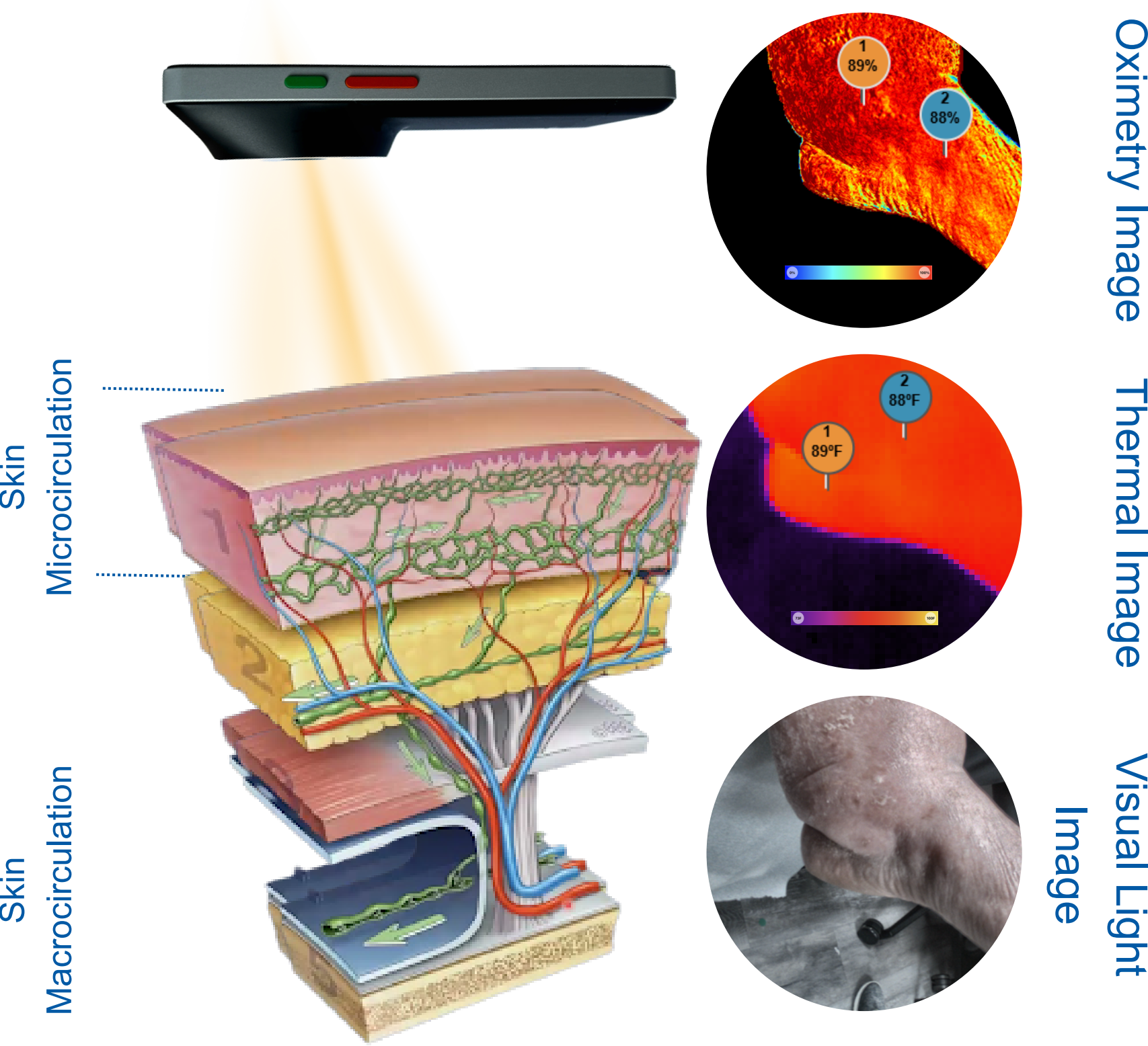


Introduction

Chronic wounds—including venous leg ulcers (VLU)—impact up to 10.5 million Medicare beneficiaries, or 2.5% of the total population of the United States.¹ Adequate tissue perfusion is critical for healing.²⁻³ Yet standard vascular diagnostics (Ankle-Brachial Index [ABI], Toe-Brachial Index [TBI], Transcutaneous Oxygen Pressure [TcPO₂], and Doppler ultrasound) often fall short in assessing real-time microvascular status at the wound bed. Multispectral near-infrared spectroscopy (NIRS) imaging noninvasively measures tissue oxygen saturation (StO₂) in real time at and around the wound bed. While promising, its correlation with conventional diagnostics remains underexplored. This study aims to close gaps in microvascular assessment to enhance equity and outcomes in wound care. It evaluates the correlation between NIRS-derived tissue oxygen saturation (StO₂) and standard vascular diagnostic tests, and explores the added value of a multimodal approach combining infrared (IR) thermography and digital photography.



Schematic Illustration of Skin Layers and Circulation Types (left) with Multimodal Imaging of the Medial Foot (right).

- Microcirculation - blood flow through the smallest vessels responsible for oxygen exchange at the tissue level. Oximetry image shows tissue oxygenation, representing microcirculatory function.
- Macrocirculation - blood flow in larger vessels that transport blood to and from tissues.

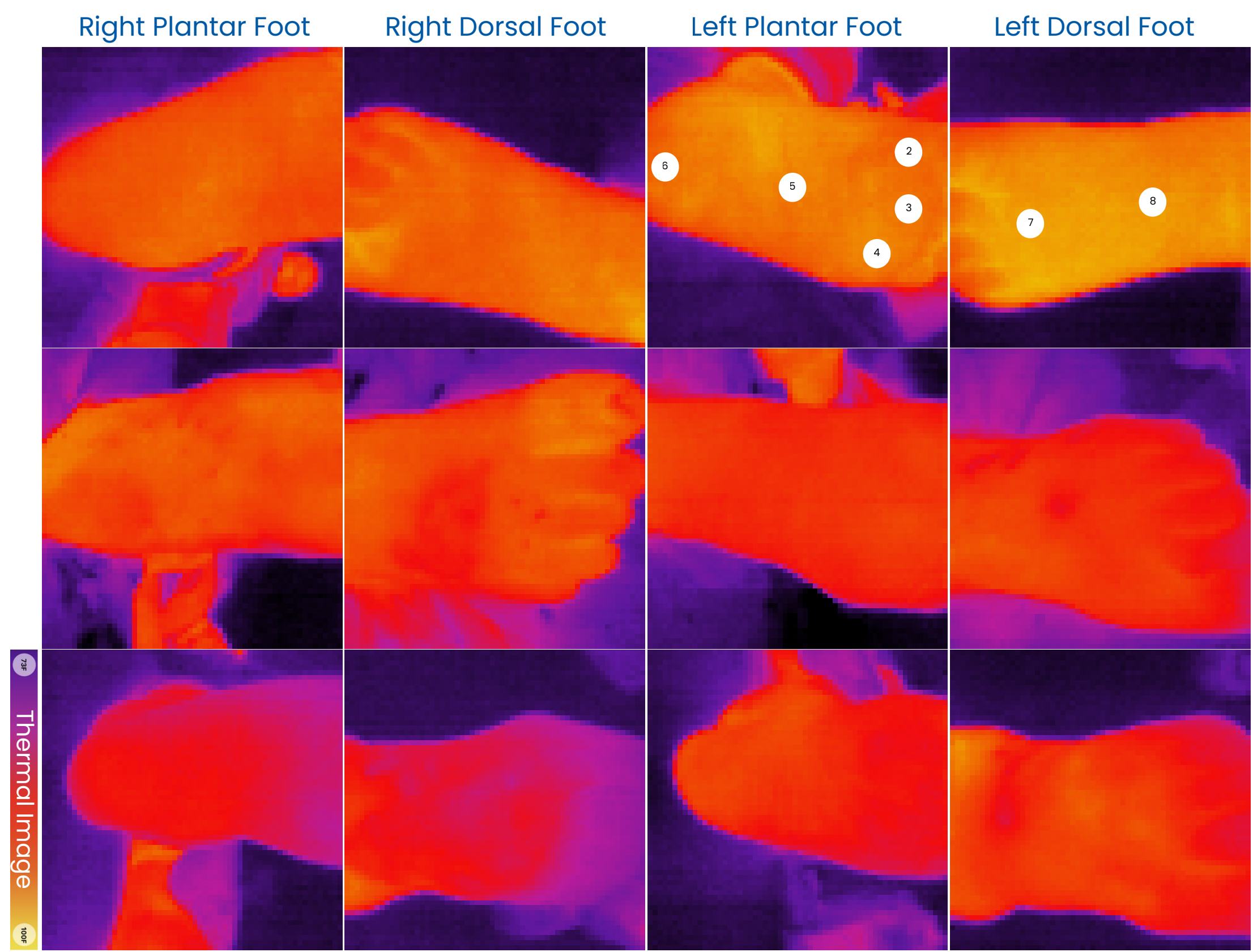
Study design

Case #	Age [years]	Gender	DVI	CVI	DM	CKD	Wound(s)	Treatment		Right	Left
								Compression wraps	Lymphedema pump	ABI	ABI
Case 1	77	female	yes	no	yes	Stage IV	bilateral VLU	yes	compliance	1.3	1.35
Case 2	78	male	no	yes	no	no	bilateral VLU	yes	no	NA	1.55
Case 3	84	female	no	yes	yes	no	bilateral lymphedema and right VLU	yes	compliance	1.1	NA

This single-center, prospective observational study enrolled 40 adults (≥18 years) with lower extremity wounds. Each participant underwent imaging using the MIMOSA Pro system (MIMOSA Diagnostics, Inc., Toronto, ON), which captured tissue oxygen saturation, skin surface temperature, and digital photographs from multiple anatomical sites on both feet—the plantar, dorsal, and medial aspects—along with the wound area and the thenar eminence of the hand as a reference. Standard vascular evaluations included ABI measurement and Doppler waveform analysis. The table summarizes the demographic and clinical characteristics of three selected participants included in this poster.

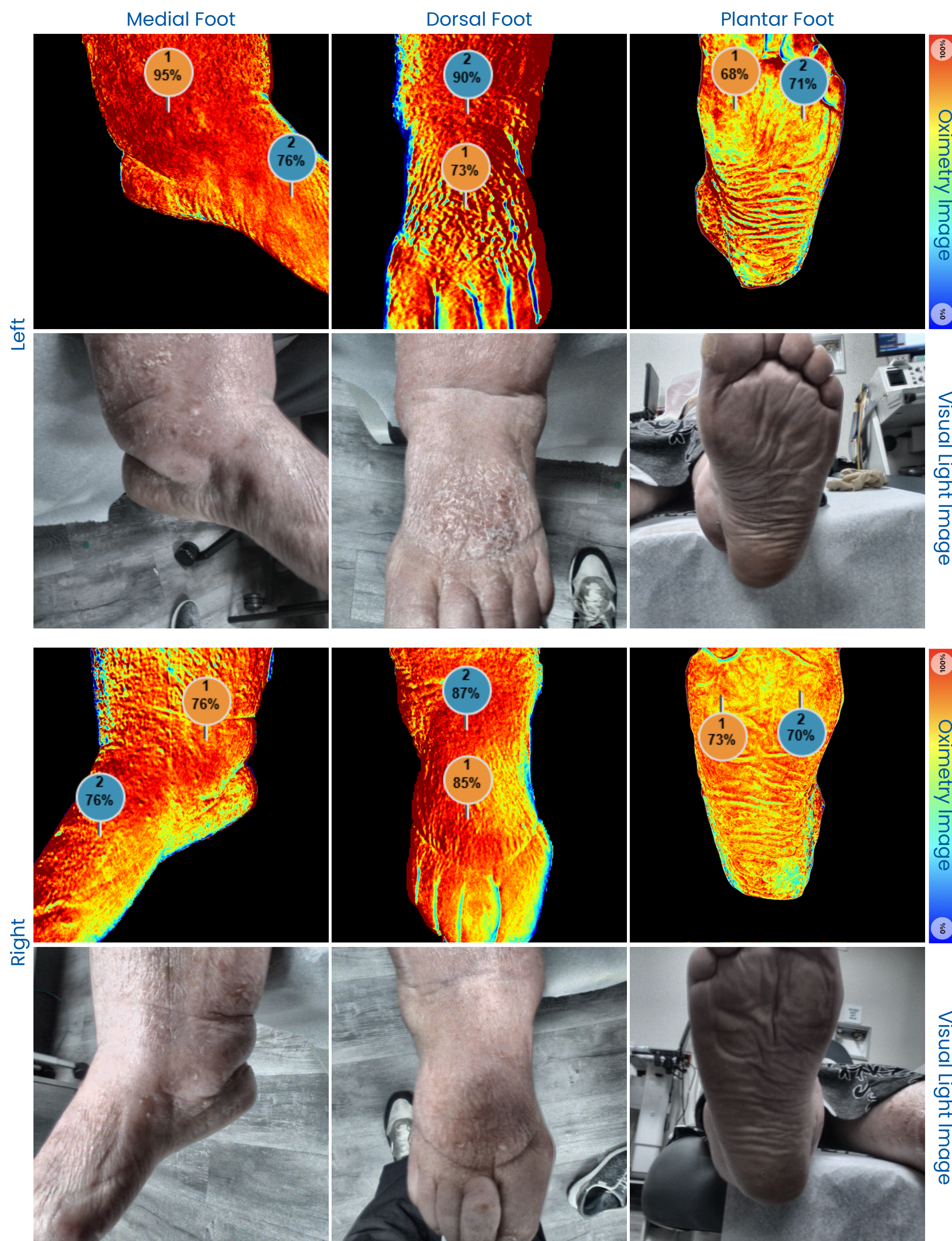
DVI — Deep Venous Insufficiency; CVI — chronic venous insufficiency; DM — Diabetes Mellitus type 2; CKD — Chronic Kidney Disease; ABI — Ankle-Brachial Index.

Results



Case #	Left / Right	2	3	4	5	6	7	8
1	Left	91	91	92	91	91	92	92
	Right	NA	NA	NA	90	90	90	91
2	Left	NA	NA	88	88	90	88	89
	Right	90	89	90	90	89	88	89
3	Left	87	86	86	87	91	91	87
	Right	82	83	82	85	86	85	86

The table presents the skin surface temperature (°F) measured at eight sites —points 2 through 8.



Illustrative Example: Case 3

Case #	Left / Right	Dorsal Foot	Inner Forearm	Medial Foot	Plantar Foot
1	Left	59	71	53	63
	Right	58	73	58	61
2	Left	54	73	55	80
	Right	66	80	61	70
3	Left	85	72	84	69
	Right	81	74	78	71

Thermography:

- Cases 1 and 2: The thermal difference between the right and left foot is less than 1.1°F, and both patients have bilateral VLUs.
- Case 3: Only the right foot has a VLU, and the right foot is colder, showing a mean difference of 3.8°F.

Tissue Oxygenation / ABI:

- In all three cases, ABIs are normal or elevated. Elevated ABI may indicate arterial stiffening or calcification, which can prevent proper compression during measurement. Abnormal ABI indicative of PAD is <0.90, which was not observed in these cases.

ABI vs. NIRS Success Rate - 67% vs 100%:

- Out of 6 ABI measurements, 2 could not be obtained due to incompressible arteries.
- NIRS was successful in all three cases for both left and right feet, demonstrating its reliability even when ABI is limited.

Discussion & Conclusions

This case series highlights the utility of multispectral NIRS imaging in assessing tissue oxygenation and microvascular status in chronic lower extremity wounds. NIRS provided reliable, real-time measurements across all cases, including when ABI assessments were limited by incompressible arteries, demonstrating its robustness and potential clinical value. Thermography, while secondary in this study, was able to detect subtle perfusion asymmetries, supporting NIRS findings and providing additional context on local tissue status. These results suggest that NIRS can serve as a practical and sensitive tool for monitoring wound healing and guiding clinical decision-making in chronic wound care.

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