

# Point-of-Care Multimodal Imaging in Mobile Chronic Wound Care: Insights from a Case Series

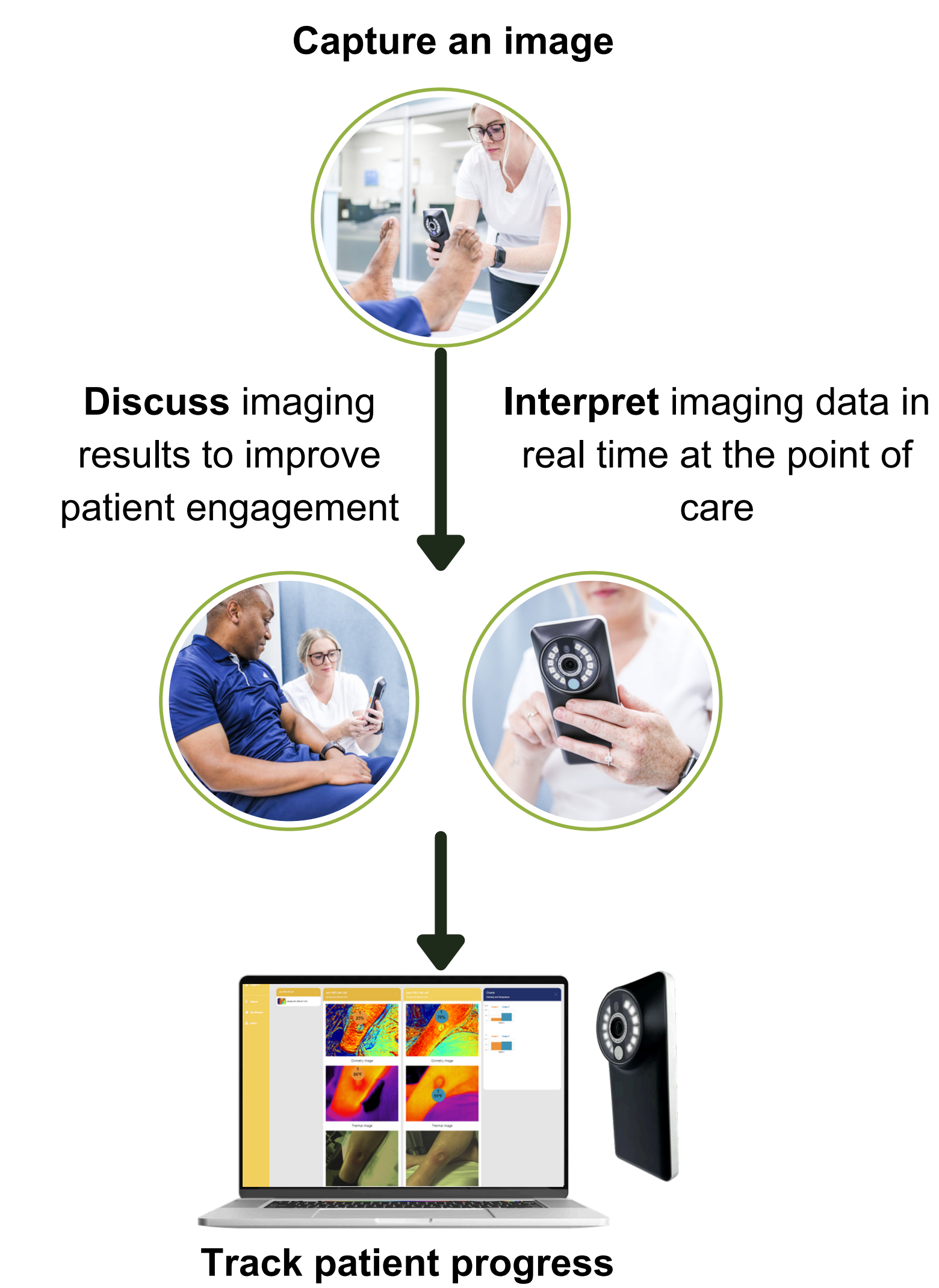
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## Introduction

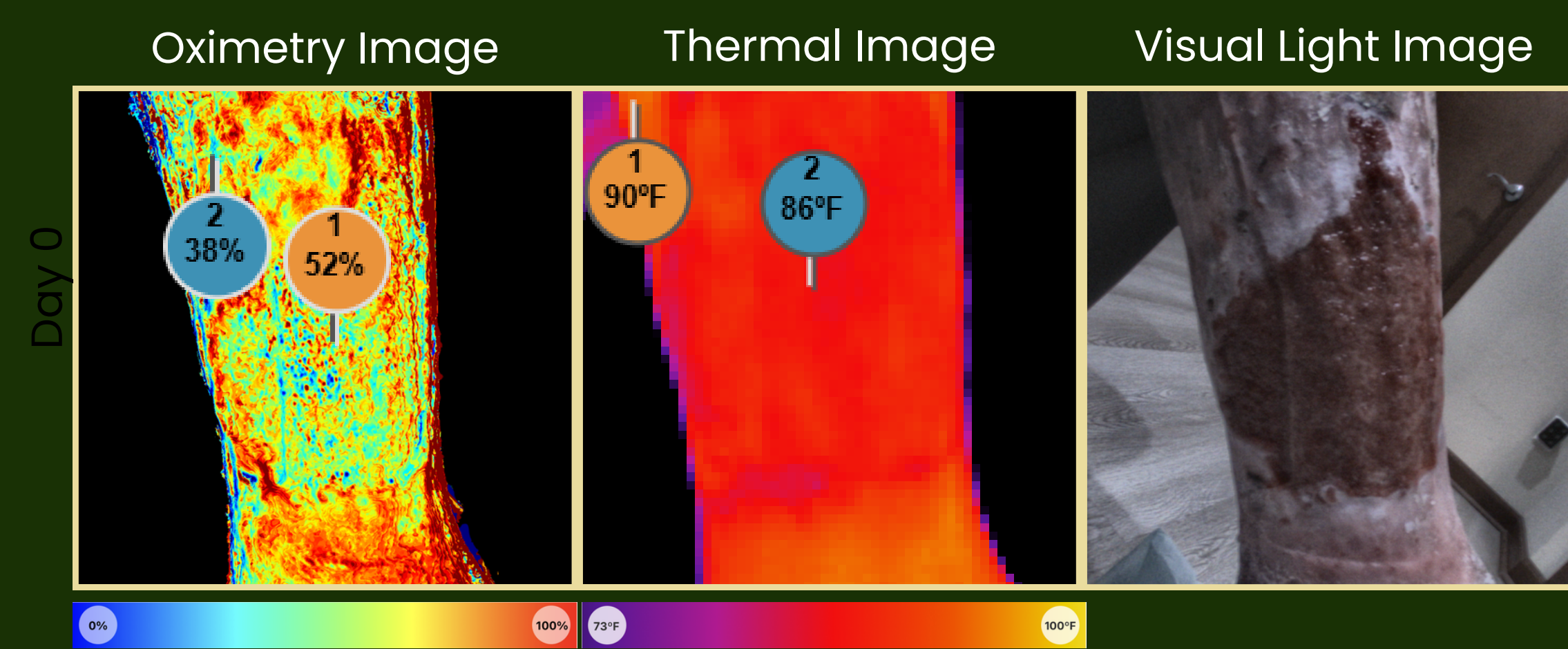
Chronic wounds represent a silent epidemic, affecting approximately 10.5 million Medicare beneficiaries in the United States and imposing an annual cost of \$22.5 billion on Medicare alone.<sup>1</sup> In mobile wound care settings, limited access to advanced diagnostics often delays the detection of perfusion deficits, infections, and atypical pathologies.<sup>2</sup> Multimodal imaging — integrating digital photography, near-infrared spectroscopy (NIRS), and infrared (IR) thermography — offers an innovative point-of-care solution, providing real-time assessment of tissue oxygenation (StO<sub>2</sub>) and temperature as a surrogate marker for infection. This case series investigates the clinical utility of multimodal imaging in guiding interventions to optimize outcomes for chronic wounds in mobile care environments.

## Methods

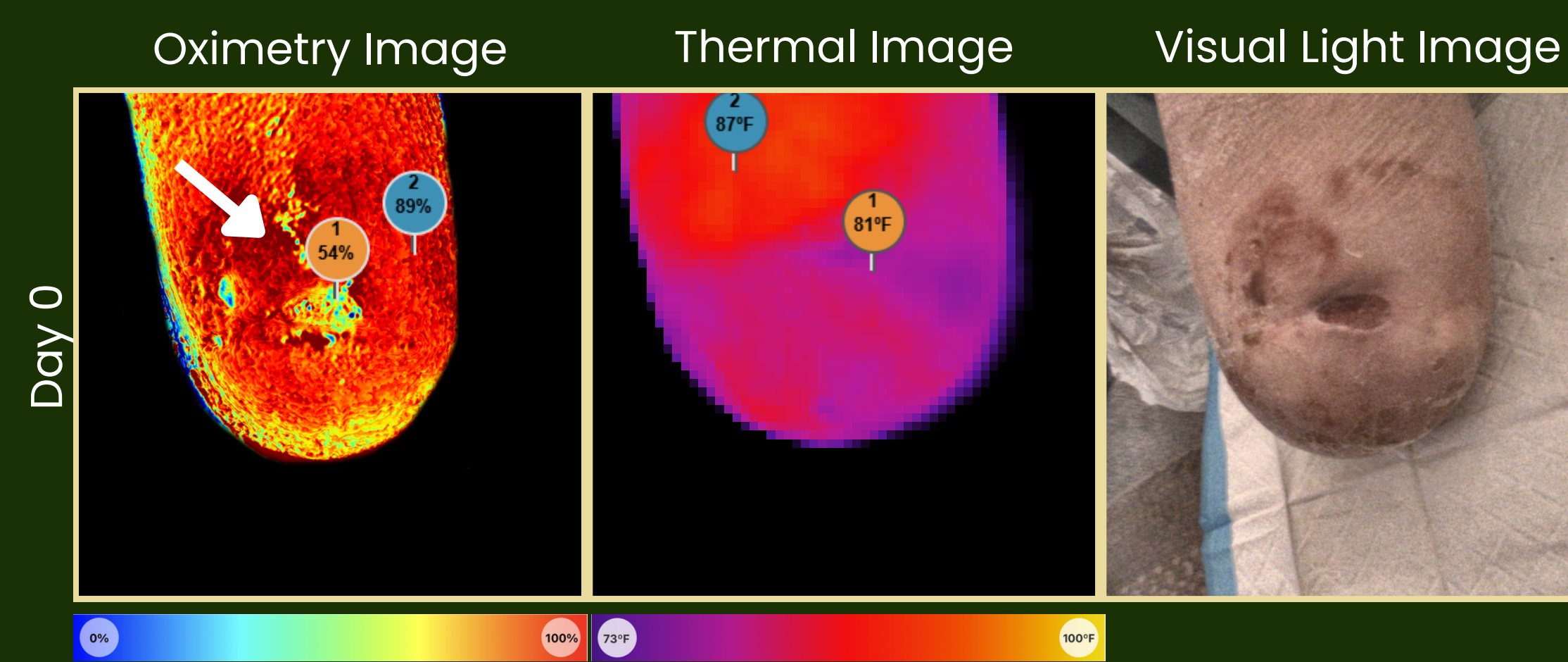
Six adult patients with various chronic wounds—including venous stasis ulcers, post-amputation stumps, and lymphedema-associated wounds—were evaluated in mobile care settings. These patients presented with multiple comorbidities, such as peripheral vascular disease and microvascular disease. A multimodal imaging device (MIMOSA Pro, MIMOSA Diagnostics) was utilized at the point of care to capture tissue oxygenation, skin surface temperature, and standard visual light images. This objective data complemented traditional clinical assessments and guided real-time treatment planning.



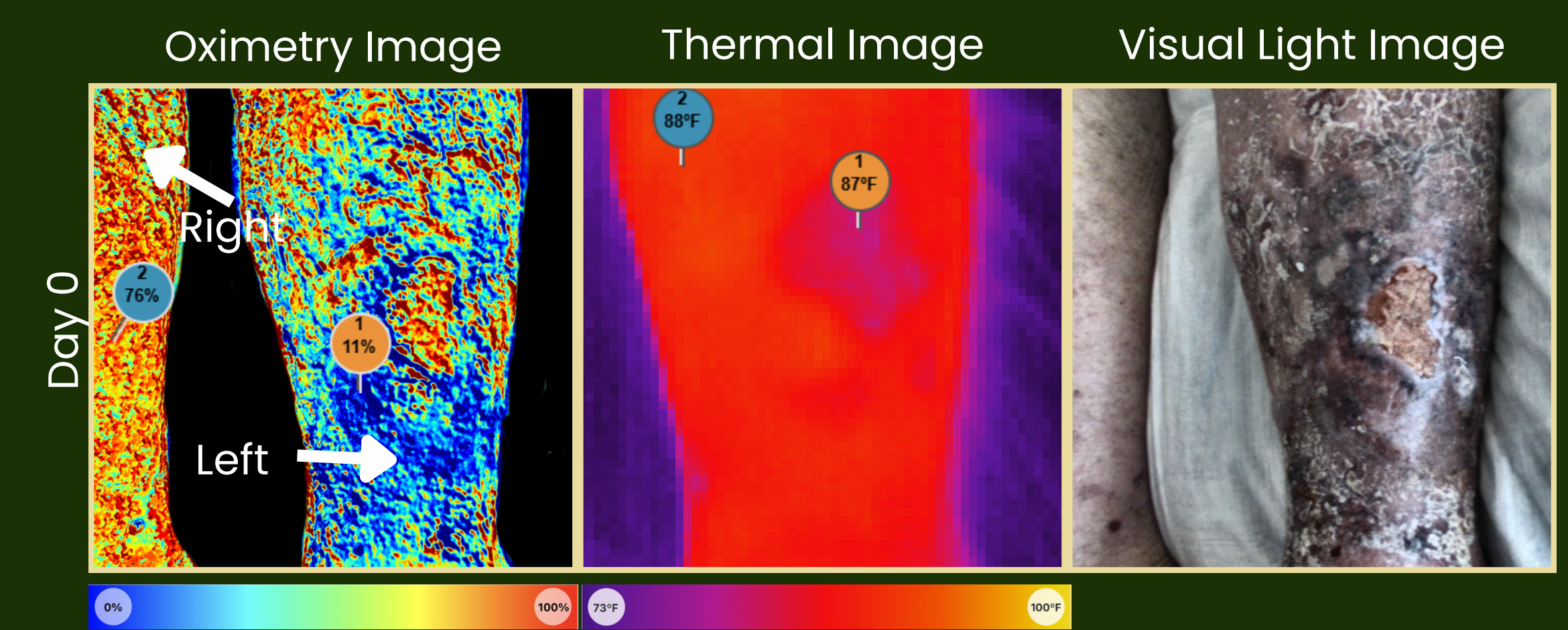
## Results



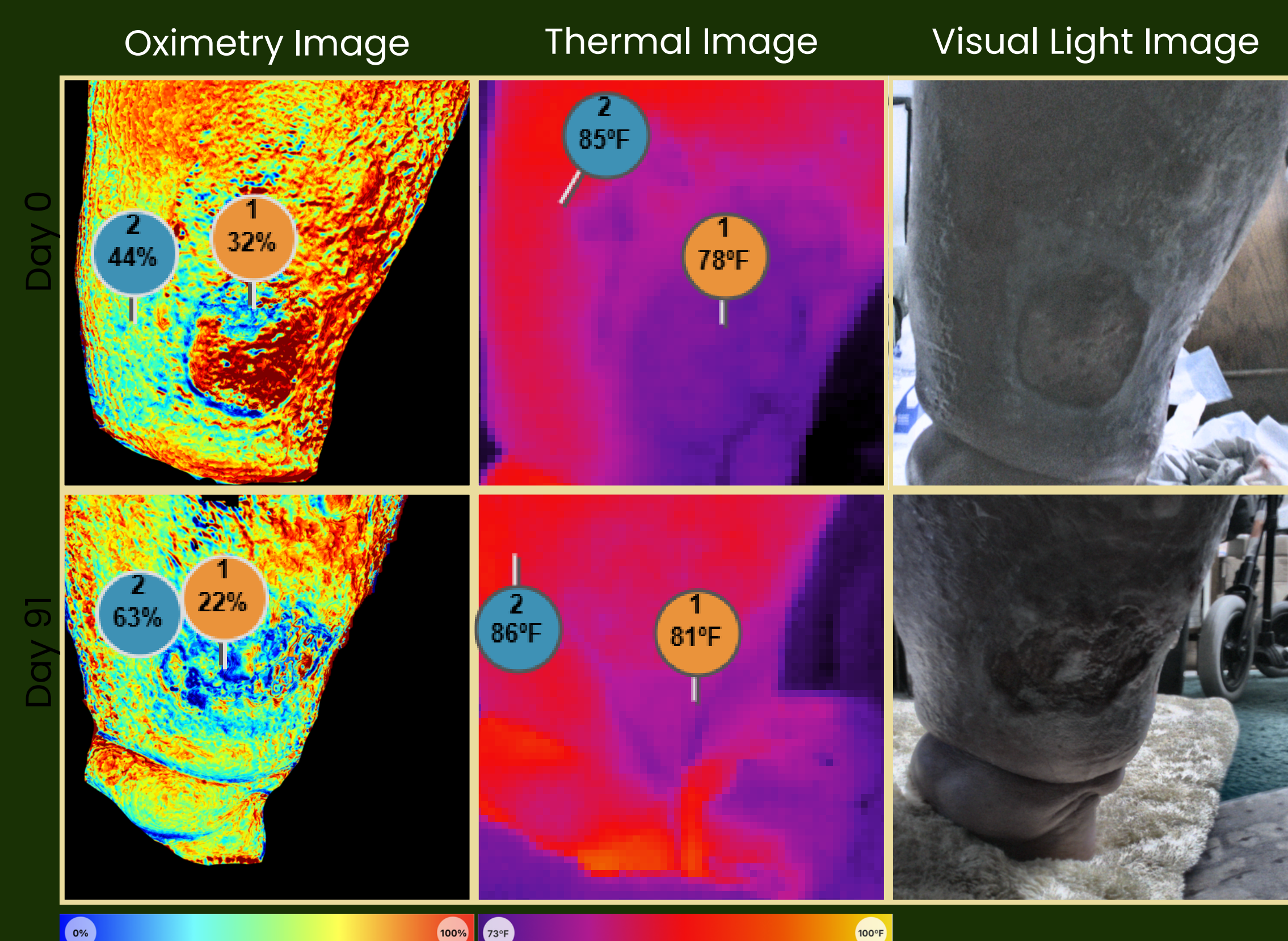
**Case 1: Venous Stasis Ulcer.** A male patient presents with a venous stasis ulcer of the right lower leg. While the reddish-brown wound bed maintains an average StO<sub>2</sub> > 50%, it is 4°F cooler than the surrounding tissue. The pale, macerated periwound region is characterized by heterogeneous oxygenation, including zones where StO<sub>2</sub> is < 39%. These StO<sub>2</sub> gradients indicate that the surrounding tissue may be at risk due to inadequate blood flow and localized ischemia.



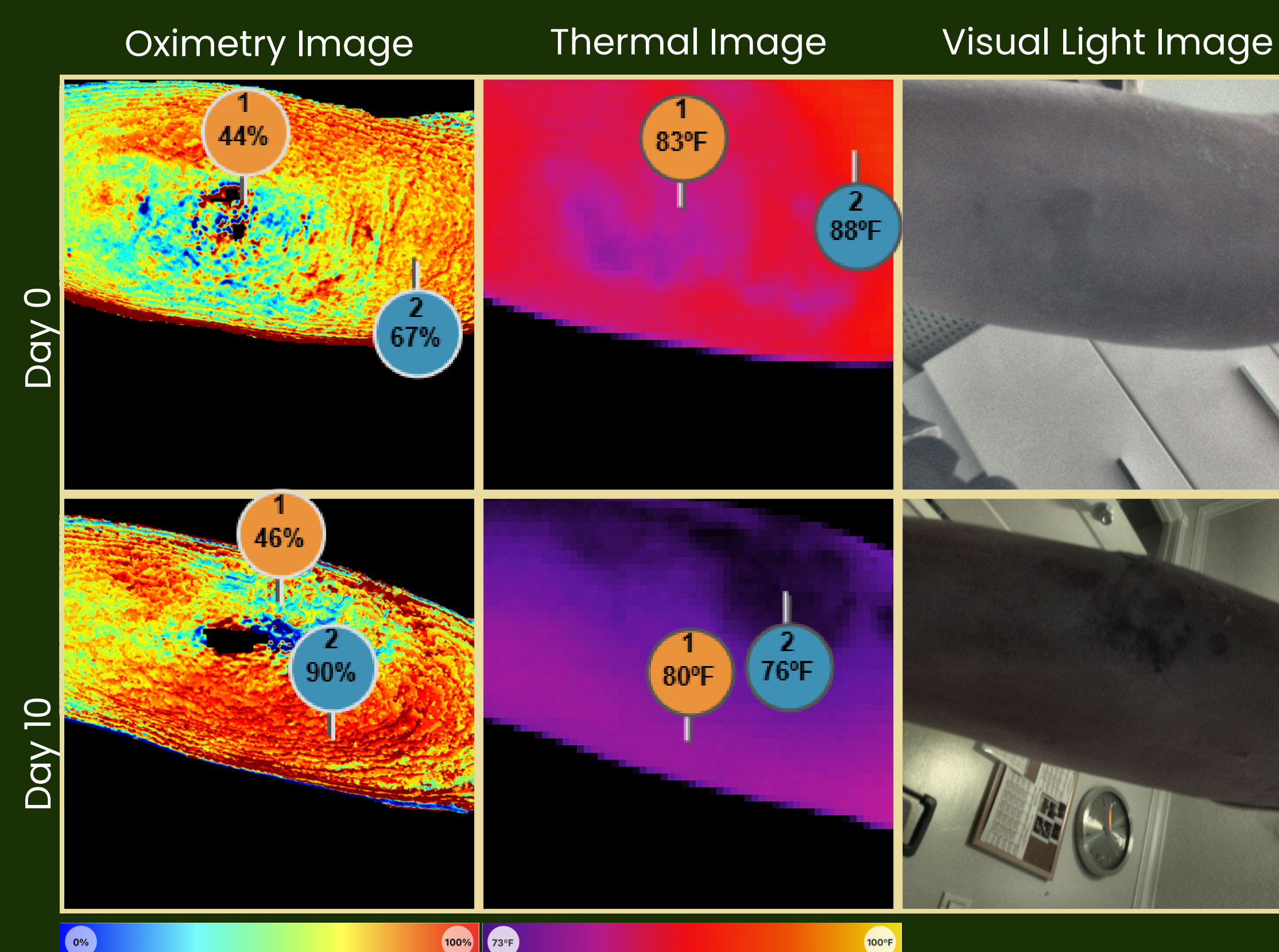
**Case 2: Right Lower Leg Stump.** A male patient presents with a wound on a right lower leg stump exhibiting strong healing potential, supported by StO<sub>2</sub> > 50% across both the wound bed and surrounding tissue. The thermal profile of the wound and periwound area is generally homogeneous. However, the superior aspect displays a localized hot spot with a 3°F temperature increase alongside hyperoxygenation. These findings serve as potential markers for localized inflammation or skin irritation.



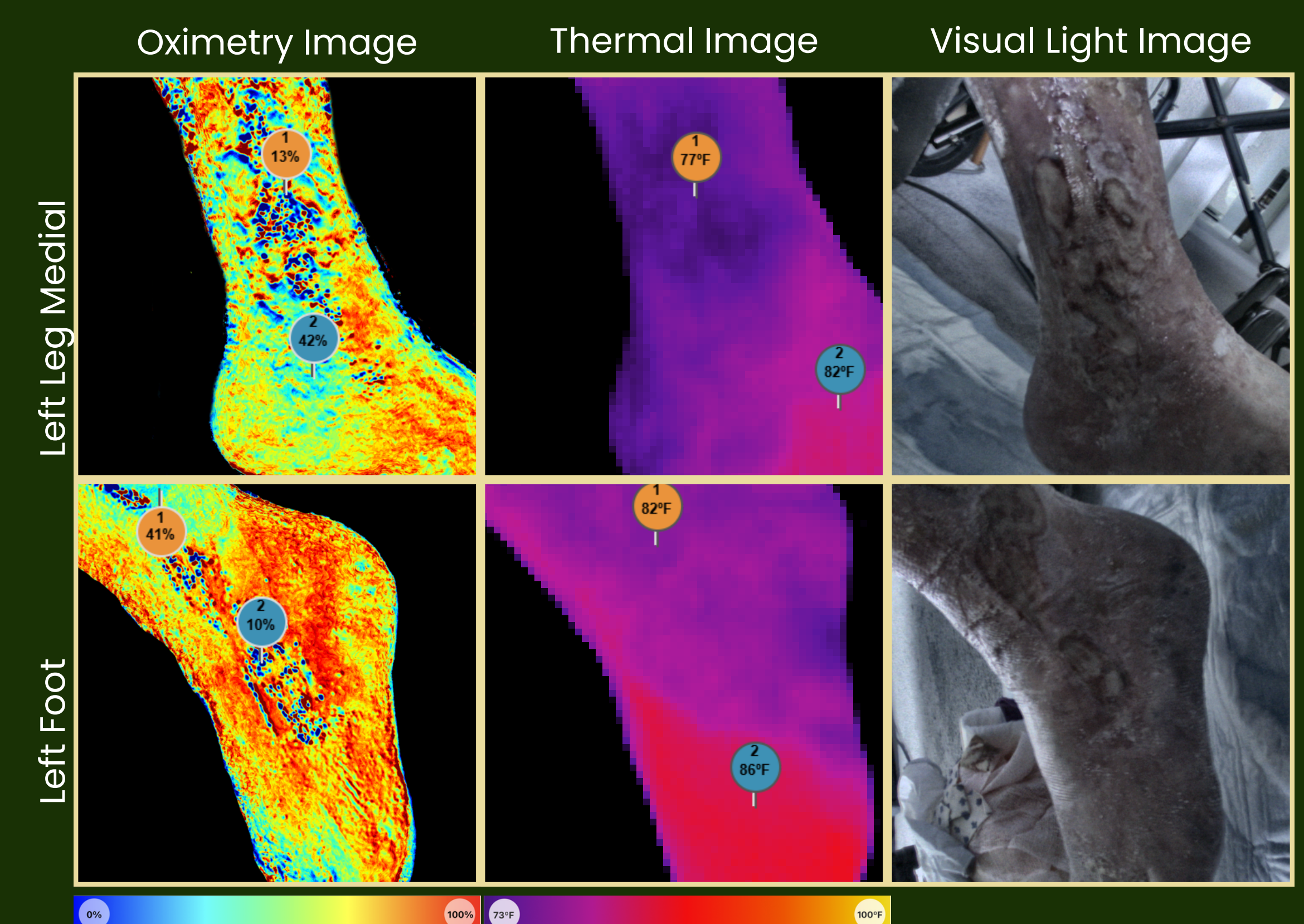
**Case 3: Bilateral Lower Extremity Ulcers.** A 65-year-old female presents with bilateral lower extremity edema and chronic, full-thickness non-pressure ulcers. While bilateral cellulitis was previously noted, thermography serves as a surrogate marker to confirm the infection has resolved, as evidenced by the absence of localized hot spots. However, NIRS imaging of the left lower leg indicates the tissue remains inadequately perfused, showing localized decreased oxygenation that may hinder healing.



**Case 4: Chronic Wound and Lymphedema.** A female patient presented with a chronic left medial leg wound. The primary clinical barriers were Stage 3 lymphedema and the presence of nonviable tissue, rather than isolated arterial perfusion issues. This case highlights how Stage 3 lymphedema creates a hostile environment for healing. The combination of chronic swelling and nonviable tissue leads to a measurable deterioration in StO<sub>2</sub>, even in the absence of primary perfusion issues.



**Case 5: Atypical Wound.** A male patient presented with a right posterior calf wound and potential vascular compromise; the wound was later identified as an atypical. On Day 0, NIRS revealed that while the wound bed and immediate periwound tissue maintained an average StO<sub>2</sub> > 39%, levels remained below 50%. Distal areas exhibited StO<sub>2</sub> > 50%, effectively ruling out significant micro-vascular compromise. By Day 10, NIRS imaging showed improvement in StO<sub>2</sub> within the wound bed, providing objective evidence of a positive clinical trajectory.



**Case 6: Deteriorating Venous Leg Ulcers (PVD).** An 82-year-old female with Peripheral Vascular Disease (PVD) presents with a two-year history of chronic, scattered venous leg ulcers. She exhibits deteriorating full-thickness wounds across the lateral and medial clusters of the left leg. In both sites, NIRS imaging confirms that localized ischemia (StO<sub>2</sub> < 39%) is present, indicating that blood flow is currently inadequate for effective healing to occur.

## Discussion

Point-of-care multimodal imaging facilitates early identification of perfusion deficits, skin compromise, and atypical wound conditions, allowing timely, targeted interventions in mobile care settings. By providing real-time, actionable insights, this technology helps overcome limitations of traditional visual assessments, supporting more accurate clinical decision-making. Portable imaging devices have the potential to improve care delivery, enhance patient outcomes, and promote equitable, efficient wound management in resource-limited and underserved environments.

1. Sen, C. K. Human Wound and Its Burden: Updated 2025 Compendium of Estimates. *Adv Wound Care (New Rochelle)* 14, 429–438 (2025).  
2. Kelso, M. R. et al. Use of near infrared spectroscopy in post-acute care: analysis of real-world clinical decision-making. *J Wound Care* 34, S6–S14 (2025).