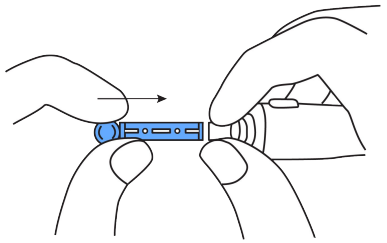
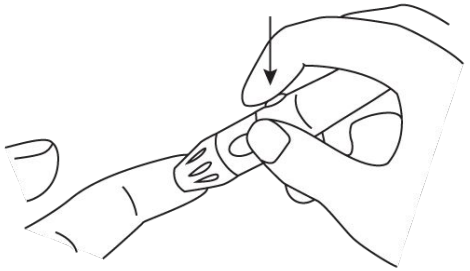
MTD
Medical Technology and Devices

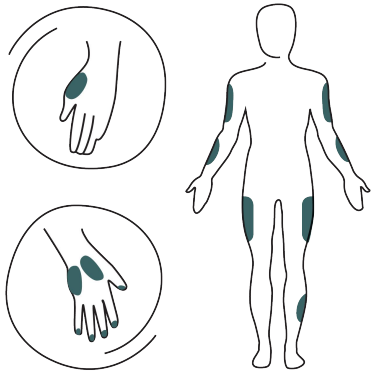
STREFA
high tech lab

SELF-MONITORING OF BLOOD GLUCOSE

FINGER PRICKS ROTATION & ALTERNATE SITE TESTING







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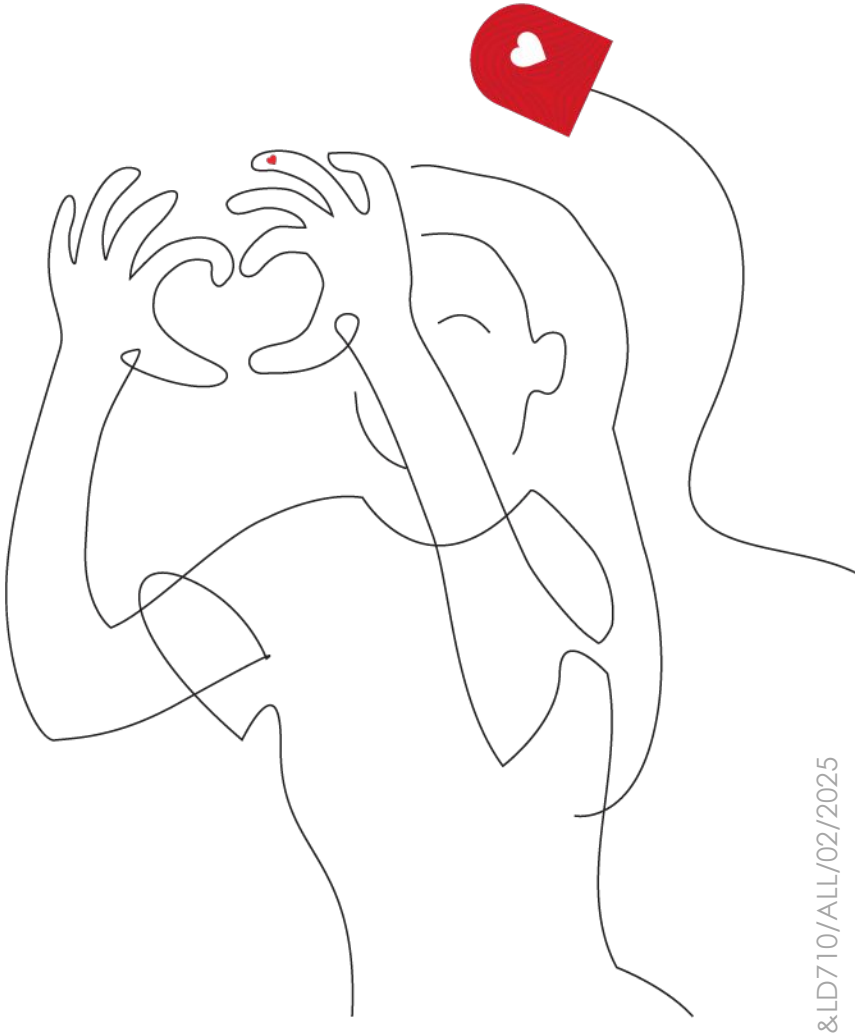
DISCLAIMER

- This material should not be used as a substitute for medical care and advice of your physician or health care professional.
  Please consult your healthcare provider before using any medical device.

- HTL-STREFA makes every effort to provide accurate information but you should always consult your physician for diagnosis and treatment.

- If you have a question that needs an immediate answer, you should call your physician or other medical professional and if you are confronting a medical emergency, call your local emergency number.



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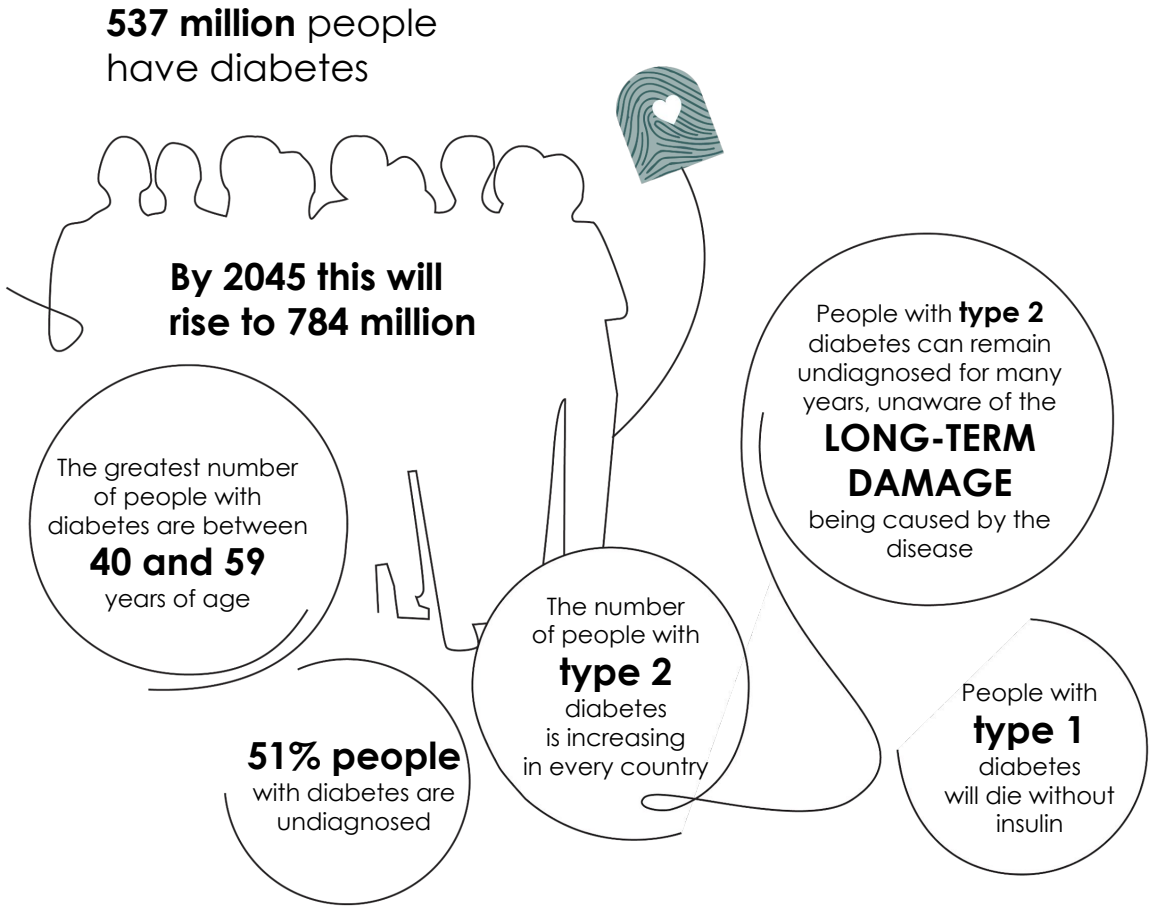
DIABETES PANDEMIC

- Diabetes is one of the most common non-communicable diseases.
- It is a chronic disease occurring when the body's pancreas does not product enough insulin or when the body cannot effectively use the insulin produced. Diabetes can cause chronic complications.
- Diabetes is a global disease affecting an estimated 537 million people.
- **WHO** projects diabetes will be the **6th leading cause of death by 2030.**
- 6,7 million people die from **diabetes complications** in 2021.



1. IDF Diabetes Atlas - 10th Edition 2021. Available on https://diabetesatlas.org/atlas/tenth-edition/

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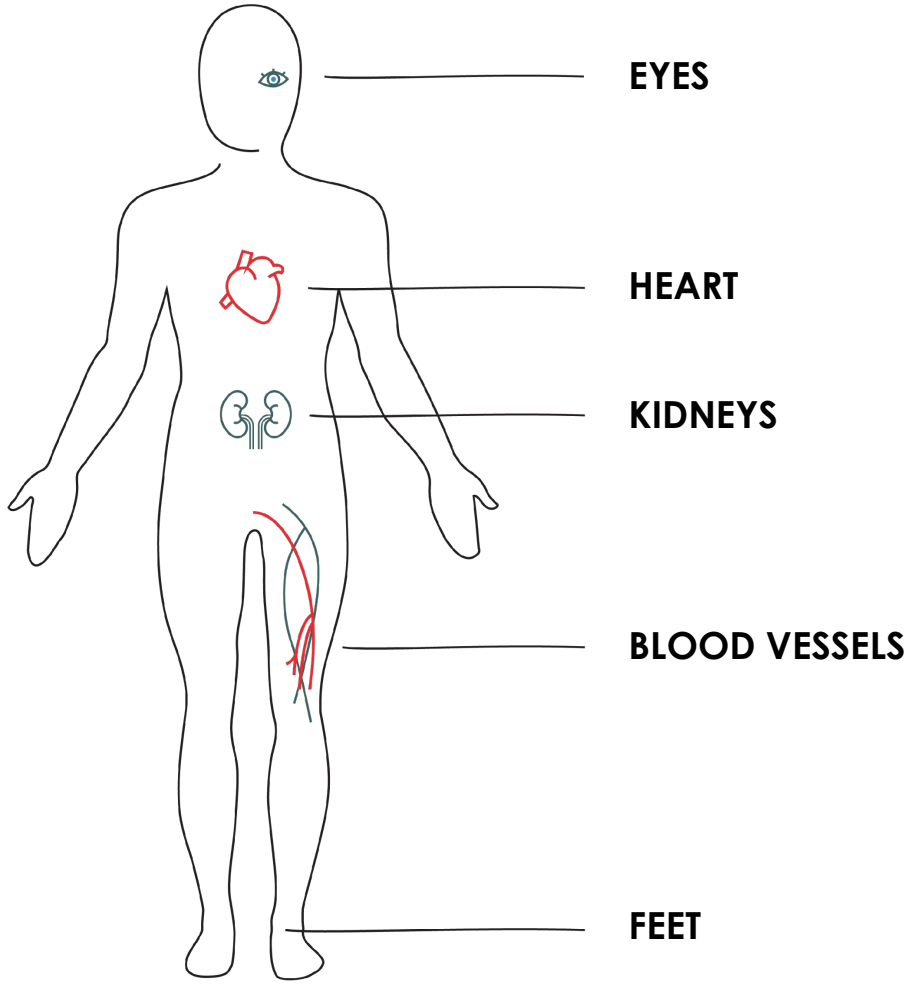
DIABETES COMPLICATIONS

- Diabetic retinopathy, severe **vision loss** or **blindness**.
- Diabetic cardiomyopathy, damage to the heart, leading to diastolic dysfunction and eventually **heart failure**.
- Diabetic nephropathy, **damage to the kidneys** which can lead to chronic renal failure, eventually requiring dialysis.
- Diabetic neuropathy, abnormal and decreased sensation which combined with damaged **blood vessels** can lead to **diabetic foot** sometimes requiring amputation.



2. Papatheodorou K, et al. Complications of Diabetes 2017. Journal of Diabetes Research Vol 2018, Article ID 3086167.

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SELF-MONITORING OF BLOOD GLUCOSE

FINGER PRICKS

- Pricking the fingers is an integral part of self-monitoring of blood glucose and part of everyday life for millions of people with diabetes.
- A little finger prick, followed by a drop of blood on the testing strip allows people to view blood glucose levels within seconds.
- Testing blood sugar levels helps people with diabetes to make proper decisions about their diet, activity and treatment requirements.
- Testing of blood sugar levels also plays a very important role in prevention and detection of hypoglycaemic events and improvement of quality of life.
- People with Type 1 diabetes are recommended to measure their blood glucose levels at least 3-4 times/day.

3. Kocher S, et al. Comparison of lancing devices for self-monitoring of blood glucose regarding lancing pain. J Diabetes Sci Technol Sep 2009 1;3(5):1136-43.
4. Heinemann L, Boecker D, Lancing: QuoVadis? J Diabetes Sci Technol 2011; 5(4): 966–981.

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SELF-MONITORING OF BLOOD GLUCOSE

- Blood samples for self-monitoring of blood glucose are obtained by pricking the fingertip with a lancet.
- Pricking the fingertips is usually connected with discomfort and pain – due to higher amount of nerve endings at the fingertips, than on any other spot on the human body.
- This discomfort might cause negative perception of self-monitoring of blood glucose, diabetes and diabetes management in general. It might lead to psychological problems and to a therapy resistance (especially in children).
- Frequent pricking is uncomfortable not only for a person with diabetes but may also result in development of massive scarring formation and loss of sensibility at the fingertips.

4. Heinemann L, Boecker D. Lancing: QuoVadis?.J Diabetes Sci Technol 2011; 5(4): 966–981.
5. Heinemann L, Finger Pricking and Pain: A Never Ending Story. J Diabetes Sci Technol 2008 Sep; 2(5): 919–921.

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SELF-MONITORING OF BLOOD GLUCOSE

HOW TO REDUCE THE DISCOMFORT DURING SELF-MONITORING OF BLOOD GLUCOSE?

First of all - remember to use a new lancet every time! Lancets are designed to be used only once, and then disposed of in a safe way. Re-usage of the lancets makes them dull or bend the tip of the lancet, causing bruising, bad wound closure and scarring.

NEW – precise grinding & sharp needle tip

TWICE USED – dulled needle tip

MULTIPLE USE – hooked needle tip

5. Heinemann L. Finger Pricking and Pain: A Never Ending Story. J Diabetes Sci Technol 2008 Sep; 2(5): 919–921
6. Available on: https://onlinelibrary.wiley.com/doi/full/10.1002/pdi.949

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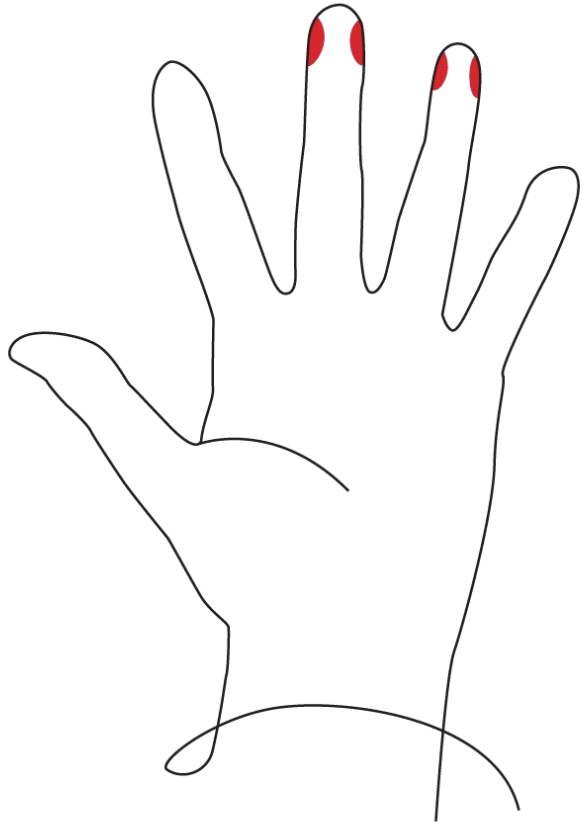
HOW TO REDUCE THE DISCOMFORT
DURING SELF-MONITORING OF BLOOD GLUCOSE?

- **One way** to reduce the chance of feeling pain during finger pricking is to **draw blood from the side of the finger**, rather than from the pad or tip of the finger. This technique helps because we have less concentration of nerve endings on the side of our fingers compared with the tip and pad of the fingers. The sides also have more blood vessels close to the surface.
- Try to use **different fingers every time** and never use a finger that is already sore – you can try to use both hands and all ten fingers as a source of blood during self-monitoring of blood glucose.
- Some people with diabetes are inventing their own system of finger prick rotation that helps them to reduce pain perception and avoid „sore fingers".



5. Heinemann L. Finger Pricking and Pain: A Never Ending Story. J Diabetes Sci Technol 2008 Sep; 2(5): 919–921.
6. Available on: https://onlinelibrary.wiley.com/doi/full/10.1002/pdi.949
7. Nakayama T, Kudo H, Sakamoto S, Tanaka A, Mano Y. Painless Self-Monitoring of Blood Glucose at Finger Sites. Exp Clin Endocrinol Diabetes 2008; 116:193-197.
8. Available on: https://www.nfb.org/images/nfb/publications/vod/vodfal0403.htm
9. Available on: https://apps.who.int/iris/bitstream/handle/10665/44294/9789241599221_eng.pdf;jsessionid=A140EFDB4F397C875F4B499E846B51DF?sequence=1

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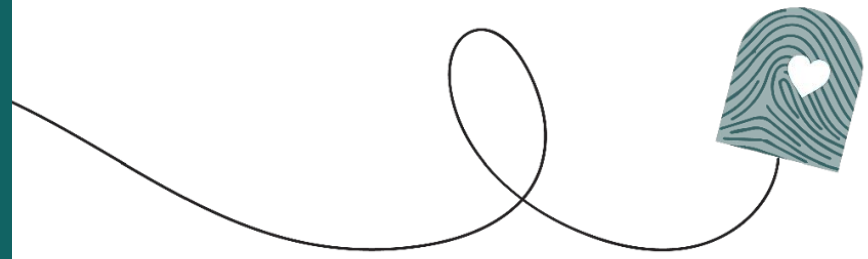
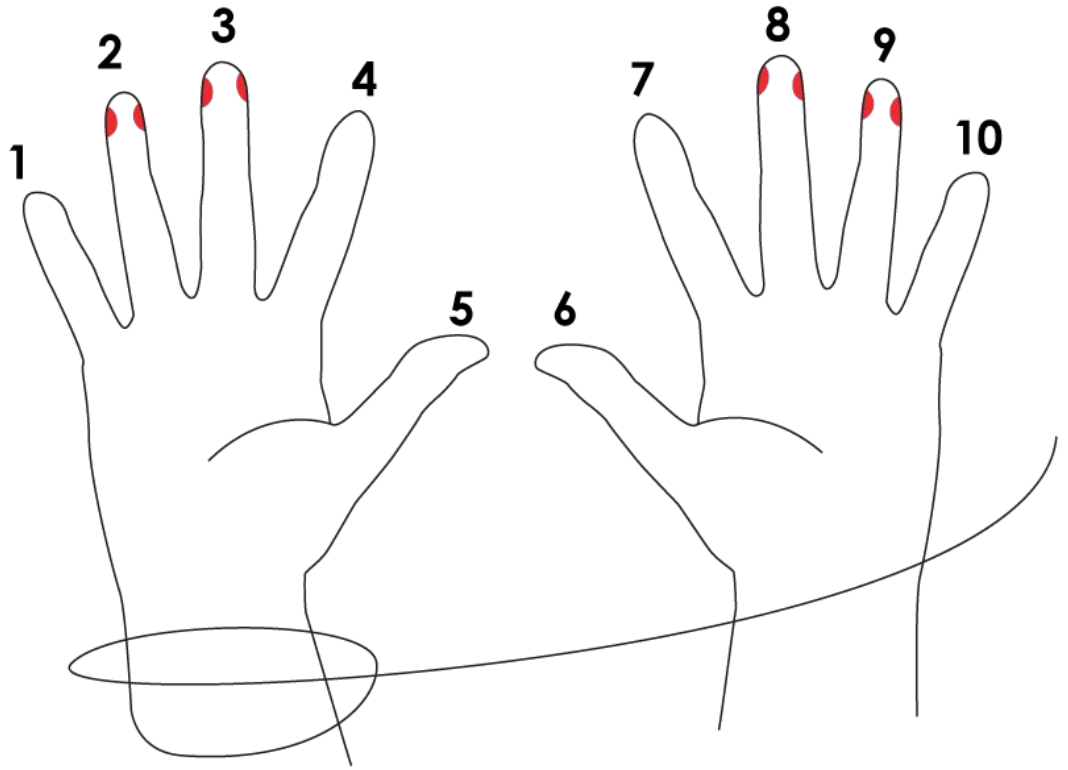
FINGER PRICKS ROTATION



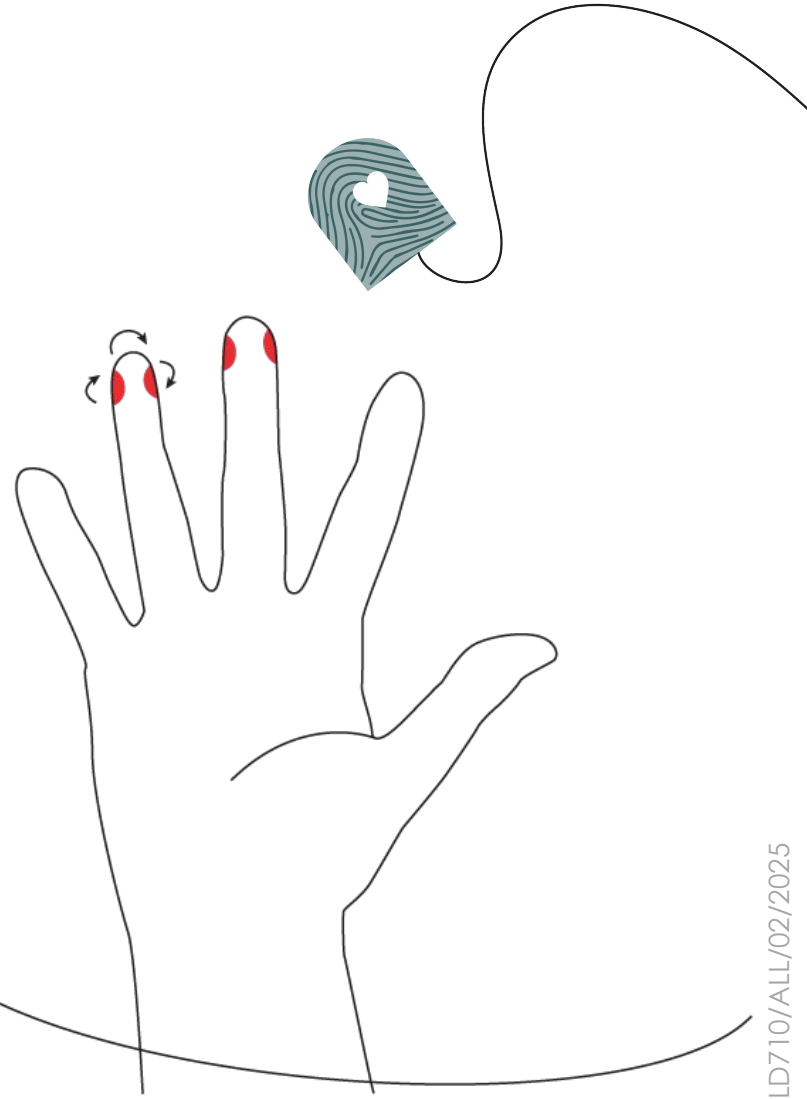


- **Finger pricks rotation might work very similar to the site rotation during insulin injections. It just requires a system.**
- **You can try to create a map of your hands and mark your fingers – in order to remember which finger to use next.**

8. Available on: https://www.nfb.org/images/nfb/publications/vod/vodfal0403.htm

FINGER PRICKS ROTATION

- If you have to prick yourself several times a day try to rotate the puncture site on the finger you are lancing.
- Start from one side and use (for example) one side in the morning and afternoon, and the other side in the evening and at night.
- Avoid lancing sore spots – use other fingers until the sore spots heal.



8. Available on: https://www.nfb.org/images/nfb/publications/vod/vodfal0403.htm

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SELF-MONITORING OF BLOOD GLUCOSE

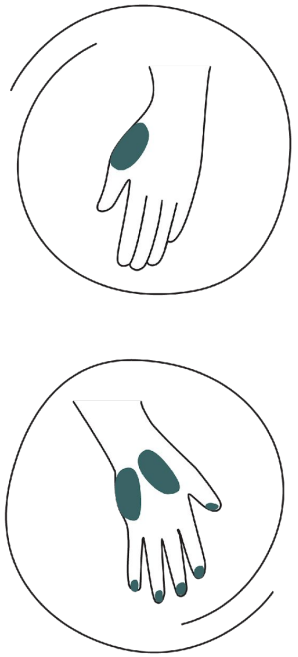
ALTERNATE SITE TESTING (AST)

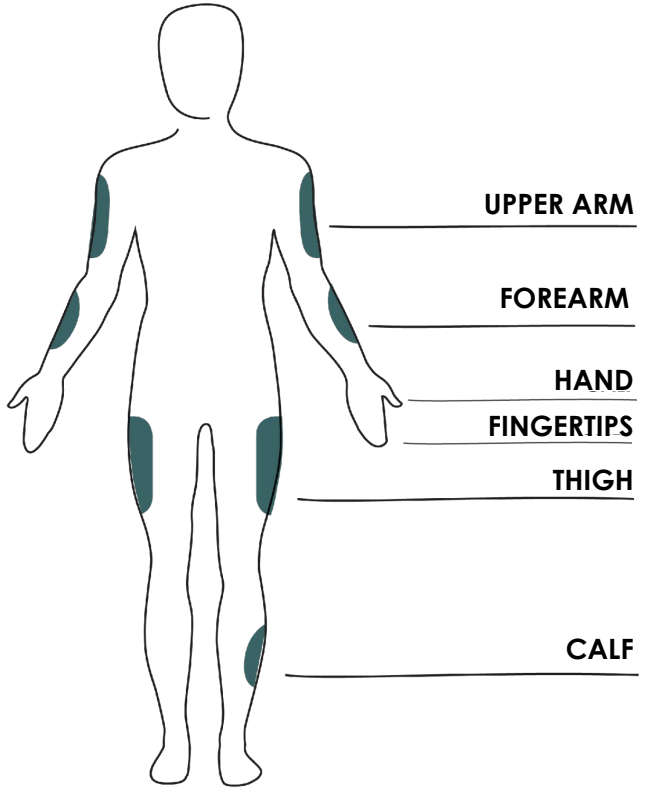
- Many people with diabetes choose to give their fingertips a break and use alternate site testing (AST).
  Before switching to AST, consult your physician if it is right for you.

- AST means using a part of the body other than the fingertips to obtain blood for blood sugar testing.

- This may include taking a blood sample from anywhere other than the fingertips, including the palm, the upper forearm, the abdomen, the calf and the thigh.
  Fingertips are traditionally used for blood glucose testing because they have many capillaries and will usually provide a large enough drop of blood to get a reading from a blood glucose meter.

Suggested Test Area for the Hand





9. Available on: https://www.fda.gov/medicaldevices/productsandmedicalprocedures/InVitroDiagnostics/GlucoseTestingDevices/default.htm

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SELF-MONITORING OF BLOOD GLUCOSE

ALTERNATE SITE TESTING (AST)

- AST testing may be particularly useful for people who require daily multiple blood glucose testing.
- However, blood glucose testing results may vary when blood sugar testing is done on other areas of the body. This is because of the way blood circulates in the body - blood flows much faster through the capillaries in the fingertips than in other body parts and (for example) reflects changes in glucose levels faster.
- People with diabetes who have relatively stable blood sugar levels may consider AST.
  You should definitely use your fingers for blood glucose testing, when your blood sugar levels are changing rapidly.
- This is important to consider when you are managing your treatment.

10. Bina D, Anderson R, Johnson M, Bergenstal R, Kendall D. Clinical Impact of Prandial State, Exercise, and Site Preparation on the Equivalence of Alternative-Site Blood Glucose Testing. Diabetes Care 2003 Apr; 26(4): 981-985.
11. Jungheim K, Koschinsky T. Risky. Delay of Hypoglycemia Detection by Glucose Monitoring at the Arm. Diabetes Care 24:1303-4, 2001.
12. Peled N, Wong D, Gwalani SL.. Comparison of Glucose Levels in Capillary Blood Samples Obtained from a Variety of Blood Sites. Diabetes Technology and Therapeutics. 4(1): 45-7, 2002.

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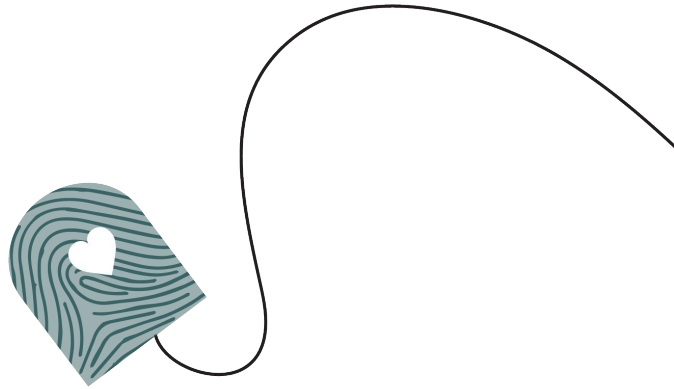
SELF-MONITORING OF BLOOD GLUCOSE

ALTERNATE SITE TESTING (AST)



When to use AST?

- Before meals.
- When fasting.
- Near bedtime (at least 2 hours after eating).

When NOT to use AST?

- When you have just taken insulin.
- When you suspect your blood sugar might be low or the result does not match how you feel.
- When you have hypoglycaemia unawareness (no symptoms when your blood sugar is low).
- When you have finished exercising.
- When you have finished eating a meal.
- When you are sick or tired or under stress.

Remember, always consult your healthcare professional before switching to AST.

9. Available on: https://www.fda.gov/medicaldevices/productsandmedicalprocedures/InVitroDiagnostics/GlucoseTestingDevices/default.htm
10. Bina D, Anderson R, Johnson M, Bergenstal R, Kendall D. Clinical Impact of Prandial State, Exercise, and Site Preparation on the Equivalence of Alternative-Site Blood Glucose Testing. Diabetes Care Apr 2003; 26(4): 981-985.
11. Jungheim K, Koschinsky T. Risky. Delay of Hypoglycemia Detection by Glucose Monitoring at the Arm. Diabetes Care 24:1303-4, 2001.
12. Peled N, Wong D,Gwalani SL. Comparison of Glucose Levels in Capillary Blood Samples Obtained from a Variety of Blood Sites. Diabetes Technology and Therapeutics. 4(1): 45-7, 2002.

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HTL-STREFA droplet®

PERSONAL LANCETS & LANCING DEVICES

INTENDED USE

- **droplet®** personal lancets are sterile, single-use medical devices intended to be used with a lancing device by lay users, for capillary blood sampling.

- **droplet®** lancing device is a medical device for multiple use with sterile, single-use lancets intended for capillary blood sampling, by a lay person.

Photo taken for the purposes of presentation, by the employees of HTL-Strefa S.A.

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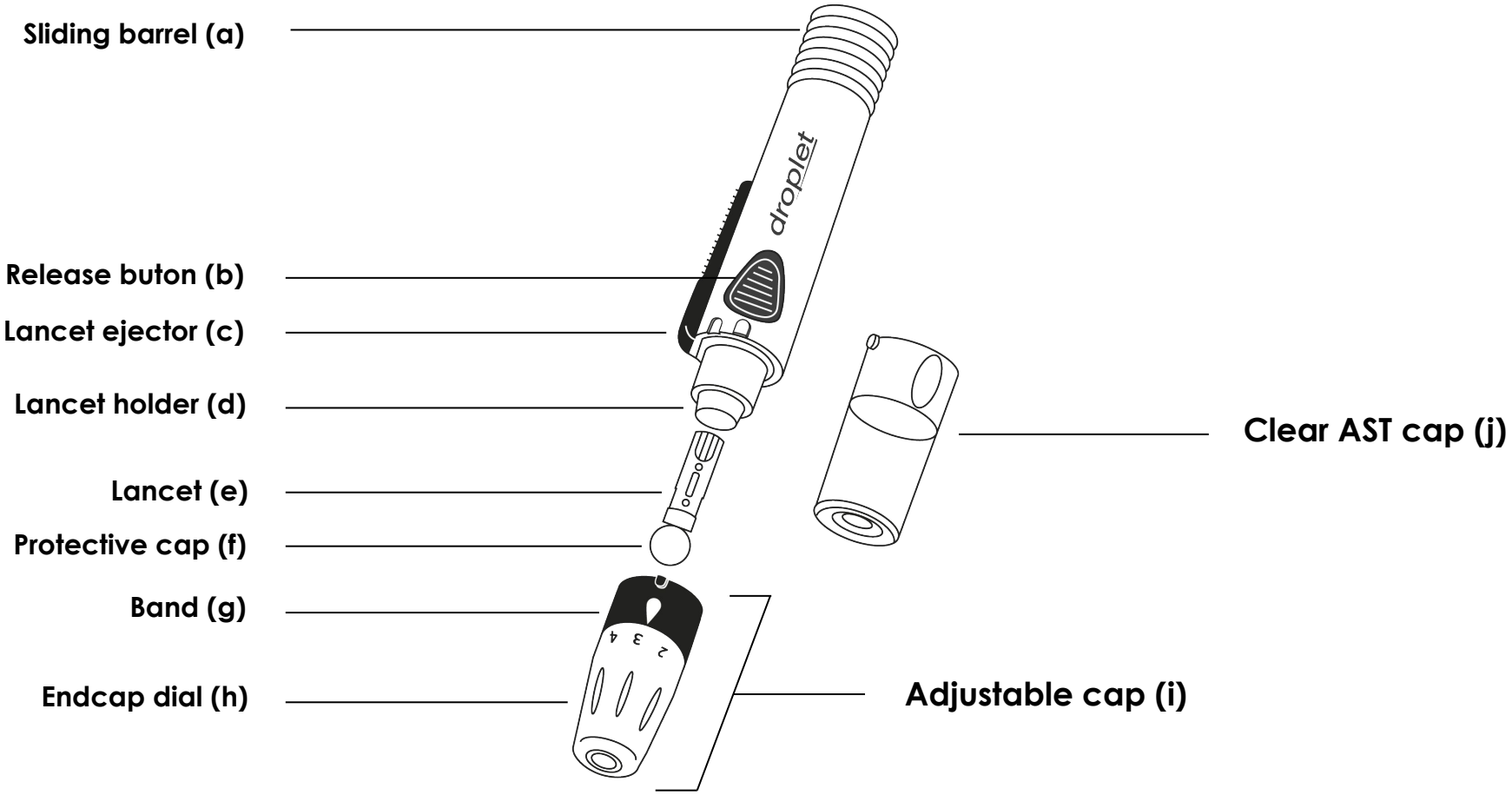
SELF-MONITORING OF BLOOD GLUCOSE

HOW TO USE PERSONAL LANCETS WITH LANCING DEVICE

KEY FEATURES:



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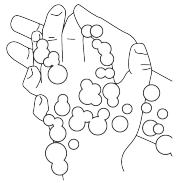
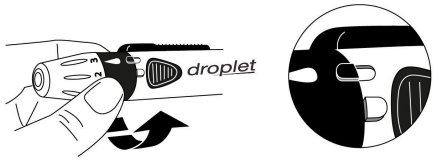
SELF-MONITORING OF BLOOD GLUCOSE

HOW TO USE PERSONAL LANCETS WITH LANCING DEVICE

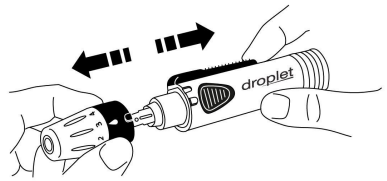
BEFORE USE:



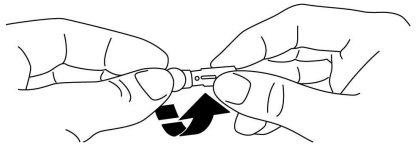
1 Wash your hands and puncture site thoroughly with soap and warm water and dry.



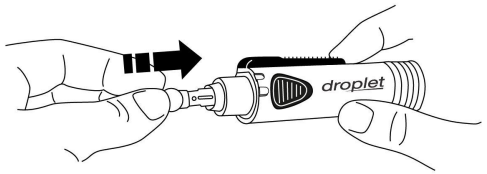
2 To unlock the device, twist the band (g), which is a part of the adjustable cap (i). The raised mark and indented mark line up as shown.



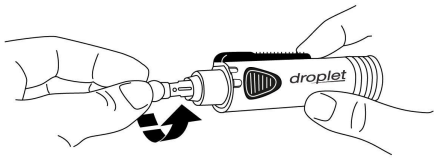
3 Pull off the adjustable cap (i).



4 Prepare a new, sterile lancet (e).
Do not remove the protective cap (f) from the lancet (e). Rotate it by ¼ (90 degrees).



5 Insert the lancet (e) into the lancing device. Push it until you hear a click. The release button (b) will raise.



6 Twist off the lancet protective cap (f) completely. Do not pull the lancet (e). Be careful not to touch the needle nor a release button (b).

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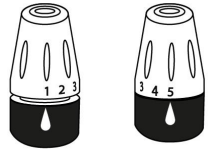
SELF-MONITORING OF BLOOD GLUCOSE

HOW TO USE PERSONAL LANCETS WITH LANCING DEVICE

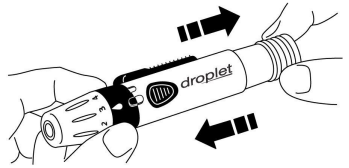
COLLECTING A BLOOD SAMPLE FROM THE FINGERTIP (WITH THE ADJUSTABLE CAP):

Use the adjustable cap (i). Do not use the clear AST cap (j).

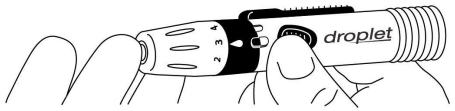
1 Put the adjustable cap (i) back on the lancing device and twist it on clockwise until it comes to a complete stop. You hear or feel a click and both raised marks line up as shown.



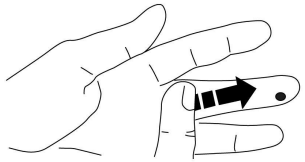
2 Set the puncture depth (from 1 to 5) by rotating the endcap dial (h).



3 Pull back the sliding barrel (a) and let it go in order to prepare the lancing device.



4 Press the lancing device against the chosen side of the finger and press the release button (b) **UNTIL THE DEVICE CLICKS.** (If the device does not puncture, reset by repeating Step 3).



5 To obtain a drop of blood, gently press the finger towards the puncture site. Do not press the puncture site!

6 After a drop of blood is obtained, perform the test.

7 Wipe the puncture side with a clean, dry tissue.

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SELF-MONITORING OF BLOOD GLUCOSE

HOW TO USE PERSONAL LANCETS WITH LANCING DEVICE

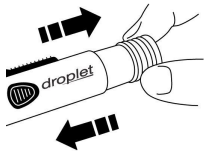
COLLECTING A BLOOD SAMPLE FROM THE ALTERNATE SITES (WITH THE AST CAP) - PALM:

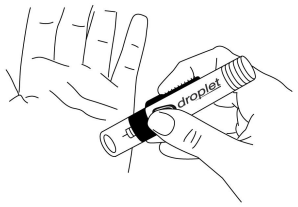
CAUTION: Do not use the clear AST cap (j) on your fingertips.

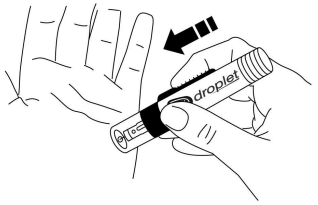
1. Follow the steps described in section BEFORE USE.

2. Instead of the adjustable cap (i), put **the AST cap (j)** on the lancing device. Twist it on clockwise until it comes to a complete stop. You hear or feel a click and both raised marks line up as shown.

3. Choose the puncture site on your palm according to the place indicated in the drawing. Avoid veins, moles, bones, and tendons.







4. Pull back the sliding barrel (a) and let it go in order to prepare the lancing device.

5. Press the lancing device against the chosen puncture site, then press the release button (b) **UNTIL THE DEVICE CLICKS**. (If the device does not puncture, reset by repeating Step 4.)

6. Do not take the device away from your palm. Maintain steady pressure until a small, round blood drop forms under the clear AST cap (j).

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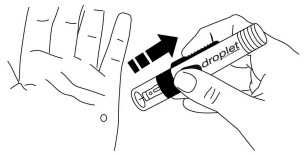
SELF-MONITORING OF BLOOD GLUCOSE

HOW TO USE PERSONAL LANCETS WITH LANCING DEVICE

COLLECTING A BLOOD SAMPLE FROM THE ALTERNATE SITES (WITH THE AST CAP) - PALM:

CAUTION: Do not use the clear AST cap (j) on your fingertips.



7 Lift the lancing device straight up and away from the skin without smearing the blood drop.

8 Perform the test.

9 Wipe the puncture site with a clean, dry tissue and maintain pressure on the site until the bleeding stops.

10 Follow the section EJECT THE LANCET FROM LANCING DEVICE.

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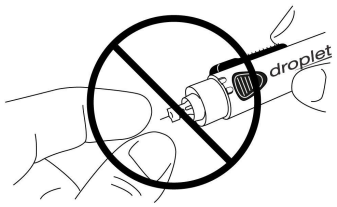
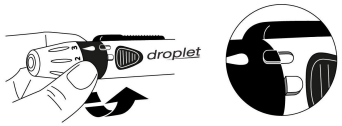
HOW TO USE PERSONAL LANCETS WITH LANCING DEVICE

EJECT THE LANCET FROM LANCING DEVICE

Do not use your fingers to remove the lancet (e) from the lancing device! Your lancing device has a lancet ejector (c).



Do not reuse lancets. Discard the used lancet safely as per local regulations



1

Twist the band (g), which is a part of the adjustable cap (i) or AST cap (j) so the raised mark and indented mark line up as shown in the picture. Pull off the adjustable cap (i) or AST cap (j).

2

Push the lancet ejector (c) forward to dispose of the used lancet (e) in a safe way until the lancet falls into the sharps container, then slide ejector (c) back.

3

Attach adjustable cap (i) or AST cap (j). Twist the band (g) or AST cap (j) to lock.

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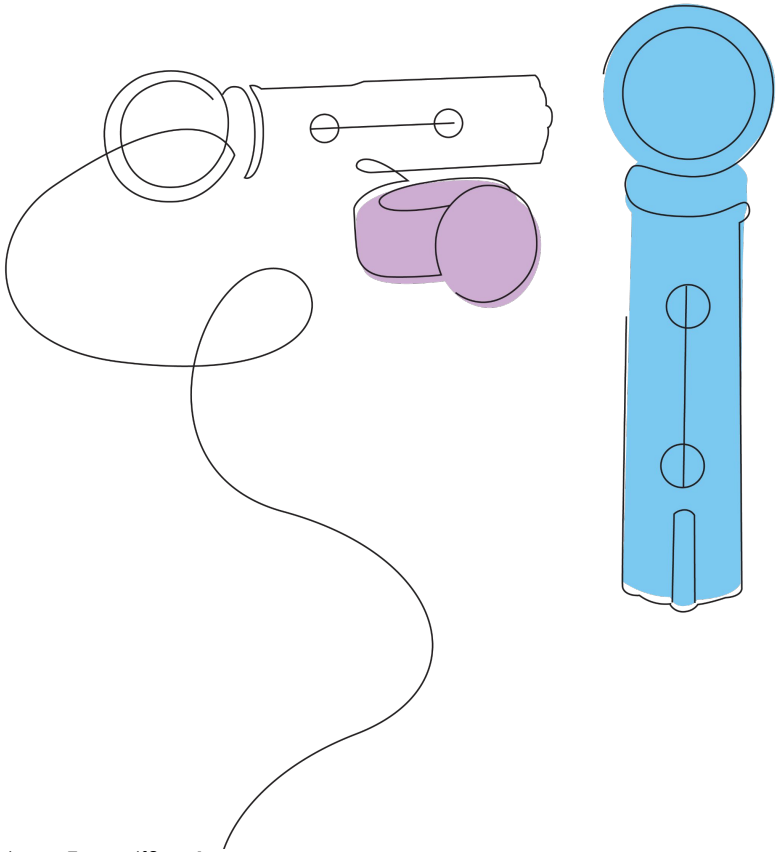
SELF-MONITORING OF BLOOD GLUCOSE

TIPS

- Your choice of a proper lancet version should be based on, among others, your BMI, skin type, region of origin, availability of lancets on the local market and your personal preferences.
- Remember to use a new lancet every time! Lancets are designed to be used only once, and then disposed of in a safe way.
- Re-usage of the lancets makes them dull or bend the tip of the lancet, causing bruising, bad wound closure and scarring.



13. Available on: http://www.euro.who.int/__data/assets/pdf_file/0005/268790/WHO-guidelines-on-drawing-blood-best-practices-in-phlebotomy-Eng.pdf?ua-1

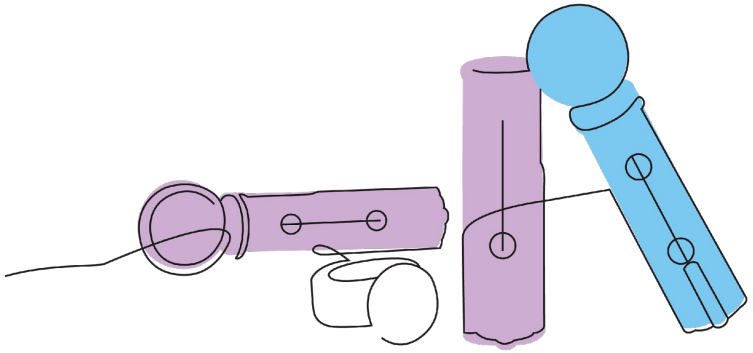
SELF-MONITORING OF BLOOD GLUCOSE

TIPS

SINGLE USE ONLY!

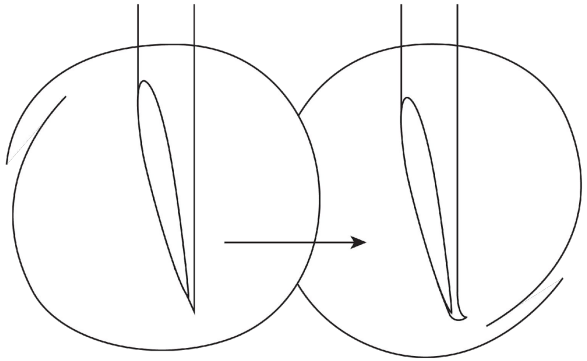
Personal lancets are sterile and for single use only.

Personal lancets should be used only once and disposed of in a sharps container.



RE-USAGE CAN:

- Dull or bend the tip, causing bleeding, bruising, or scarring
- Increase the risk of infection because the needle is no longer sterile
- Residual pain, bad wound closure, and compromised wound healing (e.g., scarring)



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SUMMARY

- Pricking the fingers is an integral part of self-monitoring of blood glucose and part of everyday life for millions of people with diabetes.
- Pricking the fingertips is usually connected with discomfort and pain – due to higher amount of nerve endings at the fingertips, than on any other spot on the human body.
- Finger pricks rotation helps to reduce the chance of feeling pain during finger pricking.
- AST testing may be particularly useful for people who require daily multiple blood glucose testing. However, restrictions to AST apply.
- droplet® personal lancets & droplet® lancing device are intended to be used for capillary blood sampling.
- You should always consult your physician for diagnosis and treatment and the choice of proper medical device, capillary blood sampling technique and test sites.

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THANK YOU

HTL-STREFA S.A.
ul. Adamówek 7
95-035 Ozorków
info@htl-strefa.pl
www.htl-strefa.com

www.mtdglobal.com

HTL STREFA
high tech lab
a company of MTD Group

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