

The Ins and Outs of Capillary Blood Collection

As healthcare providers look to improve patient outcomes and laboratories seek ways to decrease the amount of blood drawn from patients that are the most vulnerable to complications, capillary blood collection becomes an important alternative to venipuncture. Capillary collections are typically associated with less risk including a decreased chance of iatrogenic anemia through excessive blood draws.

Though we tend to think of children when considering capillary specimens, these samples may be alternatives for the adult population as well. For example, capillary collection may be more appropriate for the following:

- Severely burned patients
- Obese patients
- Patients with thrombotic tendencies
- Elderly patients or others in whom superficial veins are very fragile or inaccessible
- Patients performing self-testing
- Point-of-care testing
- Patients who have a paralyzing fear of needles
- Patients requiring frequent testing

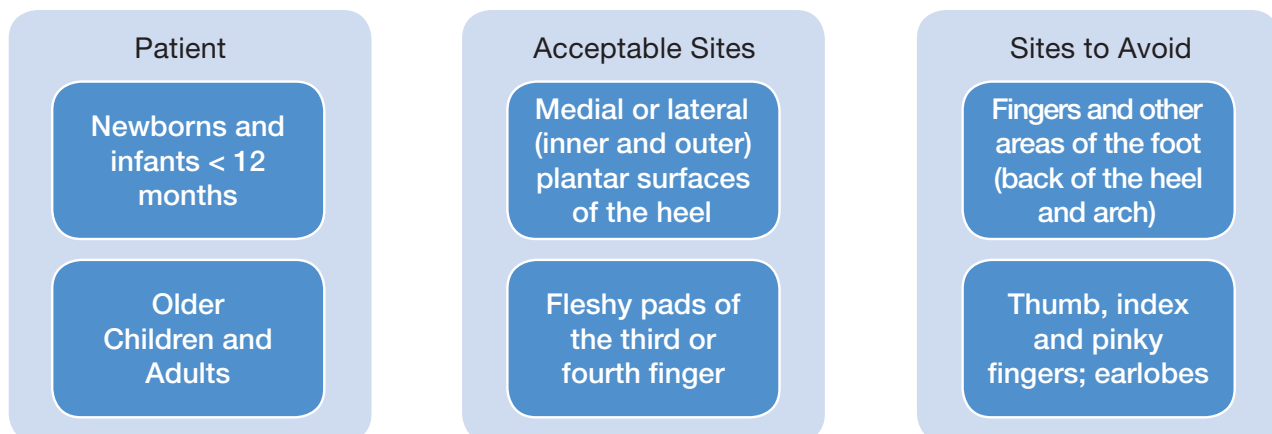


Capillary collection, however, remains one of the most challenging procedures in specimen collection in terms of sample consistency and the typical patient population. Capillary blood is a mixture of arterial and venous blood but also contains interstitial and intracellular fluid. This accounts for some variation in diagnostic results when compared with venous blood. However, the amount of these tissue fluids can vary depending on the collection technique, which impacts the sample matrix and, potentially, analytical results. It is, therefore, important that proper collection technique and sample handling be utilized to minimize this effect.

Additional considerations must be given to blood collection from pediatric patients, who are more routinely drawn by capillary collection. Special effort should be made to calm the patient and, where applicable, explain the procedure in age-appropriate terms. This may take some extra time but ultimately improves the experience for everyone involved.

Site Selection and Equipment

The site for collection of a capillary sample varies depending on the age of the patient as indicated in the chart below.



Sites that are bruised, traumatized or swollen should be avoided. Additionally, a skin puncture should never be performed on the same side as a mastectomy without prior authorization from a physician.

Once the collection site has been determined, it is important to select the appropriate type of lancet. Lancets should be constructed for single-use and have a spring-loaded, retractable sharp to prevent accidental exposure. There are two types available: puncture devices and incision devices. Puncture devices pierce the skin in a vertical direction and are appropriate for frequent collection or when smaller amounts of sample are required. Incision devices slice through tissue and capillary beds in a horizontal direction and are used when larger quantities of blood are needed. Incision devices tend to be less painful than puncture devices and are less likely to result in hemolyzed specimens but are not recommended for frequent testing such as glucose monitoring.

Performing the Collection

All patients who demonstrate anxiety should be treated with compassion and patience throughout the procedure. For pediatric patients, some additional time and effort may be necessary to calm their fears. Before the procedure begins, use appropriate pain intervention techniques according to your facility's policy, and provide step-by-step explanation. Once the procedure begins, distract the patient's attention with casual conversation.

Step	Instructions
1	Wash hands and put on latex-free gloves.
2	Assemble supplies and equipment within reach. Include the appropriate types and sizes of capillary blood collection devices based on the testing required and patient variables.
3	Select and pre-warm the puncture site for three to five minutes (as applicable). Make sure the temperature does not exceed 42°C.
4	Cleanse the site and allow to air dry. Blowing on the site is not recommended. Ensure the site has fully dried before proceeding to prevent patient discomfort.
5	Open a sterile puncture or incision device within view of the patient to provide assurance the device is sterile.
6	Hold finger/heel firmly, position lancet device on skin.
7	Activate the device according to the manufacturer's Instructions for Use (IFU).
8	Dispose of the device in an appropriate sharps container according to your facility's policy following use.
9	Wipe away the first drop of blood with a clean gauze pad to prevent contamination of the specimen with tissue fluid if appropriate for the testing method.
10	Fill tubes according to the manufacturer's IFU following the correct order of draw (additional collection information below*).
11	Tubes with additives should be mixed with gentle tapping during collection. Invert 5-10 times following collection to ensure proper mixing of additive with sample.
12	After all tubes are filled, apply pressure until bleeding has stopped. A bandage can be applied once bleeding has stopped if appropriate.
13	Label the tubes prior to dismissing or leaving the patient and ensure all supplies are disposed of properly.
14	Remove gloves and wash hands.

*The patient and the collection device should be properly positioned so the blood flows freely into the tube by gravity and/or capillary action during the collection process. It may be beneficial to position the patient's finger or heel lower than the heart. Additionally, orient the site vertically downward so that the blood doesn't trickle down the skin away from the puncture site and instead flows directly into the collection tube. It may also be necessary to gently squeeze the fingertip or heel to increase blood flow. However, avoid excessively "milking" of the heel or finger. Such compression increases the likelihood that the red cells will rupture (hemolyze) and tissue fluid will contaminate the specimen. If excessive squeezing is required because of an inadequate blood flow, the procedure should be terminated and an attempt should be made using another site.

The correct order of draw for capillary collection, according to CLSI GP42, is indicated to the right and is notably different from that recommended for venipuncture. The EDTA tube is collected first in order to minimize the potential for increased tissue fluid and clotting in specimens for hematology testing. The EDTA tube is followed by tubes with other additives and then any necessary serum tubes.

For additional information please refer to the Greiner Bio-One MiniCollect® Skin Puncture Manual.

Sources:

CLSI. Procedures and Devices for the Collection of Diagnostic Capillary Blood Specimens; Approved Standard - Sixth Edition. CLSI document GP42-A6. Wayne, PA: Clinical Laboratory and Standards Institute; 2008.

Greiner Bio-One. MiniCollect® Skin Puncture Manual - 980132 rev 03, 12.2015 us. Monroe, NC: Greiner Bio-One North America, Inc. 2016.

