	Procedure Title: <i>Capillary Puncture</i>
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I. Principle and Clinical Significance

- A. Principle – capillary blood collection is the preferred method of blood specimen collection for newborns and infants, especially when small volumes of blood is needed for testing.
- B. Clinical Significance – ability to collect small volumes of blood for laboratory testing because it minimizes pain.

II. Specimen – capillary sample

III. Reagents – N/A

IV. Equipment and Supplies

- A. Capillary tubes
- B. Betadine
- C. Gauze
- D. Lancets

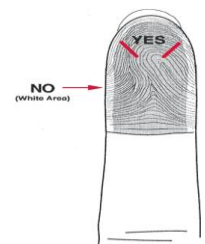
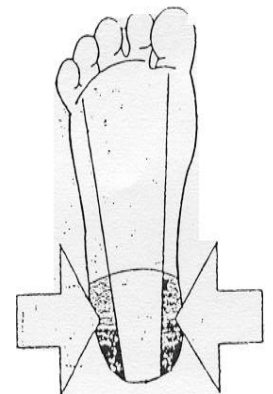
V. Calibration – N/A

VI. Quality Control – N/A

VII. Procedure

- A. Follow the Patient Identification and Specimen Labeling prior to collection of capillary blood gases.
- B. Assess the patient to determine whether a finger or a heel would be most appropriate for use as determined by:
 - 1. The age of the patient
 - 2. The size/weight of the patient
 - 3. Availability of sites
 - 4. Tests ordered and the amount of blood required to perform those tests
 - 5. See Procedural Note X for additional guidelines

- C. If required, warm the selected site for 2-5 minutes prior to drawing the puncture.
1. A heel warmer **MUST** be used when electrolytes or blood gases are being drawn.
 2. **It is strongly recommended** that an infant heel warmer be utilized prior to any puncture because a heel warmer increases circulation 7 times.
- D. If possible, choose a site that is not swollen or has not been punctured too many times.
- E. Determine the correct safety lancet to use as determined by:
1. The age of the patient
 2. The size/weight of the patient
 3. Availability of sites
 4. Tests ordered and the amount of blood required to perform those tests
- F. Follow the following guidelines when using **heel puncture devices**; lancets are single-use with retractable blades.
1. Heels are preferred for capillary puncture in infants less than 6 months of age.
 2. A Quick Heel lancet (purple = 0.85 mm depth) should be used for pre-term infants, <1.5 kg or 3 lbs 5 oz. which is supplied by the NICU.
 3. A Quick Heel (green = 1 mm depth) should be used on term infants, >1.5 kg or 3 lbs 5 oz which is supplied by the laboratory.
 4. The puncture is to be performed on the lateral side of the side of the heel.
 5. Avoid swollen, calloused and heels with scars and lesions.
- G. Follow the following guidelines when using **finger lancing devices**; lancets must be auto-disabling single-use devices (approved by CVAC).
1. A lancet with a puncture depth of less than 2.0 mm should be used for finger sticks on children greater than 9 months of age.
 2. The middle or ring finger are the preferred digits for finger Sticks.
 3. The skin puncture is obtained from the palmar surface of the fingers' distal phalanx.
- H. Cleanse the skin with 70% isopropanol alcohol (unless drawing for blood gases which requires Betadine to cleanse the skin – See Capillary Blood Gases Sampling).
1. Even if bleeding stops, do not re-wipe the site with alcohol during the collections as this can cause destruction of red blood cells and skew the results.



2. This may result in rejection of the specimen.
- I. Perform the puncture on the most medial or most lateral portion of the plantar surface of the heel or palmar surface of the finger's distal phalanx (See attached illustration).
- J. Wipe away the first drop of blood which may contain alcohol that could affect test results.
 1. If drawing a blood gas, it must be collected first, before other samples (See Capillary Blood Gases Sampling).
 2. Once the second drop of blood forms over the puncture site, place the capillary tube in center of the drop of blood.
 - a. The blood will flow into the tube by capillary action into the bottom of the tube
 - b. The blood will follow the same track as the first drop.
 - c. Blood flow from the puncture is enhanced by holding the tube at a slight downward angle below the heart and gently applying intermittent pressure to the surrounding tissue (or proximal to the puncture site when the blood is obtained from a finger).
- K. Avoid excessive squeezing, "milking" or "scooping" the blood from the skin into the collection tube as well as strong repetitive pressing "milking" as this may result in hemolysis or tissue-fluid contamination of the sample.
- L. Use clean gauze to apply gentle pressure on the puncture site once the necessary amount of blood is obtained.
- M. Bandage the site with appropriate size band aids (see Application of Band-Aids After Capillary Punctures).
 1. Band aids should not be applied to pre-term infants in the NICU.
 2. Unwrap a piece of gauze and wrap around infants' foot and secure gauze to itself with a small band aid.
- N. Label samples at the bedside or, if an outpatient, in front of the patient.
- O. Gently invert all blood specimen, capillary and venous, collected in tubes containing anticoagulants, 8 – 10 times; do not shake.

VIII. Procedural Performance

- A. Using swollen or previously punctured sites may contaminate the specimen because of accumulated tissue fluid.

IX. Procedural Notes

- A. The Clinical and Laboratory Standards Institute (CLSI) recommend that fingers of infants less than 9 months of age should NOT be used for a capillary puncture however, given the size of the child this may not always be the case.
- B. Toes of infants should NOT be used for capillary punctures to avoid the risk of puncturing the bone.
- C. Toes of children should NOT be used for capillary punctures to avoid the risk of puncturing the bone.
- D. Common problems and solutions for capillary punctures:

1. Clotted, Quantity Not Sufficient (QNS) and hemolyzed specimens are the most common problems.
 - b. In order to prevent clotted or shot samples, it is imperative that the specimen is obtained as quickly as possible before the clotting process begins.
 - c. Warming the site will also help the blood flow more freely.
2. Hemolysis, the destruction of red blood cells, which can adversely affect test results, is caused by wiping the site with alcohol during the collection, excessive squeezing, or by scraping the blood from the surface of the skin with the collection container.
 - a. Warming the site will increase blood flow, making it easier to collect the specimen.
 - b. As the specimen is being collected, ensure the blood is not running or smearing on the skin surface.
 - c. Large round drops of blood provide easier collection.
3. Capillary punctures performed in the center of the heel could penetrate the bone possibly causing bone spurs or osteomyelitis.

X. References – N/A

XI. Related Documents – N/A