

MESI mTABLET TBI

Essential guide



Please note that ABI is recommended as a first step in arterial assessment. TBI is most effective when performed on patients with non-compressible arteries (diabetology and nephrology) and when no cuffs can be placed on the ankles (i.e. extensive wounds, lymphedema).

TBI measurements may only be performed by medical professionals who have received appropriate device use training.

The quality of the measurement can be affected by the patient's amount of rest, anatomy, toe temperature, cuff size and cuff placement. In the case of a result that seems unusual or inconsistent with the patient's anamnesis, the measurement should be repeated.

TBI measurement is one of the initial steps in arterial assessment. For a full diagnosis, further arterial assessments need to be performed.

Environment

- > Perform the measurement in a **warm room** (21-25 °C / 70-77 °F).
- > **Warm up** the patient's toes to prevent vasoconstriction (27-28 °C / 80-82 °F is optimal).
- > The toes **should not be hyperextended** or flexed. Muscle tightening can impair the blood flow, which can lead to an abnormal result in a healthy patient or to signals flatlining.
- > **Keep the light conditions the same** – do not walk behind the toes during the measurement, do not close or open the blinds. Try covering up the toes with a towel/blanket to prevent the light conditions from changing.
- > Have the patient in **as supine a position as possible**; let them rest for a few minutes while you place the cuffs and the probes.

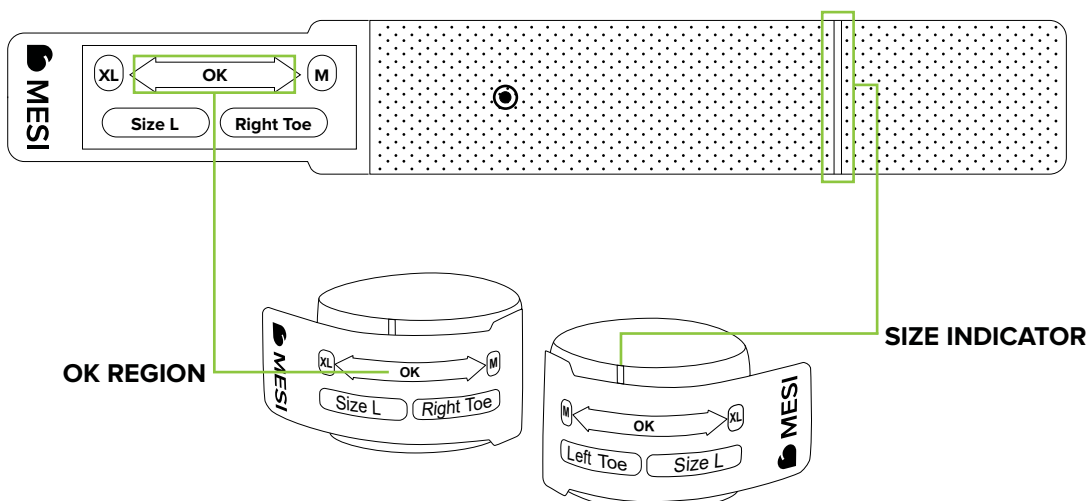
Toe selection

The toe cuff is usually placed **on the big toes**. If the patient has a missing big toe, place the cuffs on the second toe on both feet instead.

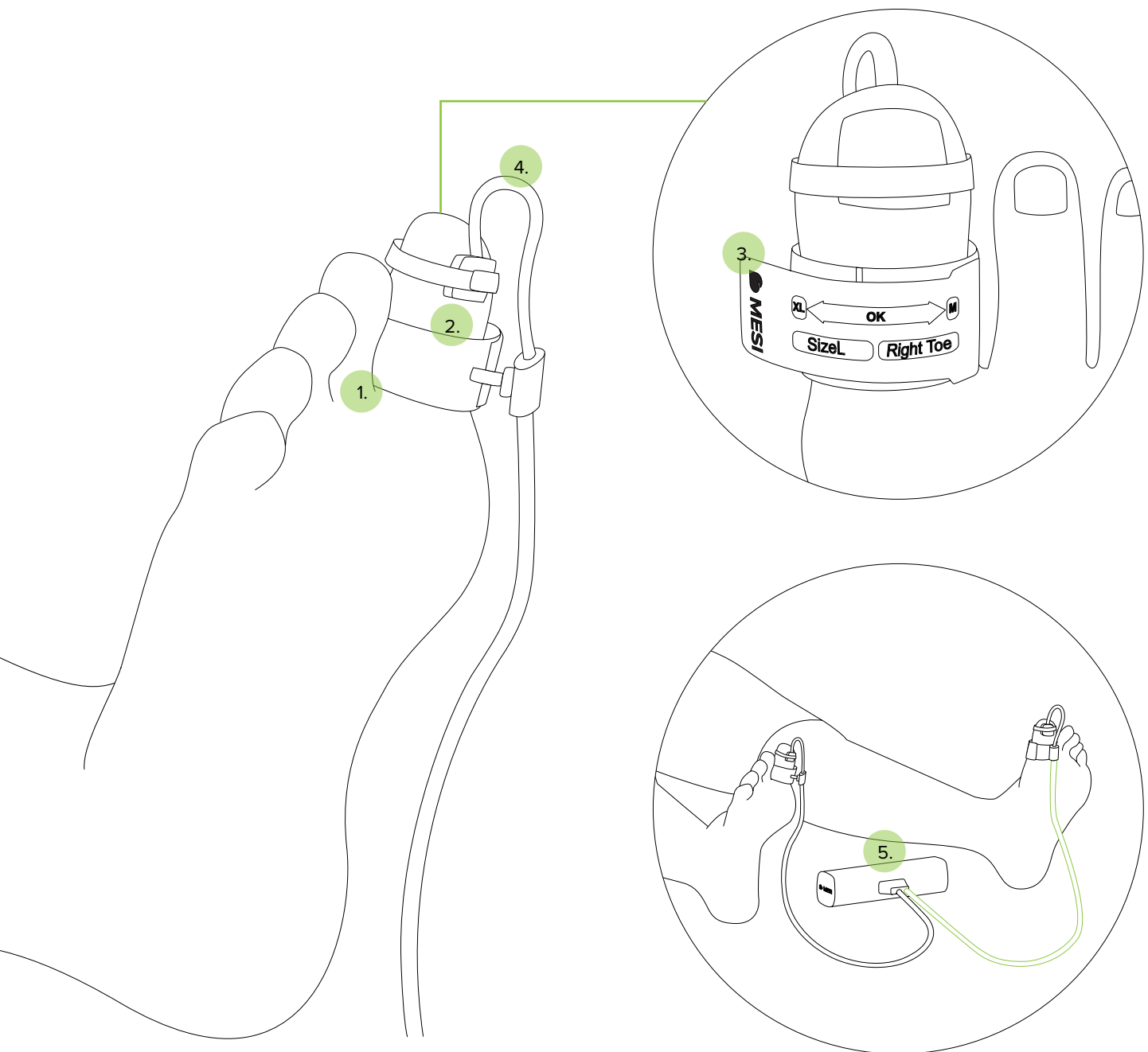
Cuff and probe placement

Use the correct cuff size. You can determine it with **SIZE INDICATOR** (white line) on the cuff. If it is in the **OK REGION**, you have chosen the right size. If the size indicator is not in the OK region, please consider changing it to a bigger cuff.

When changing the cuff, follow the proper instructions on page 8.



Before the measurement



1. The cuff should be positioned at the **bottom of the toe** to ensure there is enough space for the probe.

2. The cuff should be facing the **soft/bottom part** of the toe.

3. **Fasten the cuff sufficiently:** the bladder must momentarily block the blood flow in the artery, but shouldn't cause the toe to change colour.

4. Bend the probe cable to make an **arch towards the soft part of the toe**. The entire surface of the probe has to be in contact with the skin, snug against the toe.

5. The module should be placed **between the legs**, with the tubes facing outwards.



After placing the cuffs and the probe, run the measurement by clicking **CONTINUE**.

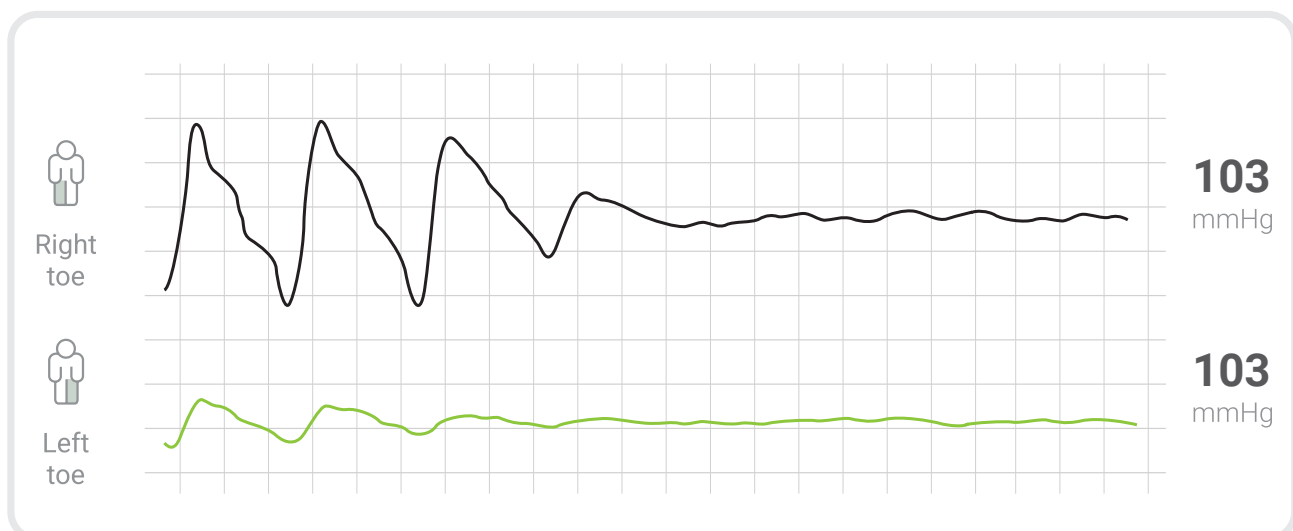
1. Wait for a few seconds for the signal strength amplitudes to adapt on their own OR amplify them manually by pressing the (-) and (+) buttons.
2. The amplitudes should span across 3-4 squares.
3. Once the waveforms are stabilised, press **START**.

During the measurement




During the measurement, verify if the toe waveforms have gradually become smaller and flatlined before they reappear as the cuff deflates.

If they fail to do so, check if you have used the **correct cuff size** and fastened the cuff sufficiently.



At the end of the measurement

Before confirming the automatically selected waveform at the end of the measurement, you have the option to re-position the caliper manually and select a different return point of the blood flow by moving the caliper left or right. This is necessary if the patient has accidentally moved their toe during the measurement.

For repositioning the caliper, use the caliper tool. In order to see the automatic selection again, press the  button.



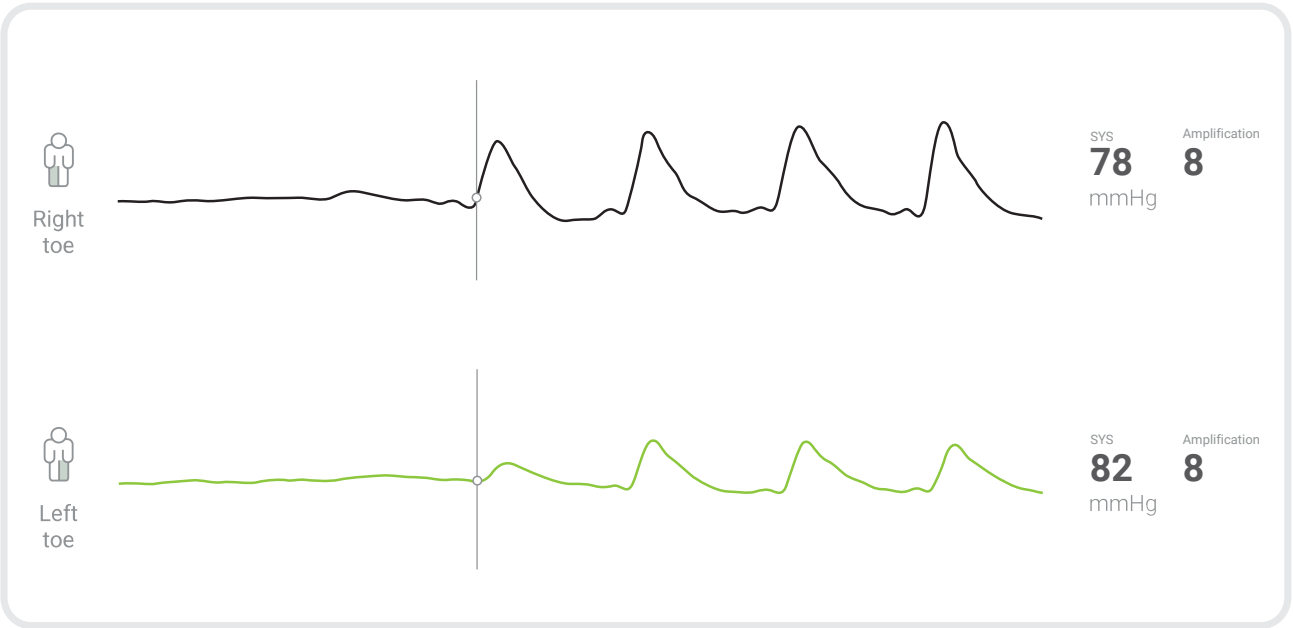
Correct positioning of the caliper

The caliper should be positioned at the beginning of the first clearly visible waveform, i.e. the first waveform denoting the beginning of a clear pulse pattern. Each next waveform is similar or larger in shape.

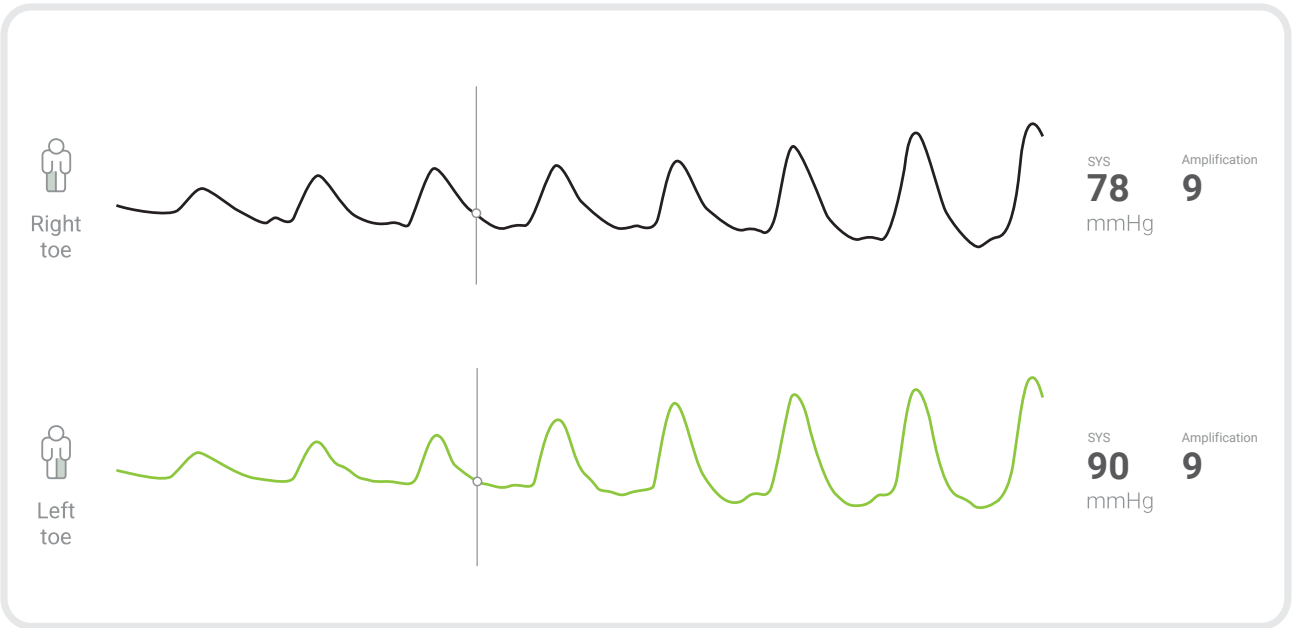
However, the device might take the “wrong” waveform as the first one. This happens if the cuffs were not tightened sufficiently and the waveforms didn’t disappear and re-appear, or if the patient moved at any point. In this case, the caliper should be adjusted manually.

The caliper **SHOULD NOT** be positioned on a random waveform somewhere on the graph. This always affects the calculated result; the consequence can be a wrong TBI calculation. Please make sure you review the waveform and the automatic selection, and adjust it before confirming the result.

Example of **correct** caliper positioning



Example of **wrong** caliper positioning

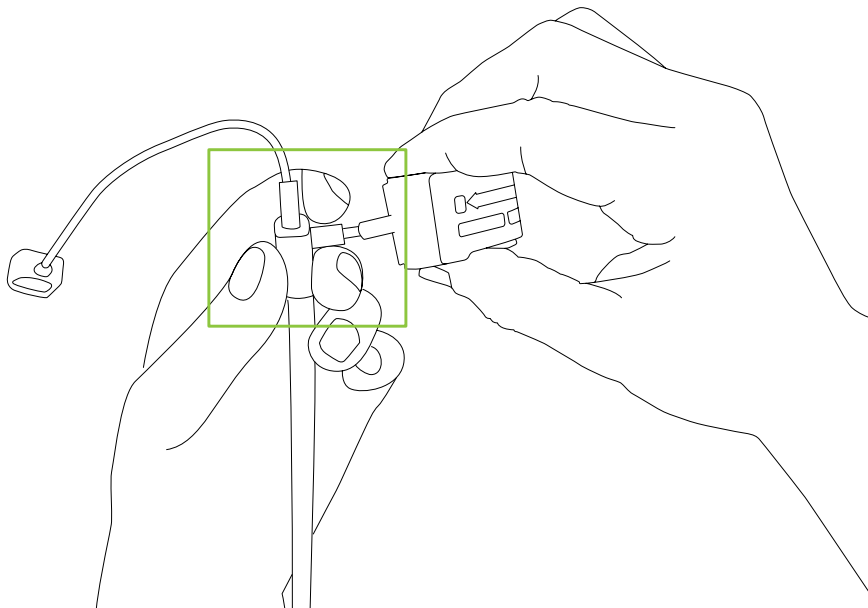


Troubleshooting

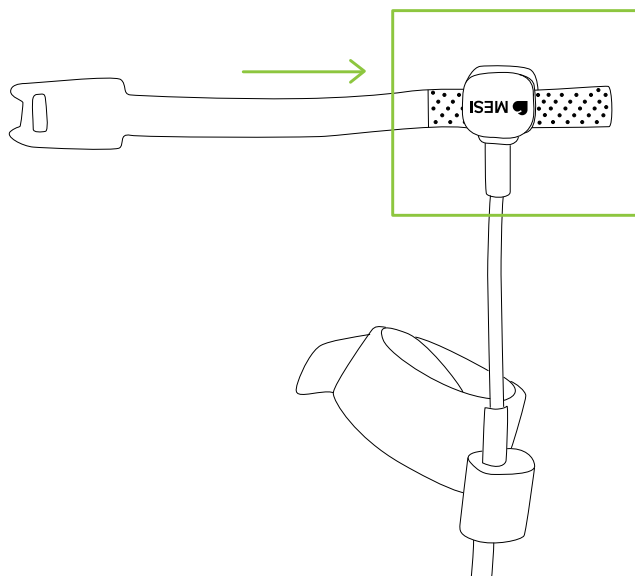
TOE CUFF CHANGING

The toe cuffs should be changed properly to prevent damage to the tubes. When removing a cuff from a tube, do not pull at the cuff. Pinch the white holder between your index and middle fingers and secure the holder's side with your thumb. Then, pull the cuff out of the tube.

When placing the cuff on the tube, make sure that the text on the cuff faces the patient. When standing at the patient's feet, you should see it turned upside down. Turning the cuff this way enables easier cuff tightening.



Use of fastener (velcro) strap for the probe: When sliding the velcro strap through the probe, make sure that the smooth and not the velcro side is facing you. Pull the strap all the way, insert it into the loop in the strap and put the velcro sides together.

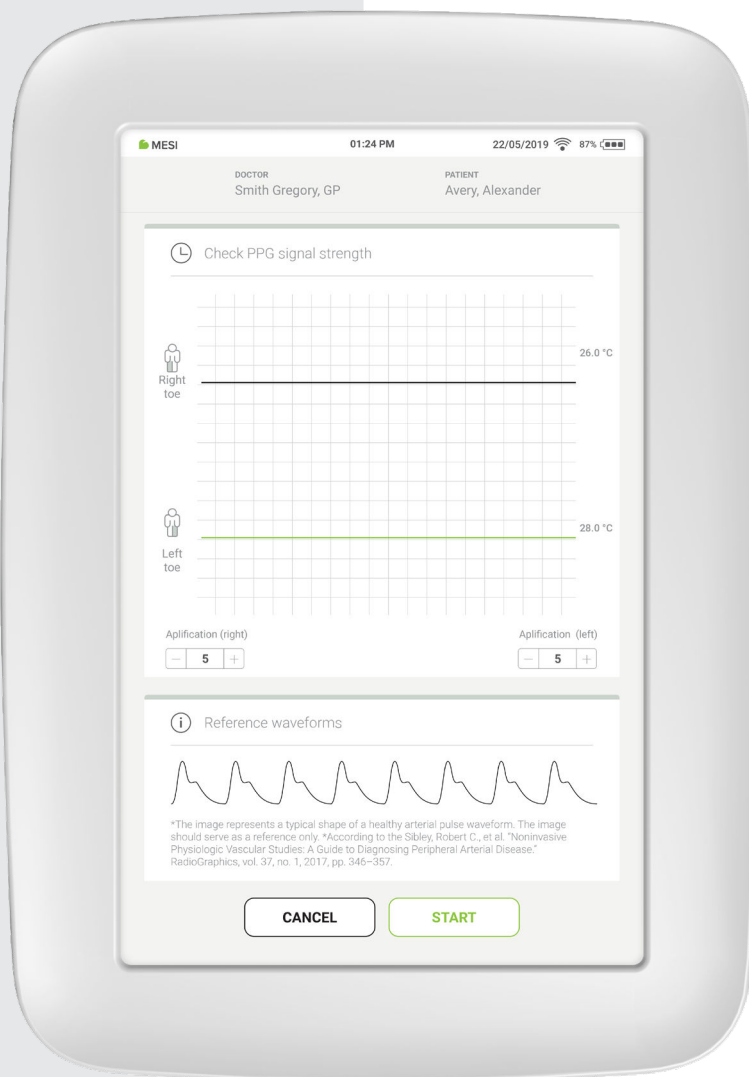


BEFORE STARTING THE MEASUREMENT

No waveform

After selecting the TBI measurement and pressing CONTINUE, no waveforms appear; the lines are flat. Follow these steps:

- Check the connection from cable to the module.
- Check the temperature of the toes and warm them up if necessary.
- Cover the feet with a blanket/towel to make the light conditions consistent.
- Positioning the PPG sensor can influence the measurement result, so it is important to try out several positions before finding the optimal signal strength. In this, the PPG sensor should be held at a certain area for at least a few seconds before changing its position.
- Loosen the toe cuff (reduce the occlusion of non-inflated cuff).
- Check the placement of the toe cuffs.
- Loosen/tighten the fastener strap of the PPG probe (reduce the pressure of the probe to the toe).
- Make sure the probe cable is not bent too much.
- Advise patient not to move during the measurement.



DURING THE MEASUREMENT

No flatline

- Check the size of the cuff. If it is too small, use a bigger cuff.
- The cuff might not be tightened sufficiently. Try tightening it more.

Inflation error

- Check the connection of the toe cuff to the pressure hose.
- Check the cable connection with the module.
- Make sure the toe cuffs are not damaged.
- Make sure you are using the correct size of the toe cuff.
- Tighten the toe cuff.
- Check the connection of the arm cuff with the module.
- Make sure the arm cuffs are not damaged.
- Make sure you are using the correct size of the arm cuff.
- Tighten the arm cuff.

AFTER THE MEASUREMENT

Result over 1.0 marked in green

Toe pressures are lower than arm pressures. For this reason, the result should be verified and the measurement retaken. In this case, check the tips above on caliper positioning and any physical interferences during the measurement.

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