

Cephalic and Saphenous Venipuncture

[The following are excerpted from *Clinical Textbook for Veterinary Technicians*, 5th ed. (2002)]

Chapter 3: Diagnostic Sampling and Therapeutic Techniques

A veterinary technician proficient in obtaining diagnostic samples and performing a variety of treatment techniques is an invaluable asset to any veterinary practice. Technicians should therefore have expertise in many basic procedures, such as blood and urine collection, intravenous catheter placement, and fluid and medication administration. As the practice of veterinary medicine becomes more specialized, technicians are asked to perform increasingly more advanced diagnostic and therapeutic techniques. Many technicians, for example, are now employed by specialty practices in which performing certain advanced skills has become routine. For this reason, a variety of advanced as well as basic procedures are addressed in this chapter.

Basic Guidelines

Whenever possible, baseline blood or urine samples should be obtained before the initiation of fluid therapy. Administration of fluids and the recent ingestion of a high-fat or high-protein meal may alter blood or urine laboratory values.

All supplies needed for collection of samples and for therapeutic procedures should be gathered ahead of time. Samples should be collected and stored in appropriate containers with the patient's name and hospital identification number printed on the label.

Whenever a needle is inserted through the skin as part of a treatment (e.g., intramuscular injection) or a sampling procedure (e.g., blood collection), the skin should be clean, dry and free from obvious inflammation and infection. Microbes and other contaminants present on the skin surface may be introduced into the underlying tissue when the needle is inserted. Needles and intravenous catheters from which the protective coverings have been removed should remain sterile and should only be handled at the hub; the shaft, for example, should not be touched or set down on a nonsterile surface.

SMALL ANIMAL SAMPLING AND THERAPEUTIC TECHNIQUES

Blood Sample Collection

Venous Blood Sample

Most technicians perform venipuncture on a routine basis either to collect a blood sample for laboratory test or to inject a drug or medication. Only through experience does one

learn to collect a blood sample quickly with minimal trauma to the vessel or stress and discomfort to the patient (Box 3-1). Proper animal restraint is as important as venipuncture itself.

Box 3-1	VENOUS BLOOD COLLECTION
<ul style="list-style-type: none">• Attach a 20- to 25-gauge needle to a 1- to 6-ml syringe.• Occlude the vein with a tourniquet or digital pressure.• Wipe the skin and hair on top of the vein with an alcohol-soaked cotton ball to help identify the vein.• Insert the needle with the bevel facing up through the skin and into the vein at a 25-degree angle.• Slowly retract the syringe plunger, and collect a blood sample.• Release the pressure on the vein, and release the syringe plunger when a sufficient volume of blood has been collected.• Remove the needle from the vein.• Apply digital pressure to the venipuncture site as soon as the needle is removed until hemostasis occurs.	

Venipuncture is performed with either a needle and syringe or a Vacutainer collection system. The method and needle gauge selected depend on the vessel size, blood quantity required, intended use of the sample, and technician preference.

The majority of venipunctures in cats and small dogs are performed with 22-gauge needles. Larger-gauge needles, such as 20- and 18-gauge, may be used in large-breed dogs and in most farm animals. The needle for any venipuncture technique should always be inserted into the vein with the bevel facing upward.

Blood collected for coagulation profiles (i.e., activated clotting time, prothrombin time, activated partial thromboplastin time) should be drawn rapidly through a 20-gauge needle. The needle should ideally penetrate the vessel on the first attempt to minimize the amount of tissue fluid that enters the sample; tissue fluid (thromboplastin) may hasten the clotting process.

Smaller, 25- 28-gauge needles are used with smaller vessels, fragile vessels, or multiple venipunctures. Bihourly sampling to establish a blood glucose curve is a situation in which use of a small-gauge needle is appropriate. The amount of negative pressure applied to aspirate the blood into the syringe must not be excessive. Forceful retraction of the syringe plunger may result in hemolysis of the red blood cells as they pass through the needle, yielding erroneous laboratory values. Application of excessive negative pressure may also cause the vein to collapse.

Just before venipuncture, the hair and skin over the vessel are wiped with a cotton ball saturated with 70% isopropyl alcohol. This helps to remove some superficial skin contaminants, causes vasodilation, and improves visualization of the vein. In animals with dense hair coats, the vessel may be easier to identify if the hair over the vessel is

parted with an alcohol-soaked cotton ball or shaved with a clipper. When blood is drawn for bacterial culture, the region on top of the vein is shaved and aseptically prepared. Sterile gloves are worn when collecting blood for culture.

The most frequently used sites for canine blood collection are the cephalic, jugular, and lateral saphenous veins. The cephalic, jugular, femoral, and medial saphenous veins are used for feline venipunctures.

To collect blood from a peripheral vein, introduce the needle into the occluded vessel as far distally as possible. If the initial venipuncture attempt is unsuccessful, reinsert the needle more proximal to the previous entry site. For jugular venipuncture, the initial attempt is made in the caudal third of the jugular vein. Subsequent venipuncture attempts can be made further cranial. If the vessel is damaged in the distal portion of the vein, a more proximal region is still patent and usable for blood collection.

After blood is collected the needle is detached from the syringe and the stopper is removed from the collection tube before the blood is transferred into the tube. This reduces the amount of hemolysis that may occur if blood is forcefully ejected through the narrow lumen of a needle. If blood is transferred into a tube containing an anticoagulant, such as lavender-topped EDTA tubes, the stopper is quickly replaced and the tube is gently inverted a few times to mix the blood with the anticoagulant. Vigorous shaking can cause hemolysis. The tube containing the anticoagulant should be at least half filled with blood to achieve the appropriate blood/anticoagulant ratio.

Cephalic Venipuncture

To collect blood from the cephalic vein, which is located on the cranial aspect of the foreleg, the animal is restrained in sternal recumbency or in a standing position. Small dogs may be picked up and held in a standing position. Small dogs may be picked up and held in the restrainer's arms with a foreleg extended. Some large-breed dogs prefer to remain standing or seated with a foreleg held in extension. Refer to Figure 3-1.

To perform venipuncture on the right cephalic vein, the restrainer is positioned on the animal's left side. The left hand or arm is placed under the muzzle to pull the head toward the restrainer's body. The restrainer wraps foreleg, and occludes the vein with the thumb at the elbow. Alternatively, a tourniquet may be secured just distal to the elbow joint to occlude the vein if an assistant is unavailable.

Once the patient is restrained, the phlebotomist grabs the leg, places a thumb lateral to the vein, and pulls the skin distally to stabilize the vein. The cephalic vein is wiped with alcohol. A 22-gauge needle attached to a 3-ml syringe is slowly inserted at a 25-degree angle through the skin and into the vein. Approximately 0.5 to 0.75 cm of the needle is placed into the vein. Blood appears in the needle hub when the needle enters the vein. The syringe plunger is retracted, and blood flows into the syringe as shown in

Figure 3-2. If too much suction is applied, the vein may collapse, and blood flow will cease. Blood flow may also be interrupted if the needle tip is lodged against the vessel wall. To remedy this situation, the needle is slightly rotated and repositioned. If blood flows into the syringe too slowly, the animal's foot can be repeatedly pumped to augment blood flow.



FIGURE 3-1. For venipuncture some large-breed dogs prefer to remain seated on the floor with a foreleg extended.

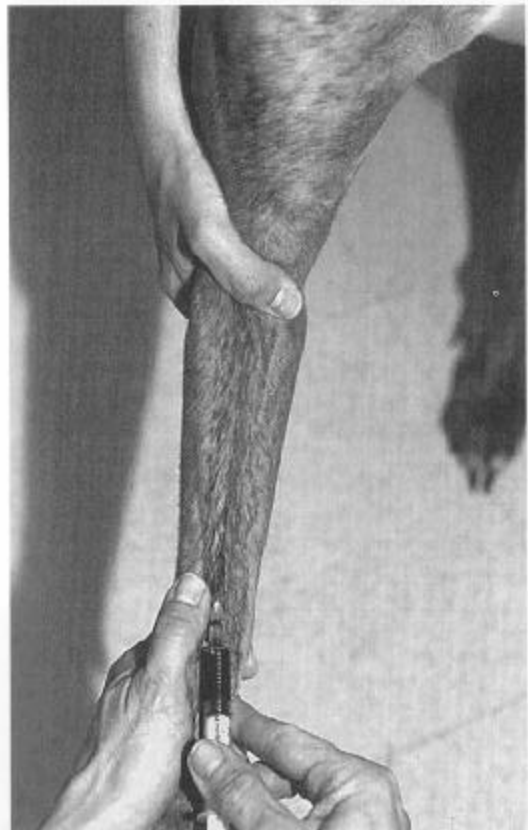


FIGURE 3-2. Restraint of a large-breed dog for venipuncture of the cephalic vein.

After a sufficient volume of blood is collected, the restrainer's thumb or the tourniquet is removed from the vein. The needle is withdrawn, and digital pressure is applied to the venipuncture site for 10 to 20 seconds. Insufficient application of pressure may result in blood leakage from the vessel into the surrounding tissue and the formation of a hematoma. If a hematoma occurs during venipuncture, the needle is promptly removed and a gauze sponge is held firmly over the site until the bleeding subsides. When venipuncture is reattempted, the needle is reinserted proximal to the initial needle entry site or in a different vein.

[Discussions of jugular and lateral saphenous venipunctures skipped here.]

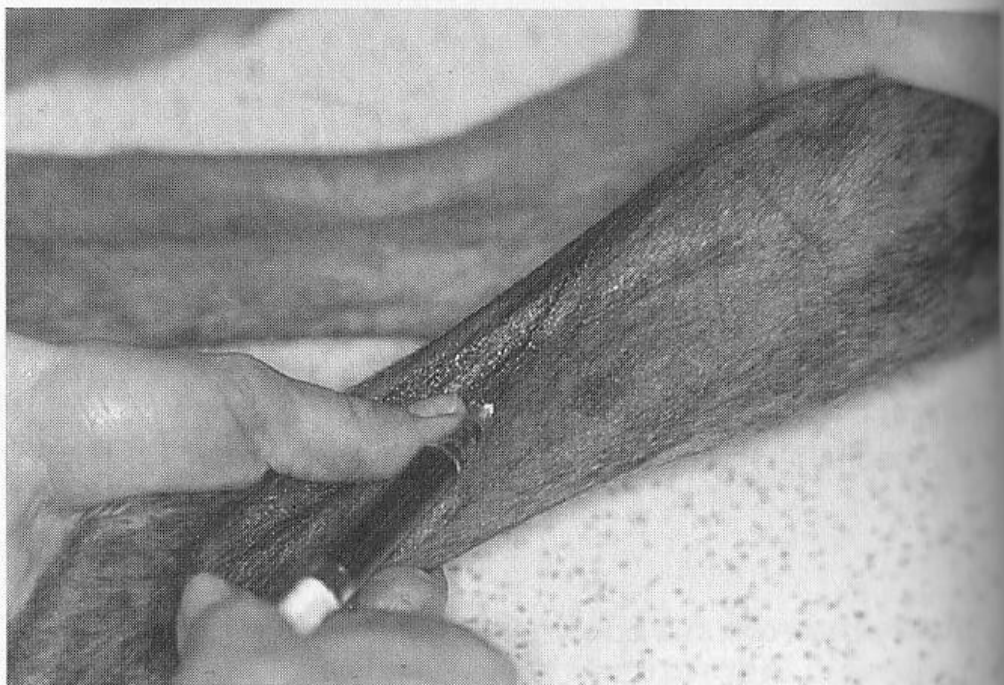


FIGURE 3-6. The thumb is placed alongside the lateral saphenous vein to stabilize the vessel.

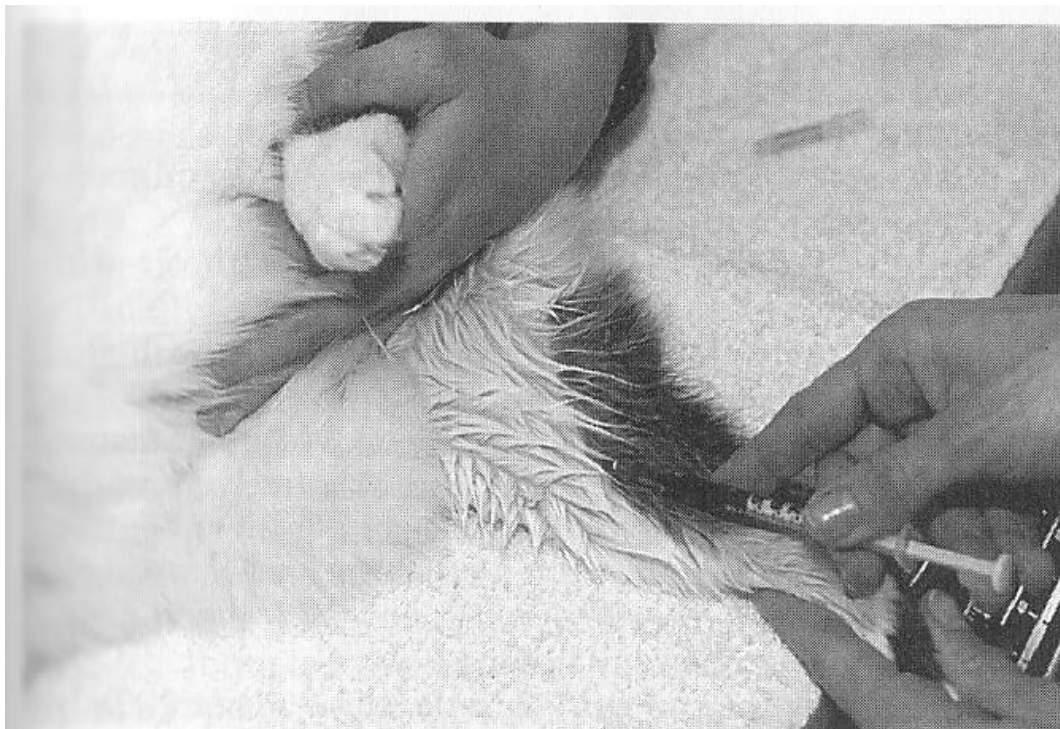


FIGURE 3-7. Venipuncture of the femoral vein in the cat.

Medial Saphenous or Femoral Venipuncture

The medial saphenous or femoral vein, which is located on the medial aspect of the rear leg, is used to obtain small volumes of blood, primarily in feline patients. If the right vein is used, the cat is stretched in right lateral recumbency with the left rear leg abducted. The phlebotomist grasps the tarsus and extends the left [sic – right] leg. The vein is occluded with pressure applied by the restrainer's left hand in the right inguinal region. It is easy to identify the vein after the medial aspect of the leg is wiped with alcohol and the hair is parted over the vessel. Blood is collected with a 22- to 25-gauge needle attached to a 1- or 3-ml syringe. (Figure 3-7). Firm pressure is applied to the puncture site for at least 60 seconds after venipuncture. This is particularly important at these sites because the medial saphenous and femoral veins are prone to hematoma formation.



Fig. 2-4. Cephalic venipuncture. The holder's right hand is placed at the elbow to maintain the cat's right foreleg in extension, while the right thumb is used to occlude venous return and maintain the vein in an anterior position. The cat's body is positioned between the holder's arm and body.

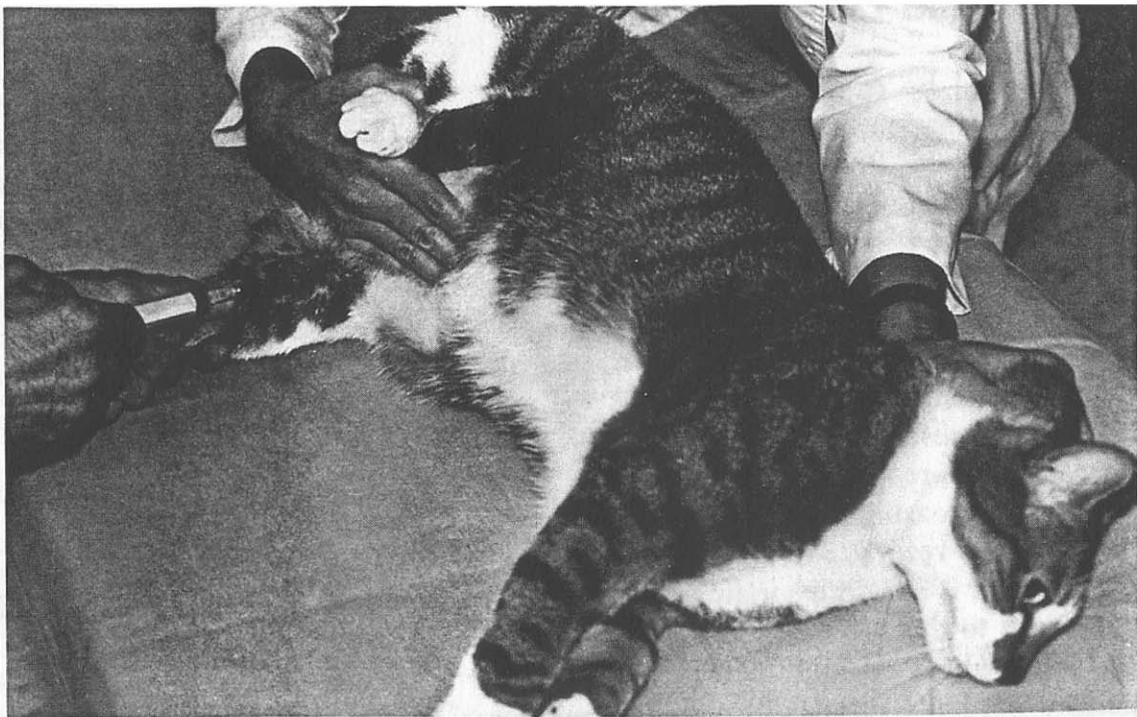


Fig. 2-6. Saphenous venipuncture. The cat is held in lateral recumbency. While one hand is used to immobilize the cat's neck, the opposite hand is used to distend the vein and restrict movement posteriorly.