



How to Interpret Podium Foot Scans





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Podium images and their meaning

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PART 3

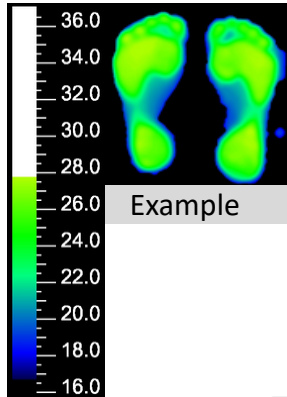
Case studies



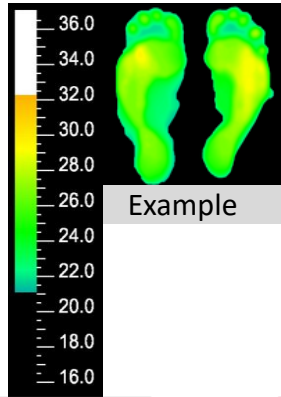
Colour Scales

The Fixed Scales

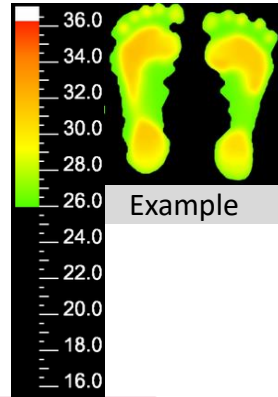
- The fixed scales always show the same colours for the same temperatures
- There are 3 scales, one for each plate:



Cold



Medium



Warm

Advantage:

- easy to compare scans from different dates and different patients

Disadvantage:

- difficult to see small temperature differences

When to use:

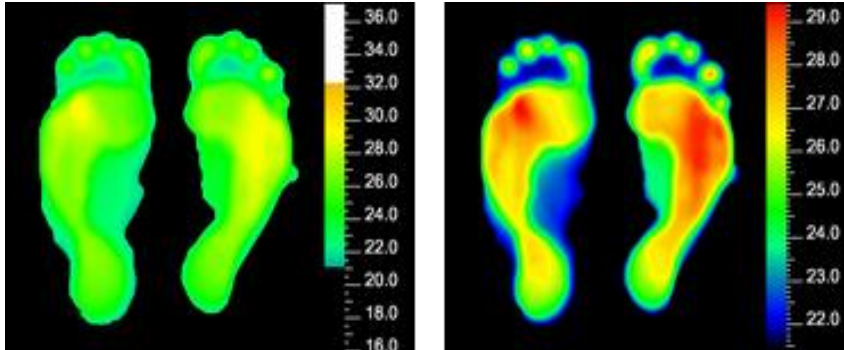
Use fixed scales to compare scans from different dates or different patients



Colour Scales

The Dynamic Scale

- The dynamic scales stretches all available colours between the coldest (dark blue) and hottest (red) parts of a scan, maximising contrast.



Static Scale

Dynamic Scale

Both images show exactly the same foot

Advantage:

- easy to see small temperature differences

Disadvantage:

- difficult to compare scans from different dates / patients
- chance of misinterpretation (e.g. red does not necessarily mean “hot” as in the example image shown here)

When to use:

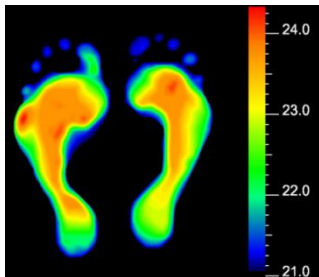
Use the dynamic scale to see small temperature differences in a scan



Histogram Statistics

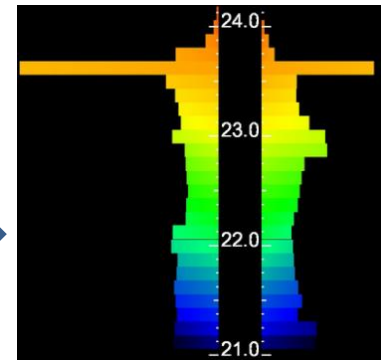
What is a Histogram

- A temperature histogram is made of several “buckets”, shown as horizontal bars.
- Each bucket represents a temperature range, e.g. 20.0 °C to 20.2 °C, and is shown in the colour of that range.
- Every pixel from a foot scan image is counted into its respective bucket. The more pixels, the larger the bucket colour bar.
- Podium produces 2 histograms for each scan – one for the left and one for the right foot. They are shown side by side.



Source Image

Colour/ Temperature	Left Foot Buckets	Right Foot Buckets
24.2-23.4 °C	10 pixels	5 pixels
23.7-23.7 °C	500 pixels	230 pixels
22.5 -22.6 °C	100 pixels	110 pixels
21.4 -22.5 °C	90 pixels	180 pixels



Histogram



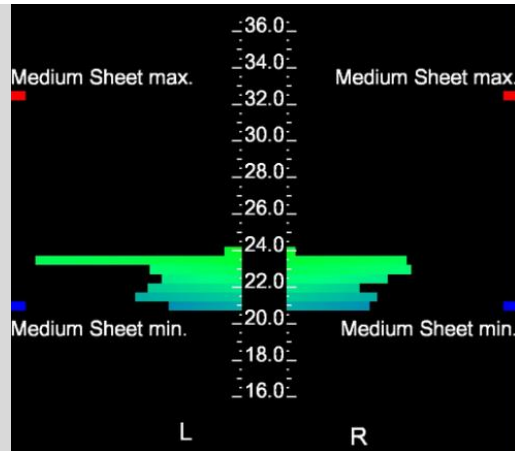
Histogram Statistics

The Fixed vs. the Dynamic Histogram

- Both histogram types show exactly the same information
- The dynamic histogram (like the dynamic scan) stretches the buckets and colours only over those temperatures that are present in the scan. The fixed histogram uses a fixed range
- Advantages & disadvantages are the same as with dynamic and fixed scans (i.e. easy to compare vs. higher resolution)

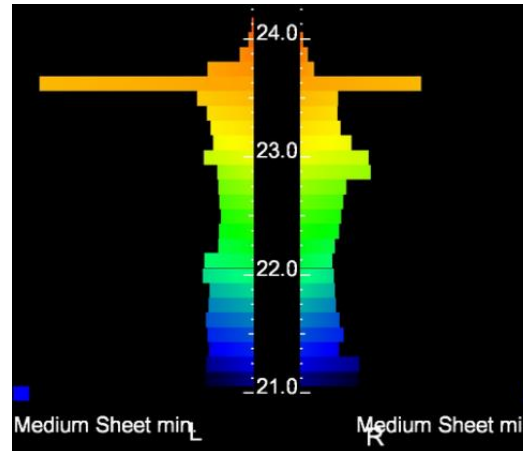
Fixed Scale

- more easy to compare
- lower resolution



Dynamic Scale

- more difficult to compare
- higher resolution
- potential for misinterpretation (red may not be "very hot" - as shown here)





Histogram Statistics

The Visual Image

In the visual image look out for:



- foreign bodies
- skin cuts & cracks
- discolouration, bruises
- wounds, injuries

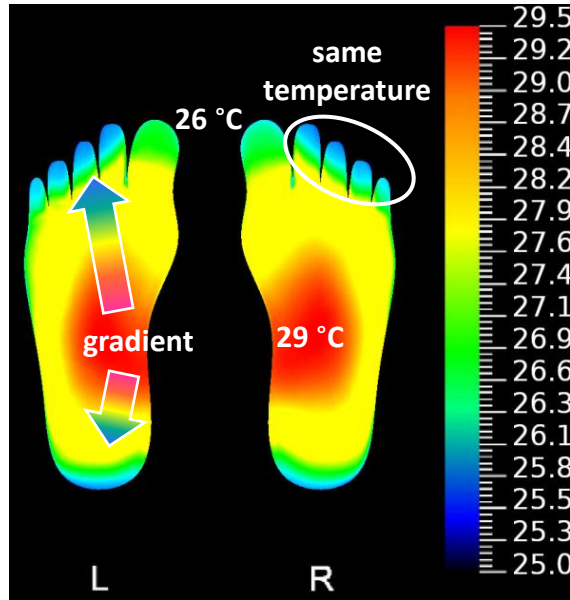
- expect to see healthy blanching of the skin where it touches the foot plate. Absence of blanching may indicate problems such as neuropathy.
- Some features could simply be dirt or fluff (as shown in the left foot here)



Interpreting the Results

The Normal Foot

The temperature distribution in a normal foot is characterised by:



- very good **left-right (contralateral) symmetry** with point-to-point differences of less than 1.8 °C (usually much less)
- the temperature **gradient from medial arch to toe and heel** is positive with the gradient between ca. 0 °C and 7 °C
- 2nd to 5th **toes** have approx. the **same temperature**
- **No hot spots**, no extended **cold areas**
- **Average foot temperature** 26 °C (at the toes) to 29 °C (at the medial arch)

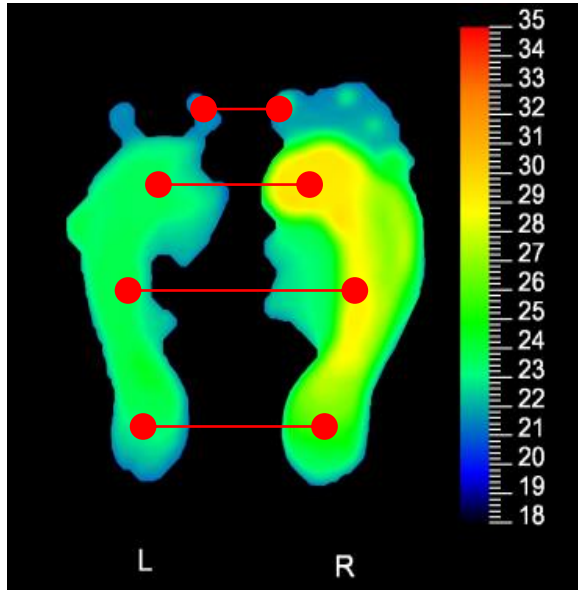
Any deviation from the above may be a cause of concern



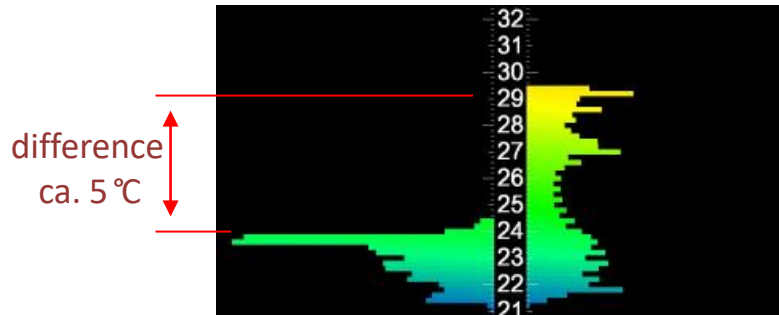
Interpreting the Results

Contralateral Symmetry Breach

A breach in contralateral symmetry may indicate an underlying problem:



- In the scan compare left/right temperatures point-by-point (e.g. big toe left vs. big toe right, heel centre left vs. heel centre right)
- A difference of **more than 2 °C** is indicative of a problem
- The histogram helps to do the assessment (note that the histogram does not compare point-by-point, just the overall symmetry)

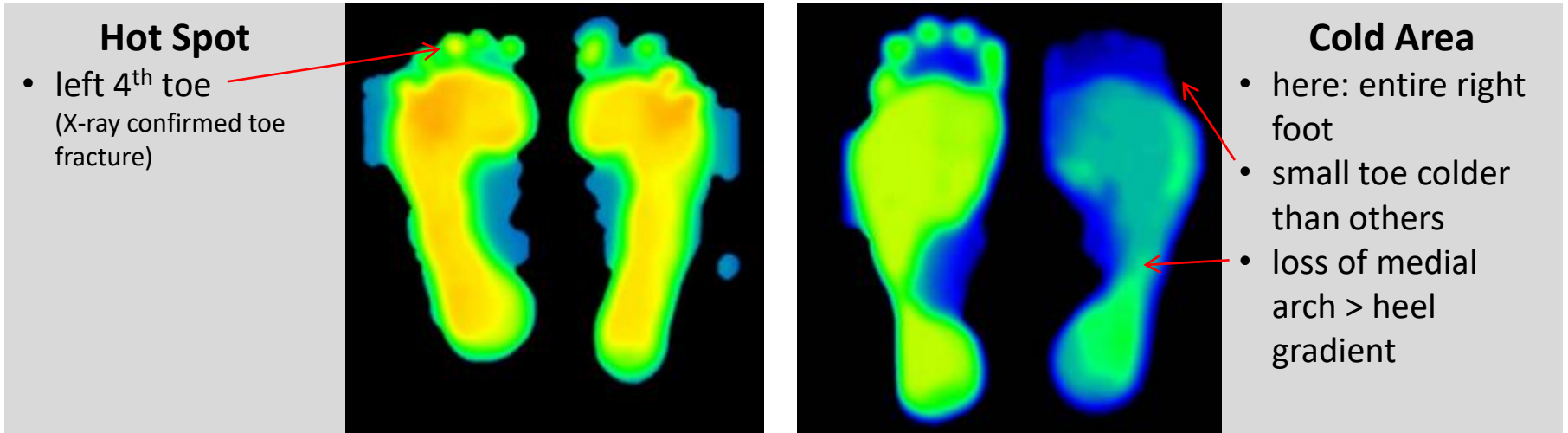




Interpreting the Results

Hot Spots / Cold Areas

- Isolated hot spots could be a sign of localised inflammation
- Cold areas point towards problems with blood supply

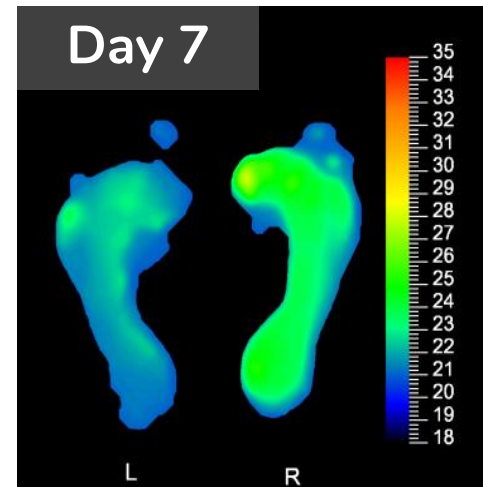
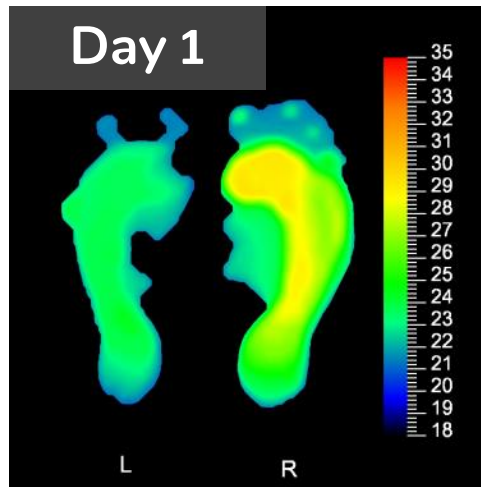




Interpreting the Results

Changes over time

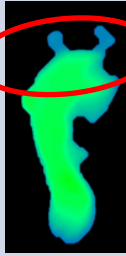
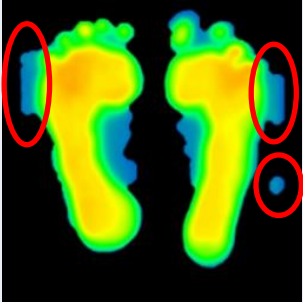
- Difficult to standardise (patients may be overall warmer or colder on different days, different shoes or socks, nicotine, caffeine, room temperature, time between socks off and scan, etc)
- Therefore focus on comparing patterns, not so much absolute temperatures
- Useful for monitoring impact of treatment. Example:





Interpreting the Results

Pitfalls

Feature	Reasons	Action	Appearance
“Amputated” toes	<ol style="list-style-type: none"><li data-bbox="392 401 929 445">1. Toes do not touch plate<li data-bbox="392 516 842 674">2. Toes at same temperature as the plate	<p data-bbox="981 401 1340 445">Press down gently</p> <p data-bbox="981 516 1315 620">Cool plate or use different plate</p>	
Phantom areas at lateral aspects	Internal reflections	Ignore (also in histogram)	



Case Study #1

Patient

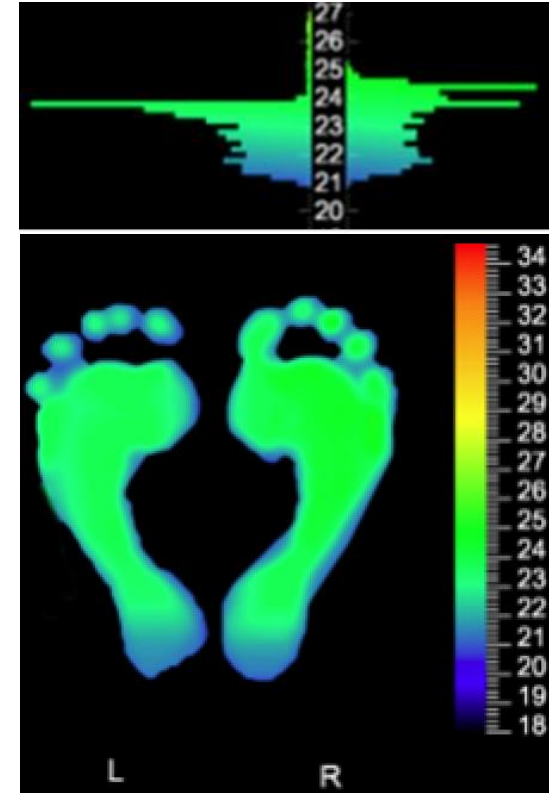
- 65, male
- Parkinson for 4 years, frequent falls
- footcare difficulties
- wears custom made orthoses

Non-Thermal Assessment

- reduction in pedal pulse
- loss of sensory perception
- excessive load on heels on stance

Thermal Assessment

- good contralateral symmetry
- no hot spots
- missing medial arch > toe gradient



moved to 3-month follow-up



Case Study #2

Patient

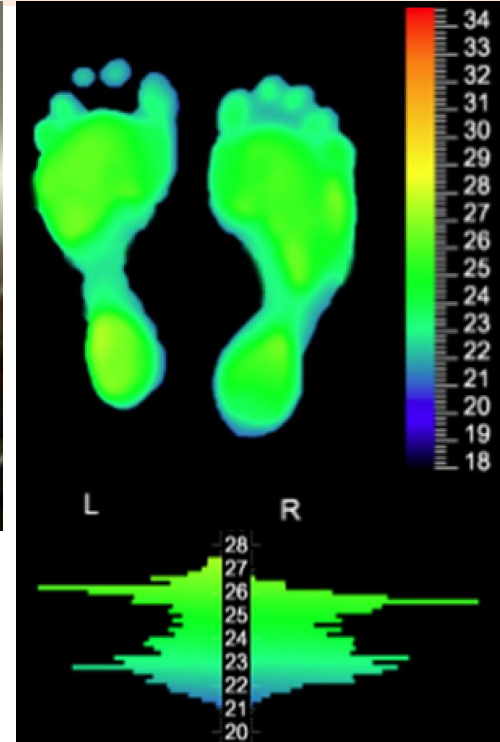
- 68, male
- Pre-diabetic
- footcare difficulties, can't reach feet
- normal footwear

Non-Thermal Assessment

- reduction in right pedal pulse, with monophasic dorsal pedis & tibial artery flows
- biphasic left

Thermal Assessment

- left foot slightly warmer (ca. 0.5 °C)
- reduced medial arch > toe gradient



Patient referred for duplex scan



Case Study #3

Patient

- 55, male
- pre-diabetes
- suffers from gout

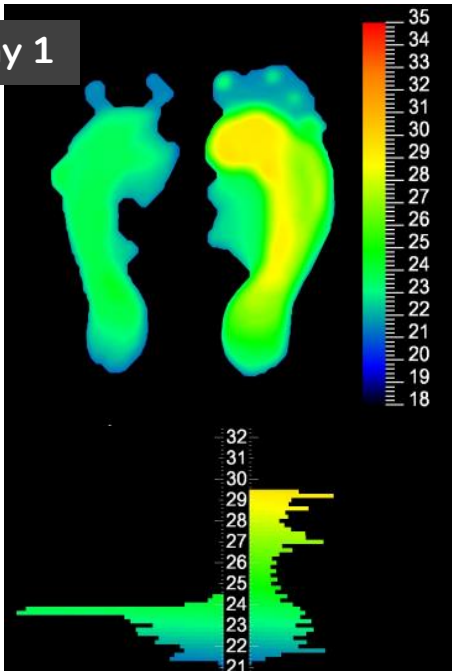
Non-Thermal Assessment

- normal pulse, biphasic
- good sensory perception
- reports painful right foot

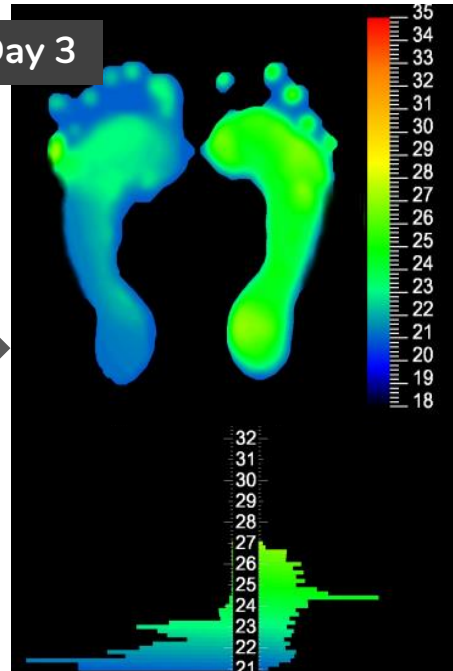
Thermal Assessment

- Day 1: right foot warmer (ca. 5 °C)
- strong asymmetry
- Day 5: (hot day) symmetry restored

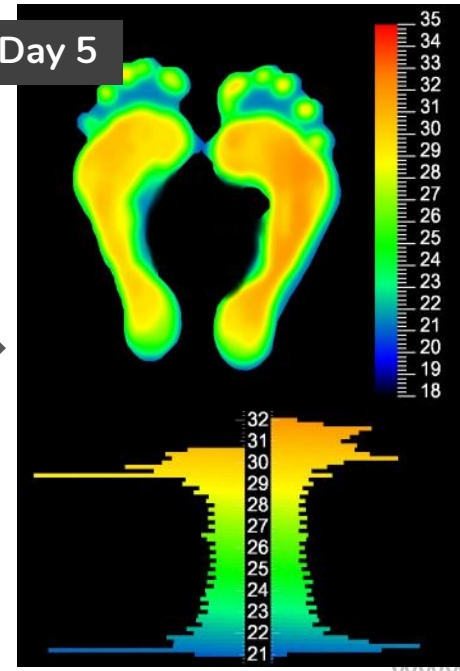
Day 1



Day 3



Day 5





Case Study #4

Patient

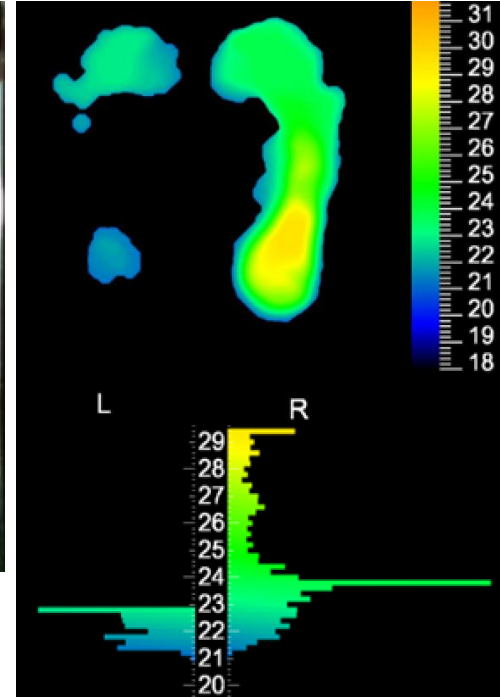
- 77, male
- neuropathy, osteoporosis
- fall > broken arm > bed rest > ulcer big toe (R)
- amputated ulcer 5th metatarsal joint (R)

Non-Thermal Assessment

- reduction in pedal pulse
- no sensory perception
- right foot swollen

Thermal Assessment

- right foot much warmer (ca. 6°C)
- inverted medial arch > toe gradient (R)



Images clear indication for urgent need of medical attention



Summary

- The healthy foot
 - thermally symmetrical
 - medial arch → toe/heel temperature gradient
 - not hot spots or cold areas
- Any deviation from the normal foot may indicate a pathological state (Podium is not a diagnostic tool)
- The pathological foot – watch out for
 - asymmetry
 - unusual temperature gradients
 - hot spots / cold areas
 - unexplained changes over time

