with black string and tubing


Place the catheter tip inside the tube and inject the blood


Advanced Tube Tails™

ii. **Spongy Bunear™**

For demonstration, teaching and practice of venipuncture of the rabbit marginal ear vein

Ingredients:

- 2 - Sheets of thin craft-foam (our preference is **Foamies** with Sticky Back, 6" x 9" x 2 mm) If sticky back is not available; a glue gun is recommended
- 1 – Piece of hollow, tubing; approximately 2 mm diameter; transparent or frosted (our preference is **Pony Bead Lacing** – frosted)
- 1 - Piece of polyester sewing thread; approximately 30 cm long
- 1 – Pipe cleaner (6 mm x 12 ")
- 1 ml of fake-blood (our preference is **Vampire Blood®**)

Supplies:

- Crafting scissors
- Sewing needle
- Syringe
- Soft-tip catheter
- Glue gun (if not sticky back foam is available)

Instructions:

1. Place 2 pieces of foam together (if using sticky back, place non-sticky side together)
2. Draw the shape of a rabbit ear onto the side of the foam that is facing up
3. With both pieces of foam held with non-sticky side together, cut the ear shape from the 2 pieces of foam
4. Lay both pieces of foam on the work surface, sticky-back side up
5. Peel the sticky back away from both pieces of cut foam
6. Mold the pipe-cleaner into the shape of the foam ear, such that the pipe-cleaner will sits approximately ½ cm short of the border of the foam ear.

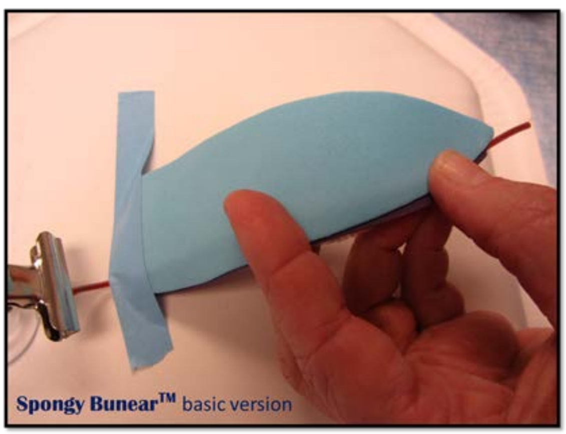
7. Either cut and remove any excess pipe-cleaner, or simply tuck the excess pipe-cleaner around the part of the pipe-cleaner structure
8. Sandwich the molded pipe-cleaner between the sticky sides of both pieces of the foam ear and press the opposing pieces of foam together
9. Cut the hollow tubing to a length that is slightly longer than the length of the ear
10. Sew the tubing onto the external border of the foam ear; placement should be about 2mm from the edge of the ear and on the side of the ear that represents the lateral orientation of the marginal ear vein in a rabbit

FOR CREATING THE ADVANCED VERSION OF THE Spongy Bunear™: Cover the ear and the tubing with transparent cling wrap to make the simulated blood vessel less apparent.

Shortly before using any version of the Spongy Bunear™:

11. Prepare a syringe filled with fake-blood and place the catheter tip on the syringe
12. Insert the catheter tip into the tubing and inject the fake-blood down the length of the tubing
13. Bend the base of the ear and tape or pin the base of the ear to a surface or to an object such as a sponge football (see photos)

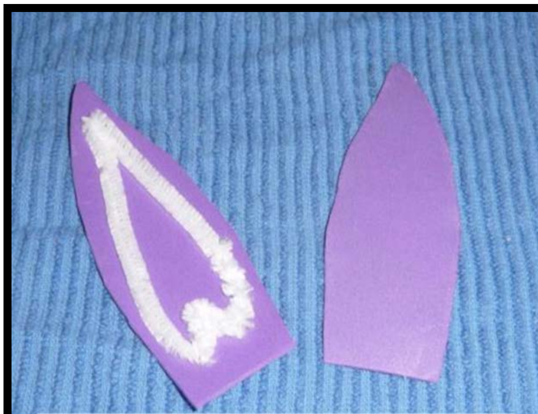
The **Spongy Bunear™** is now ready for use. Depending on the venipuncture procedure for which it is being used, it may be helpful to clamp or tie off one or both ends of the blood filled tubes.



Spongy Bunear™ basic version

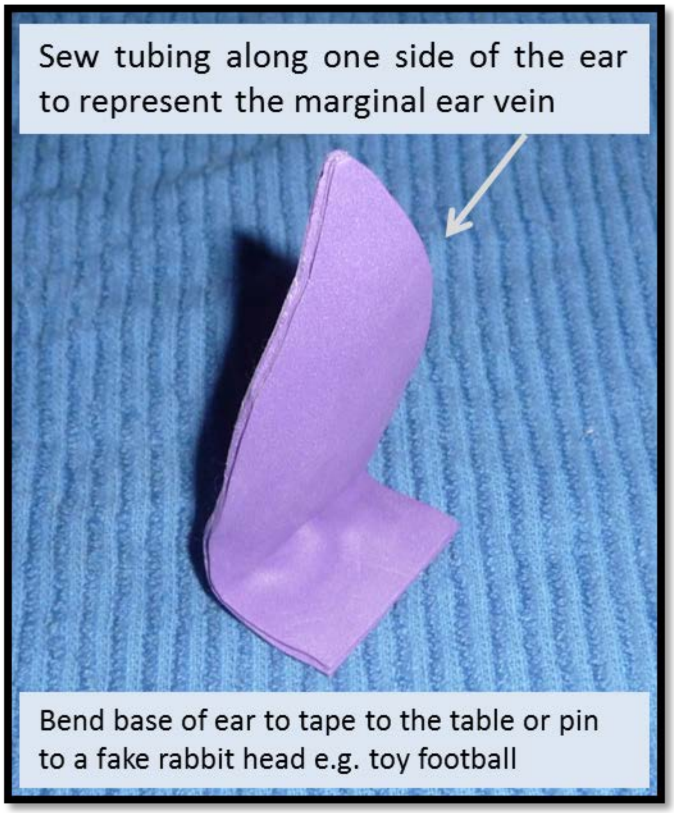
Advanced version of **Spongy Bunear™**

Images to help guide the process of making a **Spongy Bunear™**



Place pipe cleaner onto sticky side of foam

Sandwich-pipe cleaner between the sticky sides of foam


Sew tubing along one side of the ear to represent the marginal ear vein
Bend base of ear to tape to the table or pin to a fake rabbit head e.g. toy football


Spongy Bunear™ is bent and pinned to a toy football

iii. Ear Piggy Piggy™

For demonstration, teaching and practice of venipuncture of the marginal ear vein of pigs

Ingredients:

- 2 - Sheets of thin craft-foam (our preference is **Foamies** with Sticky Back, 9” x 12” x 2 mm)
- 1 – Long balloon (160 Q)
- 2 – Pipe cleaners (6 mm x 12”)
- 1 – Piece of transparent cling wrap (our preference is Press’n Seal®)
- 2-3 ml of fake-blood (our preference is **Vampire Blood®**)

Supplies:

- Crafting scissors
- Sewing needle
- Syringe
- Soft-tip catheter
- Glue gun if unable to obtain sticky-back foam

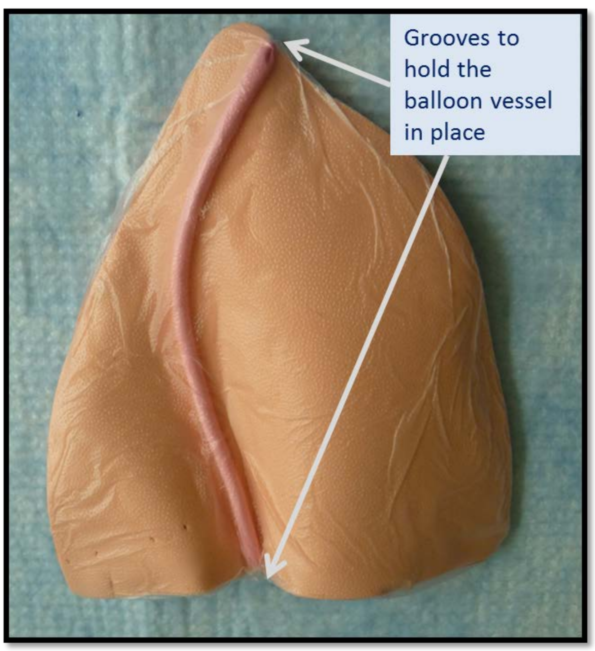
Instructions:

1. Place 2 pieces of foam together (if using sticky back, place non-sticky side together)
2. Draw the shape of a pig ear onto the side of the foam that is facing up
3. With both pieces of foam held with non-sticky side together, cut the ear shape from the 2 pieces of foam
4. Lay both pieces of foam on the work surface, sticky-back side up
5. Peel the sticky back away from both pieces of cut foam (if unable to find sticky back foam, use a glue gun to seal the pipe cleaner to the foam pieces)
6. Mold the pipe-cleaner into the shape of the foam ear, such that the pipe-cleaner will sit approximately ½ cm short of the border of the foam ear.

7. Either cut and remove any excess pipe-cleaner, or simply tuck the excess pipe-cleaner around the part of the pipe-cleaner structure
8. Sandwich the molded pipe-cleaner between the sticky sides of both pieces of the foam ear and press the opposing pieces of foam together foam (If unable to find sticky back foam, use a glue gun to seal the pipe cleaner to the foam pieces)
9. Cut a short groove (about 3 mm) at both the base and the tip of the ear
10. Mold the pipe-cleaner at the base of the ear so that it forms a slight fold in the ear
11. When ready to use, fill the balloon with fake-blood and tie a small knot into both ends of the blood-filled balloon
12. Orient the blood-filled balloon from the center of the base of the ear, securing the knotted ends of the balloon into the grooves at the base and tip of the ear
13. Cover the ear with cling wrap

The **Ear Piggy Piggy™** is now ready for use.

Images to help guide the process of making an **Ear Piggy Piggy™**



iv. Cephalic Tube™

For demonstration, teaching and practice of venipuncture of the canine or feline cephalic vein

Ingredients:

- 12" hollow tube; 1 to 2 "diameter (our preference is a paper- towel roll)
- Long Skinny Balloon (160 Q to 260 Q)
- Simulated Blood

For the advanced version of the Cephalic Tube™

- Fabric cut to a size that can easily wrap around the tube ; about 12" x 9" (our preference is velvet or crushed velvet)

Supplies:

- Scissors
- Tape
- 6cc Syringe
- Lab tape

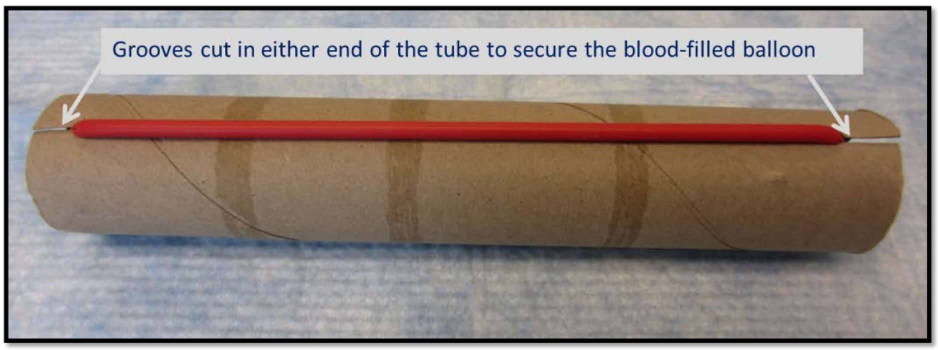
Instructions:

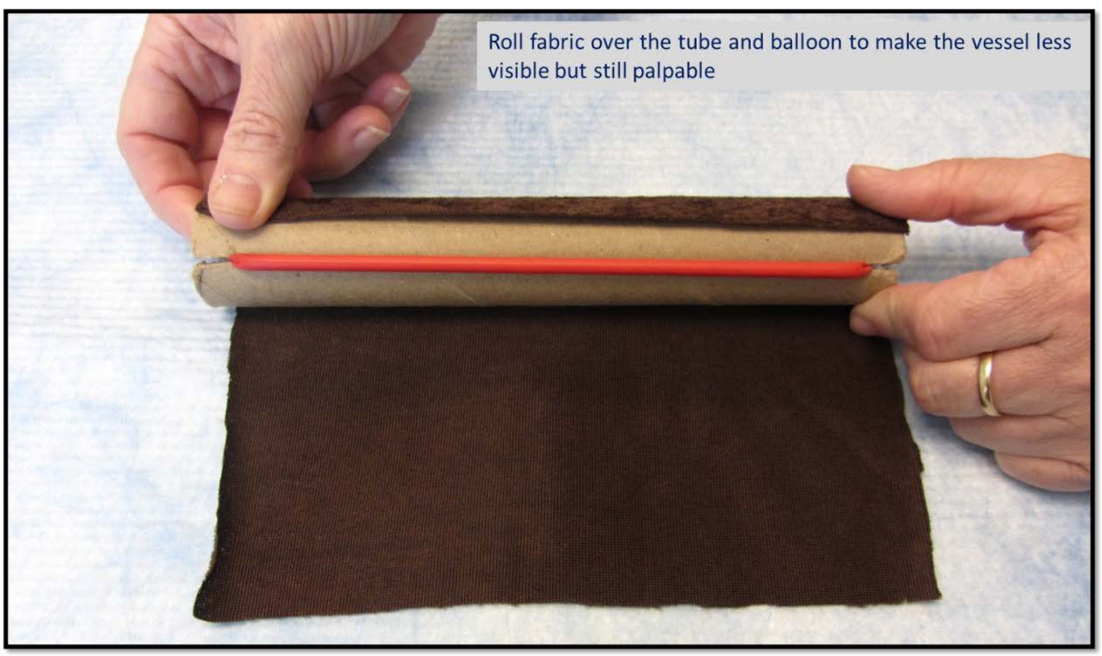
1. Cut a groove into either end of the hollow tube (preferably cardboard) at each end, directly opposite each other about 0.5" deep
2. Fill a 6cc Syringe with simulated blood (**Vampire Blood®**)
3. Guide the syringe tip into the open end of the balloon and fill the balloon with blood, while agitating the balloon slightly to expel some of the air that may be in the balloon
4. Fill the balloon until it is moderately turgid
5. Tie off the open end of the balloon and it may be helpful to also tied a small knot in the opposite end of the balloon

6. Place the knotted ends of the balloon into the grooves made on the paper towel so that the blood-filled balloon has a minimal degree of movement but is still able to roll slightly.
7. Tape the knotted ends of the balloon to the inside of tube for added security

FOR CREATING THE ADVANCED VERSION OF THE Cephalic Tube™: cover both the balloon and the tube with the fabric to make the simulated blood vessel less apparent. Tape the fabric in place.

Images to help guide the process of making a **Cephalic Tube™**





f. **Cardiac Balloon™**

For cardiac puncture blood collection in rodents

Ingredients:

- 9” Latex balloon
- 2-4” Latex balloon (water balloon)
- Simulated blood
- Hair gel

Supplies:

- 9” Latex balloon
- 3” Latex balloon
- Simulated blood
- Hair gel

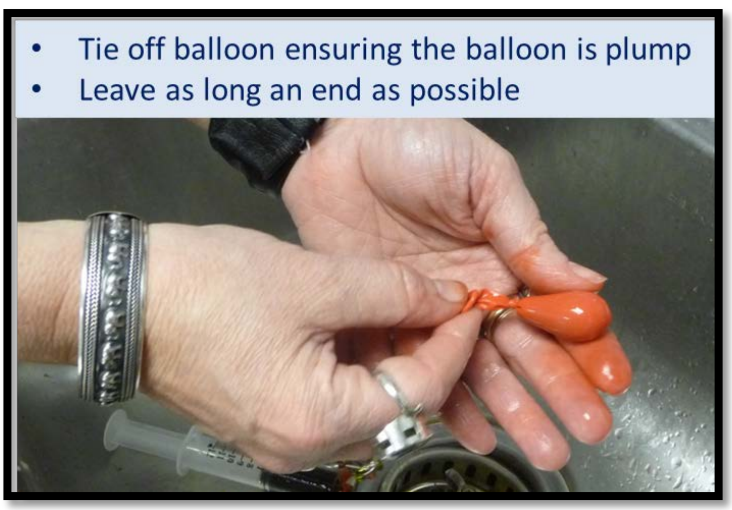
Instructions:

1. Fill the 3cc syringe with simulated blood (Vampire Blood®)
2. Fill the 3” balloon with the blood from the syringe, until the balloon is plump and is about 1.5 cm in diameter
3. Tie off the balloon while attempting to release excess air from the balloon as you tie. Note that a small amount of air in the balloon may actually be beneficial for the training exercise. When tying off, try to leave as much tail on the balloon as possible.
4. Fill the 35 cc syringe with hair gel and set aside.
5. Using the hemostat, clamp the rolled edge of the balloon, and then pass the small balloon into the 9” balloon and fill the 9” balloon with the hair gel until the 9” balloon is plump (trying not to lose any gel in the process)
6. Line up the rolled edge of the small blood-filled balloon to about 1.5 cm below the mouth of the 9” balloon

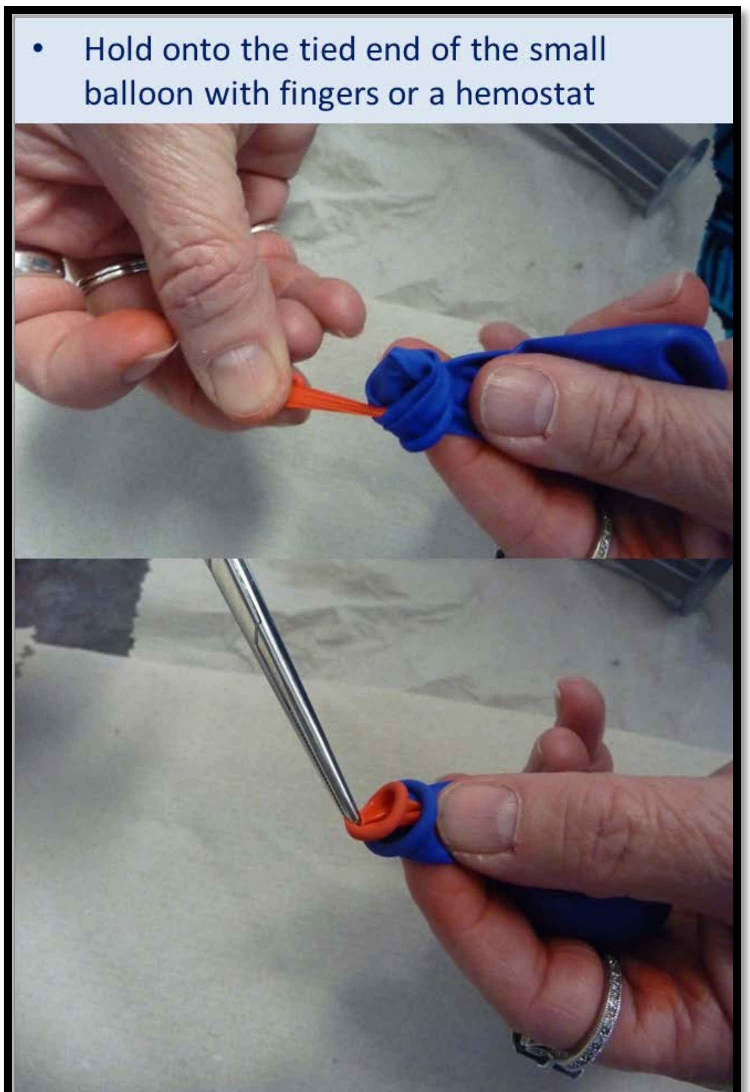
7. Tie off the neck of the 9” balloon while incorporating the neck of the small balloon into the tie. This step will secure the small balloon heart in place.

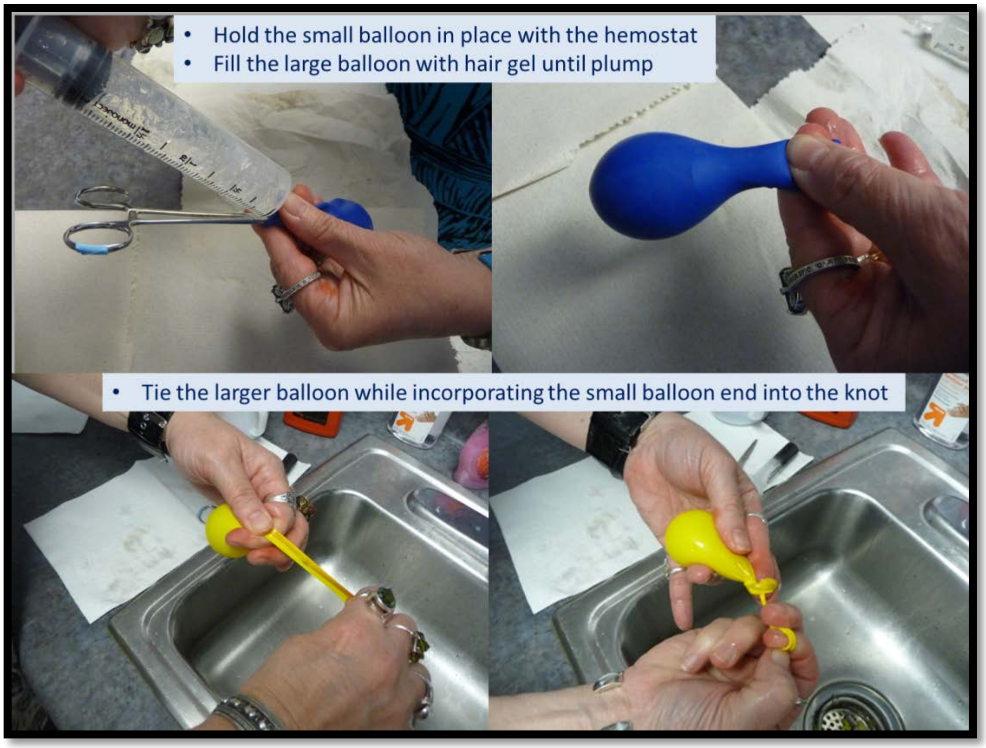
Options for other uses of the Cardiac Balloon™: This tool could be used for various types of palpation practice, which may in some cases require that the small balloon remain free floating; rather than secured to the neck of the larger balloon as for the cardiac puncture practice.

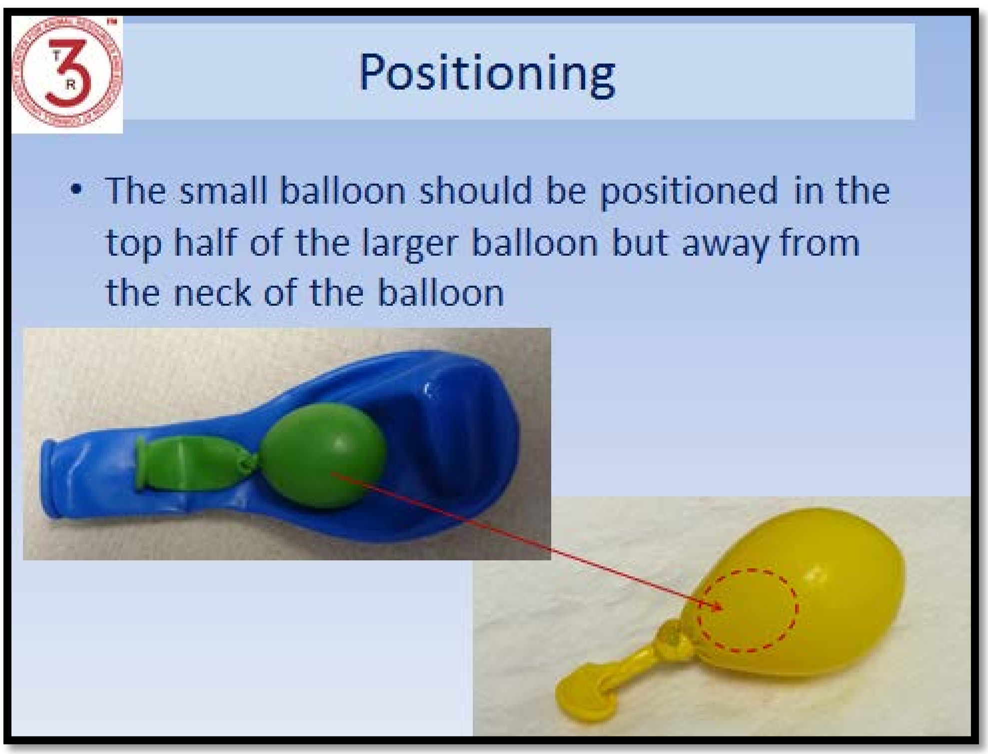
Images to help guide the process of making a **Cardiac Balloon™**




• Place middle fingers of each hand into the opening of the balloon
• Place the small, blood filled balloon between the thumb and forefinger of the dominant hand


• Hold onto the tied end of the small balloon with fingers or a hemostat


• Hold the small balloon in place with the hemostat
• Fill the large balloon with hair gel until plump
• Tie the larger balloon while incorporating the small balloon end into the knot


Positioning
• The small balloon should be positioned in the top half of the larger balloon but away from the neck of the balloon

g. **CD Mouse™**

For teaching and practice of cervical dislocation in rodents

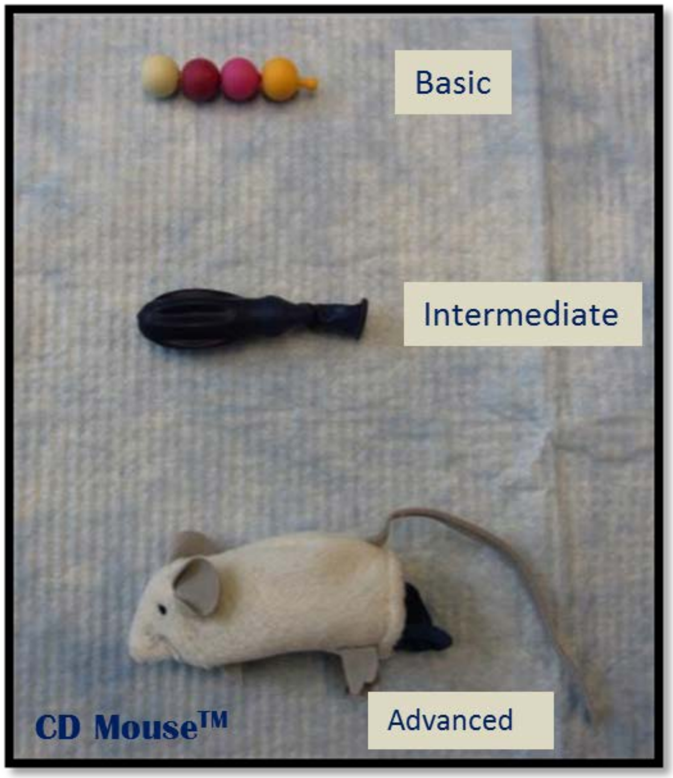
Ingredients:

- 4 - Round, connecting plastic beads (our preference is **Pop-Arty!** beads, 10mm diameter) for the basic, intermediate and advanced version of the tool
- 1 – Water balloon; 2 " diameter for the intermediate version of the tool
- 1 – mouse shaped finger puppet or cat toy, with stuffing removed, it is preferable if the toy has a tail

Instructions:

1. Attach 4-5 plastic beads together to create the basic version of the **CD Mouse™** and for the skeletal portion of the intermediate and advanced versions of the **CD Mouse™**
2. Insert beads into empty water balloon and tie off the end to create the intermediate version of the **CD Mouse™** and the center part of the advanced version
3. Insert the bead-filled balloon into the finger puppet or cat toy

Images to help guide the process of making a **CD Mouse™**


Basic
Intermediate
Advanced
CD Mouse™

We hope that you enjoy making and training with these

Translational Training Tools™

We look forward to your comments and feedback.

Our website is currently under construction; however, please check for updates on the 3 Ts at:

https://www.research.cornell.edu/care/education.html

Thank you for taking the time to explore our training tools and methods.

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The 3 Ts Serving the 3 Rs