Figure 3. Foot examination and main objective tests for risk stratification

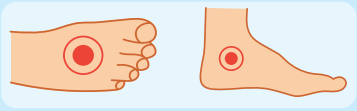
Deformity / Callus

Callus | Charcot neuro-osteoarthropathy | Mallet toe | Hammer toe | Claw toe | Hallux valgus | Pes cavus | Pes equinus | Prominent metatarsal heads

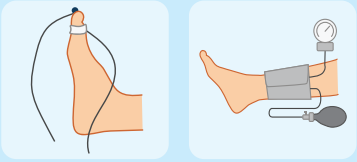
- Inspect both feet thoroughly by examining skin integrity, especially areas with callus or deformity.
- Look for deformity that increases rubbing in footwear or pressure.

  For example:
  - Charcot neuro-osteoarthropathy (rocker-bottom foot)
  - Mallet, hammer or claw toe
  - Hallux valgus (bunion)
  - Pes cavus (high arch) or pes equinus
  - Prominent metatarsal heads

PAD



Dorsalis pedis | Posterior tibal



TBPI | ABPI

Complementary tests include toe pressure and doppler waveform analysis (see Figure 2).

More details on doppler waveform analysis are available in the 2023 IWGDF Practical Guidelines[21]

- Palpate **pedal pulses** (dorsalis pedis and posterior tibial) on each foot.
- If any pedal pulse is absent:

TBPI

- Measure absolute systolic toe pressure of each big toe.
- Measure systolic brachial pressure of each arm.
- Calculate TBPI with the following formula:

$$\text{TBPI of each toe} = \frac{\text{absolute systolic toe pressure for each big toe}}{\text{higher of systolic brachial pressure between both arms}}$$

OR

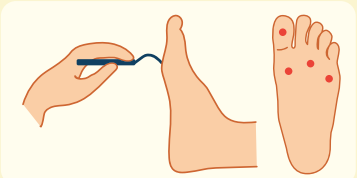
ABPI

- Measure systolic ankle pressures (at dorsalis pedis and posterior tibial) of each foot.
- Measure systolic brachial pressure of each arm.
- Calculate ABPI with the following formula:

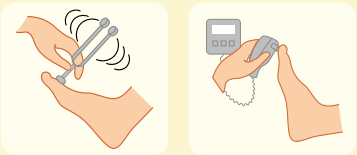
$$\text{ABPI of each foot} = \frac{\text{dorsalis pedis or posterior tibial ankle pressure for each foot}}{\text{higher of systolic brachial pressure between both arms}}$$

Note: Traditionally, most guidelines calculate ABPI using the higher of dorsalis pedis or posterior tibial ankle pressure for each foot.[13,22-24] Conversely, the 2023 IWGDF guideline[25] recommends using the lower of the ankle pressures for slightly improved diagnostic accuracy.[26] Clinician discretion should be applied when choosing to use the higher or lower of the ankle pressures, in the context of individual patient circumstances for risk assessment of developing DFU and to avoid unnecessary referrals.

Neuropathy



10 g monofilament



128 Hz tuning fork | Neurothesiometer

10 g monofilament

- Ask patient to close both eyes.
- Apply pressure with a 10 g monofilament on back of patient's hand until the monofilament buckles. This will be the baseline sensation for subsequent comparison.
- Assess plantar region of first, third, and fifth metatarsal heads, and the big toe of each foot – a total of eight sites across both feet. Avoid applying the filament directly on any ulcer, callus, or scar.
- Ask patient to inform examiner whenever pressure is felt.

OR

128 Hz tuning fork

- Ask patient to close both eyes.
- Touch the back of patient's hand with an activated 128 Hz tuning fork. This will be the baseline sensation for subsequent comparison.
- Place an activated 128 Hz tuning fork over the interphalangeal joint of each big toe.
- Ask patient to inform examiner if vibration is felt.

Neurothesiometer

- Turn on the neurothesiometer and touch the probe to the back of the patient's hand. This will be the baseline sensation.
- Place the neurothesiometer probe at the distal tip of each big toe.
- Begin at 0 V, increasing voltage gradually until patient feels vibration.
- Take three measurements and average the readings.

Alternative tests when the above three tests are not available include Ipswich touch test[21] and pin prick test[27] (see Figure 2).

Ipswich touch test:

- *Ask patient to close both eyes.*
- *With the tip of index finger, lightly sequentially touch the tips of the first, third, and fifth toes of both feet for 1–2s (do not push, tap or poke).*
- *Ask patient to inform examiner whenever touch is felt.*

Pin prick test:

- *Ask patient to close both eyes.*
- *Apply a disposable pin or toothpick just proximal to the toenail of the big toe, with just enough pressure to deform the skin.*
- *Ask patient to inform examiner when pinprick sensation is felt.*

ABPI, ankle-brachial pressure index; PAD, peripheral arterial disease; TBPI, toe-brachial pressure index