

## Topic/Significance to Practice:

Specific cellular wound healing processes may not be visible until clinical symptoms appear.

Relying solely on a visual assessment to monitor wound healing progress can be inadequate, potentially resulting in delayed interventions and impeding the progression toward closure.

## Purpose/Objective:

Studies on pressure injuries (PI) have revealed that a higher periwound temperature (PWT) compared to wound bed temperature (WBT) leads to improved wound healing ( $p=0.028$ ).<sup>1</sup> This research aims to **compare WBT and PWT to detect early indications of delayed wound healing or progression in chronic wounds, through LWIT assessment**, in line with prior research on PIs.

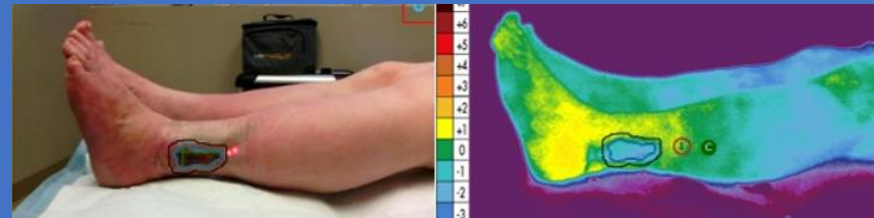
## Process/Replication:

LWIT images were taken during wound assessments, and all wounds showed positive healing progression. The LWIT software measured the WBT and the mean PWT within 0.5 cm of the wound's circumference.

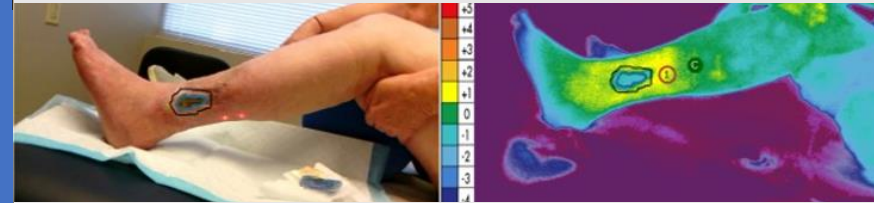
- The relative temperature differentials of the WBT and the PWT were compared, looking at increases or decreases in temperature relative to healthy tissue.
- LWIT Images were collected before wound cleansing or debridement to avoid altering the wound bed temperature measurements.
- The blue outline is a trace of the wound size; the black outline is 0.5 cm (periwound) around the wound trace.

### (Case 2) Venous Disease

The periwound temperature is 1-1.2°C warmer than the Wound Bed temperature



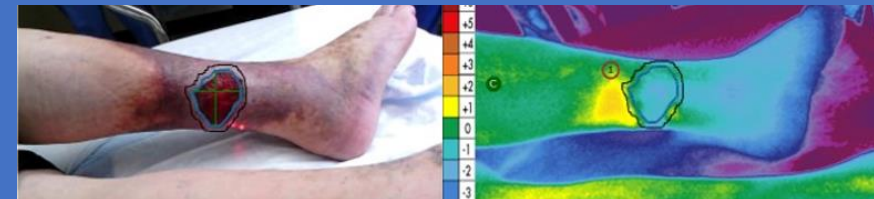
July 21<sup>st</sup>: Wound area 12.7 sq cm.  
Wound bed Mean -1.5°C, Periwound Mean -0.3°C (PW 1.2°C warmer)



August 14<sup>th</sup>: Wound area 5 sq cm; 61% size reduction.  
Wound bed Mean -1°C, Periwound Mean -0°C (PW 1°C warmer)

### (Case 4) Venous Disease

The periwound temperature is 0.5-0.9°C warmer than the Wound Bed temperature.



November 8<sup>th</sup>: Wound area 35.3 sq cm.  
Wound bed Mean -1.2°C, Periwound Mean -0.4°C (PW 0.8°C warmer)



February 14<sup>th</sup>: Wound area 3.3 sq cm; 89.3% size reduction.  
Wound bed Mean 0.2°C, Periwound Mean 0.7°C (PW 0.5°C warmer)

## Outcomes/Conclusion and Discussion:

The assessment of each wound revealed a positive healing progression, with the mean PWT equal to or warmer than the mean WBT. This case series showed that venous and venous/arterial mix etiologies had similar results as the previous PI research; **the warmer PWT (vs. WBT) temperature measurement correlated with improved wound healing trajectories as an early predictor of wound healing.**

- Case 1: venous/arterial mix, PWT 0-1°C > WBT
  - Case 2: venous, PWT 1-1.2°C > WBT
  - Case 3: venous, PWT 0.3-4.1°C > WBT
  - Case 4: venous, PWT 0.5-0.9°C > WBT
  - Case 5: venous, PWT 0.6-1.5°C > WBT
- Temperature is a physiological thermoregulatory mechanism.
  - Cellular and metabolic activity, along with clinical changes, occur during the healing process.
  - Thermal energy may be higher due to inflammation/infection
  - Lower temperatures can indicate a slower healing rate due to decreased perfusion/oxygen.<sup>2,3</sup>

## References:

1. Lin, Y.-H.; Chen, Y.-C.; Cheng, K.-S.; Yu, P.-J.; Wang, J.-L.; Ko, N.-Y. Higher Periwound Temperature Associated with Wound Healing of Pressure Ulcers Detected by Infrared Thermography. *J. Clin. Med.* 2021, 10, 2883.
2. Fierheller, M.; Sibbald, R.G. A clinical investigation into the relationship between increased periwound skin temperature and local wound infection in patients with chronic leg ulcers. *Adv. Ski. Wound Care* 2010, 23, 369–379.
3. Bharara, M.; Schoess, J.; Nouvong, A.; Armstrong, D.G. Wound inflammatory index: A “proof of concept” study to assess wound healing trajectory. *J. Diabetes Sci. Technol.* 2010, 4, 773–779.

## Disclosure/Acknowledgement:

LWIT imager utilized the SCOUT from WoundVision.