


making a difference

A photograph of two hands, palms up, holding a bright red heart-shaped object. A small, light-colored bandage with a cross pattern is on the left side of the heart. The hands are positioned over a light-colored wooden surface with vertical grain. The text 'making a difference' is at the top, and 'FOR YOUR MOST PRECIOUS SAMPLES' is in a blue banner across the middle.

**FOR YOUR
MOST PRECIOUS
SAMPLES**

Skin Puncture
Manual.

The logo for Greiner, featuring a stylized blue 'G' shape above the word 'greiner' in a bold, lowercase sans-serif font. Below 'greiner' is the text 'BIO-ONE' in a smaller, uppercase sans-serif font.

greiner
BIO-ONE

This product information is addressed exclusively to healthcare professionals. Devices of Greiner Bio-One are to be used by properly trained healthcare professionals only in accordance with the relevant Instructions for Use (IFU). For a listing of indications, contraindications, precautions and warnings, please refer to the Instructions for Use which accompanies each product or is available for download from our website at www.gbo.com (Download Center). For more information contact your local Greiner Bio-One sales representative or visit our website.

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Capillary blood collection requires skill, practical training and a thorough understanding of how the handling method can affect the test results. If the blood is not collected correctly, the results may be falsified to such an extent that the doctor prescribes inappropriate treatment.

Healthcare professionals responsible for blood collection must not underestimate the care required when collecting blood samples. This is the only way of ensuring accurate laboratory results reflecting the patient's physiology.

If the patient is a child, the person collecting the sample must have understanding for the child's anxiety. By calming their fears and collecting the samples quickly and efficiently, the person collecting the sample will be able to minimize young patients' doubts and anxiety. As the youngest patients are often nervous about the procedure, it is important to take the time for them.

This booklet is intended to provide precise instructions for capillary blood collection from patients of all ages. By carefully and consistently following these instructions, we can provide a valuable service to patients who place their trust in our training and experience. The procedure recommended in these instructions is the best way to ensure the professionalism that our patients expect from us when they place their trust in us.



Dennis J. Ernst MT (ASCP)
Center for Phlebotomy Education, Inc.

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REASONS TO PERFORM A CAPILLARY PUNCTURE

CAPILLARY BLOOD COLLECTION CAN BE AN ALTERNATIVE TO VENOUS BLOOD COLLECTION, FOR EXAMPLE, IN PATIENTS WHOSE VEINS ARE DIFFICULT TO ACCESS OR WHEN ONLY A SMALL AMOUNT OF BLOOD IS NEEDED.

Capillary blood collection is preferable to venous blood collection in numerous cases and situations, for example:

- / When small quantities of blood are required
- / In patients with severe burns and scarring
- / In obese patients
- / In patients at risk of thrombosis
- / In patients with an intense fear of needles
- / In patients during infusion therapy
- / In elderly patients with very fragile or poorly accessible veins
- / In newborns
- / After several failed venous attempts
- / For point-of-care tests
- / For dry blood tests

MiniCollect® is the
ideal system for
collecting, transporting
and processing
capillary blood.



DIFFERENCES BETWEEN CAPILLARY BLOOD AND VENOUS BLOOD ^(1,2)

Capillary blood is a mixture of blood from the capillaries, venules and arterioles, and interstitial and intercellular fluid.

As a result, the normal values differ from those of venous blood.

If blood samples are collected by capillary puncture, this must be noted in the laboratory results so that the test results can be interpreted correctly.

CLINICALLY SIGNIFICANT DIFFERENCES

in the concentrations of glucose, potassium, total protein, calcium, electrolytes, lactate dehydrogenase and aspartate aminotransferase have been reported. ^(1,16,17)

SAFETY

FOR HEALTHCARE
PROFESSIONALS,
NEEDLESTICK INJURIES
AND THE ASSOCIATED
RISK OF INFECTION
REPRESENT A VERY
HIGH RISK.

For this reason, the European social partners signed a European framework agreement on the prevention of sharps injuries in 2009, which was adopted as a European Union directive in 2010. The directive was transposed into national law in all European Union member states by 11 May 2013, with the aim of creating a working environment that was as safe as possible for all healthcare workers.

PRECAUTIONS TO BE OBSERVED WHEN HANDLING SAMPLES INCLUDE:

- / Wearing gloves in all situations where contact with body substances or broken skin is possible
- / Washing hands with soap and water or a recommended disinfectant before and after attending to patients or handling body fluids
- / Wearing appropriate work clothes when collecting blood
- / If the person collecting the blood sample has an weeping rash, they must avoid all direct contact with the patient and the handling of patient material

FOR CAPILLARY BLOOD COLLECTION, THE FOLLOWING IS ALSO IMPORTANT:

- / Only use safety products with retractable blades
- / Discard the used puncture device immediately after use
- / Any spots of blood should be removed immediately with a suitable cleaning agent while wearing gloves to avoid direct contact
- / Any accidental needlesticks must be reported immediately
- / Work clothing that has been visibly contaminated must be changed

**HUMAN BLOOD
AND ALL OTHER
BODY FLUIDS
MUST BE TREATED
AS IF THEY
WERE INFECTED
WITH HIV, HBV
OR OTHER
PATHOGENS.**

MATERIALS AND EQUIPMENT

GREINER BIO-ONE IS A SYSTEM PROVIDER OF PRODUCTS FOR SAFE CAPILLARY BLOOD COLLECTION. ITS PORTFOLIO RANGES FROM SAFETY LANCETS TO SHARPS DISPOSAL CONTAINERS THROUGH TO SAMPLE COLLECTION CONTAINERS.

Safety lancets for capillary blood collection should always be intended for single use. Puncture systems without automatic retraction into their plastic housing or where the contaminated sharp has to be removed manually should not be used.

Sharps disposal containers enable the safe disposal of medical consumables. Our containers are puncture-proof and can be irreversibly sealed.

MiniCollect® tubes have an integrated scoop for the easy and hygienic collection of blood droplets. The additional use of a capillary or funnel is not necessary. MiniCollect® tubes can be inserted into a 13 x 75 mm PREMIUM carrier tube and are therefore suitable for automated processing in the laboratory.

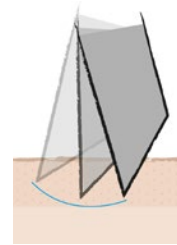


SAFETY LANCETS FROM GREINER BIO-ONE COMPLY WITH THE EUROPEAN DIRECTIVE:

- / The safety mechanism must be an integral part of the safety device, not a separate accessory.
- / The activation of the safety mechanism must be convenient and allow the healthcare worker to maintain appropriate control over the procedure.
- / The instrument must perform reliably.
- / A single-handed or automatic activation is preferable.
- / The safety mechanism should not be easily reversible once activated.

PUNCTURE VERSUS INCISION SYSTEMS

There are two types of systems for collecting a capillary blood sample: puncture systems and incision systems.

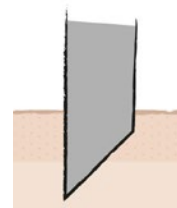


/ MiniCollect®
PIXIE

Incision system – incision.

Incision systems cut the tissue with a blade. They are used when larger quantities of blood are required. Incision is generally less painful than using a needle. Bruising is less likely. The risk of sample haemolysis is lower. The process needs to be repeated less frequently.

Blade: gentle cut, higher blood flow.
Only used for baby heels.



/ MiniCollect®
Safety Lancet
/ MiniCollect®
Lancelino

Puncture system – puncture.

Puncture systems penetrate the skin vertically with a needle. They are used when a small amount of blood is required. Puncture is advantageous for patients who require smaller quantities of blood to be collected on a regular basis, e.g. to monitor blood glucose, or in neonates when neonatal bilirubin has to be tested.

Needle: smaller puncture wound.
For patients from whom small quantities of blood are required regularly.

Blade: Higher blood volumes can be obtained than with needle lancets.

Place materials and accessories
within reach so you can stay
close to the patient.

MATERIALS REQUIRED



Gloves and appropriate personal protective equipment



Alcohol swabs or other suitable skin disinfectant



Commercially available heel warmers or warm compresses



Safety lancets



Puncture-proof sharps disposal container



Swabs



Collection tubes and labels for clear sample identification



Plasters

COLLECTING THE SAMPLE

INTERACTING WITH THE PATIENT

A lot of patients are scared of invasive procedures, even one as harmless as a capillary puncture. Easing their fears is important, but it can be difficult.

Often their fears are masked and their reactions unpredictable. That's why it's important to be empathetic and attentive with every patient so you can help them relax. Children are often very anxious before medical interventions. Care, compassion, patience, understanding and the personality of the sample collector play an important role in the success of blood collection. Young patients are often well prepared, but the anxious ones need an extra bit of patience. As children often have misconceptions about such interventions, it is extremely important that medical staff are understanding of the child's worries and fears from the very first moment. Give your paediatric patient enough time to calm their anxiety so that they accept the procedure.

YOU SHOULD TREAT EACH PATIENT LIKE A MEMBER OF YOUR OWN FAMILY. THE LEVEL OF CARE YOU TAKE WHEN COLLECTING BLOOD SHOULD BE THE SAME AS WE WOULD WANT FOR A FAMILY MEMBER: DETERMINED BY A DESIRE FOR THEIR WELL-BEING.

DENNIS J. ERNST

ALLEVIATE FEARS

Putting paediatric patients at ease always begins with the very first eye contact. Children can sense compassion and care based on your facial expressions and body language, just as you can tell whether they are afraid or at ease. The patient's willingness to cooperate is significantly influenced by how you respond to their behaviour.

DESCRIBE THE PROCESS

Describe the procedure to the patient in language that is appropriate for the patient's age, using the individual steps listed below as a guide:

- / **Show the child the finger that will be punctured**
- / **Explain that it needs to be cleaned first**
- / **Tell the patient that they will feel a nip or pinch, but avoid emotive words such as "sting" or "pain"**
- / **Show them the system you will use to collect the drops of blood and explain how it will be used**
- / **Tell the child that a plaster will be applied to the puncture site afterwards**

Explain who you are and what you will do. You should try to wake sleeping, sedated or unconscious patients. If the patient asks questions about the blood collection, give them an explanation that they can understand.

TREAT PAEDIATRIC PATIENTS AGE- SPECIFICALLY.



AGE: FROM BIRTH TO 12 MONTHS

Because punctures in this age group require a high level of technical expertise and an advanced skill set, they should only be performed by healthcare workers who have mastered heel blood collection.

Studies have shown that babies display fewer pain reactions when given glucose or sugar beforehand.^(8,9) Breastfeeding has a similar effect.^(10,11)

Every child wants to be comforted immediately after the procedure. Changing nappies during the process reduced pain responses in newborns⁽¹²⁾



AGE: 1–3 YEARS

Compassion and friendliness are essential for preparing children in this age group for the puncture. If the circumstances allow it and the parents agree, they can hold their child. That can make the situation more relaxed and minimize fear.

Gentle physical restraint can be necessary since children are often highly impulsive at this age. If possible, position the child on the parent's lap so that they can hold the child's arm during the procedure. If a parent is unable to assist, an assistant should gently restrain the young patient by holding their free arm while the patient lies on a bed or on a stretcher.



AGE: FROM 4 YEARS

The sample collector can communicate at a higher level and more successfully with children aged four and older than they can with younger children. Alleviate the child's fears by being friendly and empathetic.



IDENTIFYING THE PATIENT

If a patient is not properly identified, medical treatment errors may occur.

It is vital that all patients are correctly identified in line with your in-house guidelines.

POSITIONING OF THE MATERIALS REQUIRED

Ensure that all the materials required are readily available before performing the skin puncture.

- / MiniCollect® collection tubes according to additives and fill quantity
- / Safety lancets according to tissue thickness and amount of blood required
- / Alcohol swabs for cleaning the puncture site
- / Plaster or dressing
- / Puncture-proof sharps disposal container.

TREAT ALL ANXIOUS PATIENTS WITH COMPASSION, UNDERSTANDING AND PATIENCE THROUGHOUT THE ENTIRE PROCESS.

Before you start, explain the procedure step-by-step. Follow the corresponding pain prevention measures according to the guidelines valid in your facility. When you start the collection, distract the patient by making casual conversation.

THE CHOICE OF PUNCTURE SITE DEPENDS ON THE AGE OF THE PATIENT, THE QUANTITY OF BLOOD REQUIRED AND THE PARAMETER TO BE EXAMINED.

SELECTING THE PUNCTURE SITE

There are several factors to consider when selecting the puncture site.

INJURED OR TRAUMATIZED PUNCTURE SITES:

Punctures in highly stressed areas that have already been punctured or have suffered trauma should be avoided.

OEDEMAS AT THE PUNCTURE SITE:

Puncture sites should be free of oedemas.

PRIOR MASTECTOMY:

Samples from the same side that a mastectomy has been performed on are unsuitable for two reasons, unless they have been expressly permitted by the treating doctor:

1. There is a fluid imbalance on the affected side due to the removal of lymph nodes. Samples taken from this side could be affected and give a false picture of the patient's general condition.
2. There is a higher risk of infection in mastectomy patients in the affected body parts. Painful lymphoedema is also common in these patients.

THE HEEL IS THE PREFERRED PUNCTURE SITE FOR CHILDREN UP TO 12 MONTHS OF AGE AND THE FINGER THE PREFERRED SITE FOR OLDER CHILDREN AND ADULTS.

NEWBORNS AND INFANTS

For newborns and infants up to six months of age, the only acceptable puncture sites are the medial or lateral (inner or outer) sole of the foot at the heel.

As the tissue at an infant's heel may only be 2.0 mm deep, the puncture depth should not exceed 2.0 mm. To avoid puncturing the calcaneus, the puncture should not be made at the posterior curvature or back of the heel, as the tissue may only be 1.0 mm thick at these sites.



CAUTION!

In children between 6 and 12 months, the finger may only be punctured if the child weighs more than 10 kg (max. lancet depth 1.5 mm).

CHILDREN AND ADULTS

In patients aged one year and older, capillary punctures are usually only performed on the fleshy fingertip of the third or fourth finger (middle or ring finger).

The thumb should not be used as the skin is often too thick and callused. The index finger is not suitable as it is significantly more sensitive than the other fingers and may also have calluses. Lastly, the little finger should not be punctured because the tissue is not thick enough and the bone could be injured.



The puncture should be made on the fleshy part of the fingertip, not on the side, as the tissue on the fingertip is twice as thick as it is on the side. This minimizes the risk of the bone being penetrated.



When puncturing the finger, place the tip of the system perpendicular to the fingerprint ridges and not parallel to them. This ensures that the blood coming out forms a droplet and does not flow into the grooves of the fingerprint.

The depth of the puncture is particularly important and depends on the puncture site. Some manufacturers provide age-specific recommendations for this. Please follow the lancet manufacturer's instructions.

SELECTING THE PUNCTURE SITE

ACCORDING TO WHO'S RECOMMENDATIONS

NEWBORNS & INFANTS

Birth up to approx. 6 months and
lighter than 10 kg

CHILDREN & ADULTS

Older than 6 months and heavier
than 10 kg

PREFERRED PUNCTURE SITE

Heel

Finger

POSITIONING OF THE LANCET

Lateral (outer) or medial (inner)
plantar surface of the heel.

Inner side of the distal segment
of the 3rd or 4th finger.

Positioning perpendicular to
the ridges of the fingerprint
and slightly off-centre.

UNSUITABLE PUNCTURE SITES

Fingers, other areas
of the foot, such as the
arches or back of the heel

Thumb, index finger,
little finger, earlobe

SELECTING THE CORRECT LANCET DEPTH

The length and width of the product used should be based on the
patient's **age, weight** and the **required blood volume**.

*Preterm and low
birth weight infants:*

Lancet depth **max. 0.85 mm**

*Children aged 6–12 months
and over 10 kg:*

Lancet depth **Max. 1.5 mm**

*Newborns with average birth
weight and older children:*

Lancet depth **max. 2.00 mm**

Older than 12 months and adults:

The depth of the lancet should
be adapted to the **anatomical
conditions**.

CAUTION: When pressure is applied, the tissue compresses
and the distance to the bone decreases!

PREPARATION OF THE PUNCTURE SITE

PRE-WARMING

If desired, the puncture site can be warmed in
advance with a heel warmer or compress.



A commercially available heel
warmer or warm compress is
placed on the puncture site.
Make sure that the pre-warm-
ing temperature does not
exceed 42°C.

CLEANING THE PUNCTURE SITE



Clean the intended puncture
site with 70% isopropyl
alcohol or another recom-
mended disinfectant and let
it dry.

CAUTION!

If the alcoholic disinfectant has not completely
dried at the puncture site, the damp alcohol could
contaminate and/or haemolyse the sample.
The patient would also feel a stinging pain.

PERFORMING CAPILLARY BLOOD COLLECTION

Select the most appropriate capillary blood collection device for the selected puncture site and patient.

STEP-BY-STEP



1

Preparation

Welcome and identify the patient. Perform hand hygiene and prepare the patient in accordance with your facility's guidelines.



2

Select an appropriate puncture site

Fingertip of the third or fourth finger or medial or lateral plantar surface of the heel.

PREFERRED PUNCTURE SITE

The finger is the preferred puncture site for older children and adults, the heel for children aged up to 12 months.

PLEASE
OBSERVE THE
INSTRUCTIONS
FOR USE

at www.gbo.com



3

Pre-warm the puncture site

For three to five minutes, at a maximum of 42 °C.



4

Perform hand hygiene and put on gloves.



5

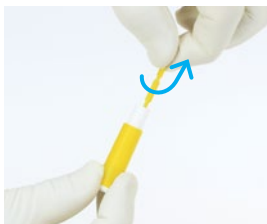
Disinfect the puncture site



6

Remove the cap

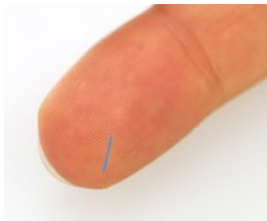
The ribbed area at the top of the tube indicates where to open the cap. Remove the cap by applying gentle upward pressure to it.



7

Prepare the lancet

Hold the lancet firmly between your fingers and release the safety mechanism as described in the corresponding instructions for use.



8

Position the lancet

Position the lancet on the skin gently without applying excessive pressure. *Punctures should be made perpendicular to the fingerprint ridges to prevent blood from channelling away.*



9

Perform the puncture

Hold the finger or heel to avoid sudden movements. After use, dispose of the lancet in a suitable container.



10

The first drop of blood

... should be removed with a clean, dry swab. *Exception: certain point-of-care tests*



11

Collect the blood sample

If more than one tube is taken, the correct order of collection for capillary samples must be adhered to. *Avoid direct contact with the scoop used to collect the blood.*

TIP FOR OPTIMAL BLOOD FLOW:



Gently press on the surrounding tissue to make the sample collection easier. The puncture site should be facing downwards. The drops of blood should flow freely down the scoop and the tube wall.

COLLECTION ORDER

ACCORDING TO CLSI GP42-ED7

The order of collection for capillary blood collection is not the same as the order for venous blood collection.

When the skin is punctured, factors that trigger the blood clotting process are released. This can lead to platelet aggregation.



1

EDTA

2

Other additives

3

Tubes without additive and serum tubes



12

Close the tube using the original cap

You will hear a "CLICK" when the tube is closed.



13

Mix the sample

Carefully invert each tube immediately after collection.

The number of inversions is specified in the corresponding instructions for use and varies depending on the additive.



14

Sample identification

Samples must be labelled by writing on the tube or using a label immediately after collection and in the presence of the patient.

The information on the labels must be cross-checked against the patient's data.



15

Post-collection care

Apply gentle pressure with a clean swab until the bleeding stops and apply a plaster to the puncture site.

Plasters are not recommended for children under 2 years of age.

Check that you have not forgotten any of the used materials before leaving the patient.



TRANSPORT OF SAMPLES AND PROCESSING IN THE LABORATORY

THE BLOOD SAMPLES SHOULD BE TRANSPORTED TO THE LABORATORY AS QUICKLY AS POSSIBLE AND UNDER APPROPRIATE TRANSPORT CONDITIONS IN ACCORDANCE WITH IN-HOUSE INSTRUCTIONS.

The MiniCollect® tubes can be screwed into the PREMIUM carrier tube. In combination, these carrier tubes correspond to a conventional tube size of 13x75 mm. In the Complete version, the MiniCollect® tube is already fixed to the carrier tube. The tubes can be placed directly in the analyzer. In addition, the carrier tubes enable identification using common label formats.

The MiniCollect® tube's cap can be pierced by a cap-piercing analysis needle while closed, before automatically resealing after the needle is removed. It is not necessary to remove the cap before analysis, thus improving the level of hygiene.



The tubes can be placed directly in the analyzer.

TROUBLESHOOTING



BLOOD FLOW AT THE PUNCTURE SITE DOES NOT START.

Hold the limb lower.
Finish the puncture and
repeat the procedure after
warming the puncture site
with a commercially available
warming pad or compress. The
temperature must not exceed
42°C. The puncture area can be
gently pressed but must never
be pressed too hard.



THE SAMPLE COAGULATES IN THE TUBE WITH ANTICOAGULANT ADDITIVE.

Discard the sample and
repeat the capillary blood
collection. Shake the blood in
the MiniCollect® tube during
collection by gently tapping
the tube on a hard surface or
closing the cap and turning the
MiniCollect® tube upside down.



OVERFILLED OR UNDERFILLED TUBES.

The tubes must be filled up to
the specified nominal volume
or between the minimum
and maximum fill marks if
applicable. Overfilling can
lead to the clotting of the
sample, while under-filling
can negatively affect the test
results (due to an excess of
anticoagulants).



HAEMOLYSIS OR CONTAMINATION OF THE SPECIMEN WITH TISSUE FLUID.

“Milking”, i.e. strong, rhythmical
squeezing of the tissue should
be avoided, since it results in
haemolysis and contamination
of the sample with tissue fluid.



**FURTHER
INFORMATION
ON OUR
PRODUCTS**

can be found on our
corporate website
www.gbo.com.

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NOTES

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IS A GLOBAL PLAYER.**
FIND THE CONTACT DETAILS
OF YOUR LOCAL PARTNER
ON OUR WEBSITE.

