



Re-Defining Wound Healing in Chronic Diabetic Foot Ulcers Utilizing Near-Infrared Spectroscopy

¹Dr. Charles Andersen, MD, FACS, MAPWCA; ²Homer-Christian J. Reiter, BSc

¹Chief of Vascular/Endovascular/Limb Preservation Surgery service (Emeritus); Chief of Wound Care Service, Madigan Army Medical Center, Tacoma, WA; Clinical Professor of Surgery, UW, USUHS; ²The Geneva Foundation, University of Washington



BACKGROUND

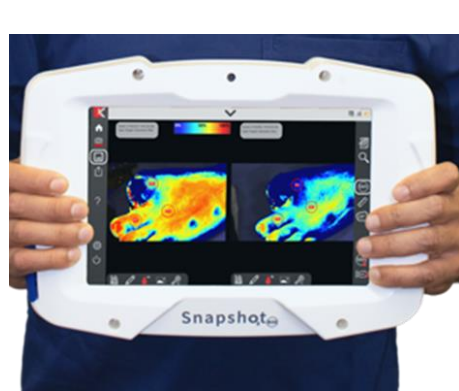
- A standardized definition for what a healed wound is does not exist, but total re-epithelialization is a primary study end point in wound care.
- While a healed wound signifies both successful clinical and study endpoints, failure to maintain a healed wound (i.e., DFU recurrence) remains high.
- Recurrence rates range from 25% (1 year) to 80% (5 years).
- Most patients with a history of a DFU will experience recurrence within 10 years⁵ and amputation will be the end point for 71-85% of recurrent DFU patients.
- Objective, point-of-care measurements indicating full-thickness healing could potentially decrease ulcer recurrence rates

OBJECTIVE

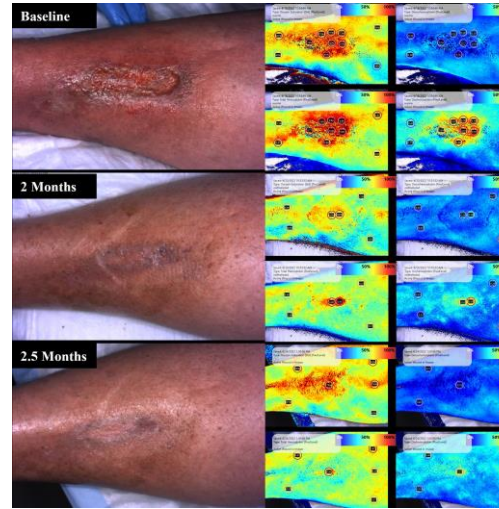
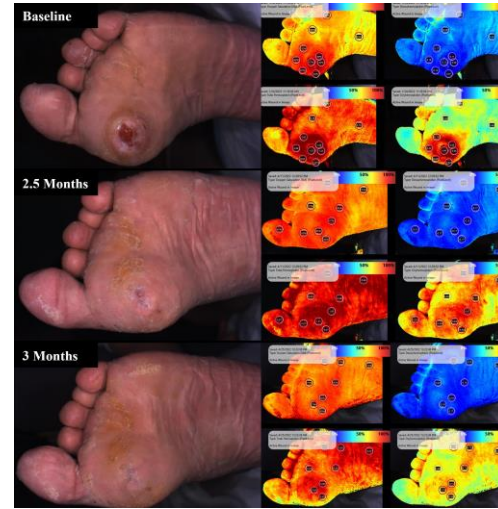
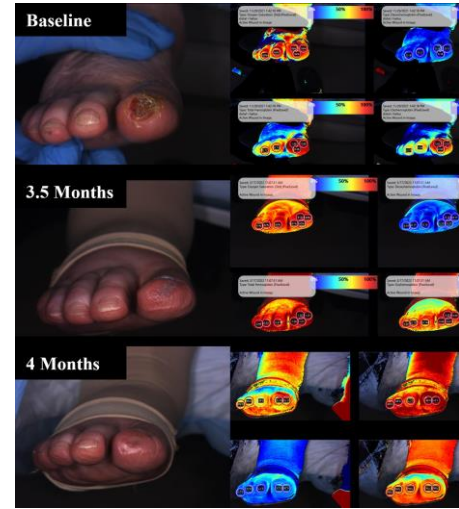
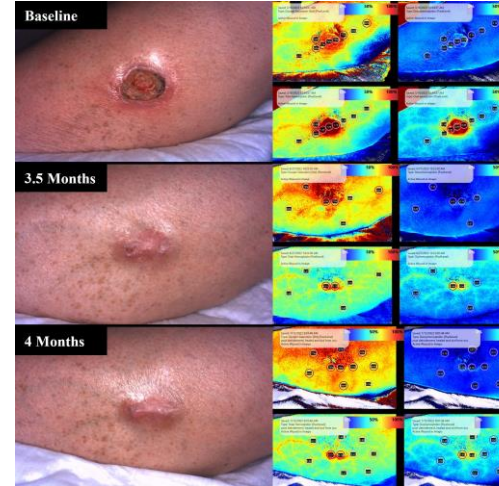
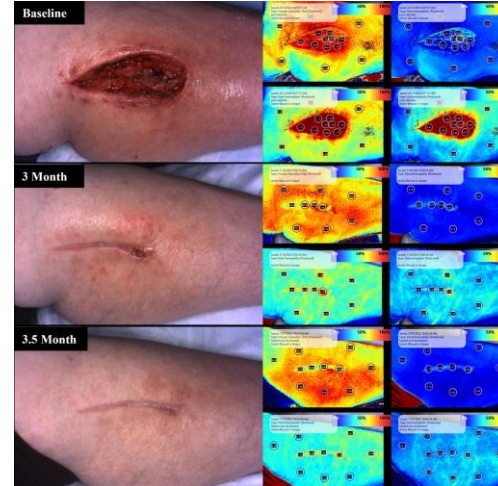
To evaluate if point-of-care near-infrared spectroscopy (NIRS) can be used as an objective measure of wound healing while also minimizing recurrence rates.

RESULTS

The average time to resolution of inflammation below the re-epithelialized area averaged 25 days [range: 8-84 days].



Handheld NIRS device used for assessment of DFUs.



RESULTS & DISCUSSION

- The average time to resolution of inflammation below the re-epithelialized area averaged 25 days [range: 8-84 days].
- Complete re-epithelialization of a DFU did not indicate that it was safe to transition patients back to protective shoe gear use and increased activities.
- After full re-epithelialization, time is needed to allow for deep dermal healing and for skin tensile strength to return.
- Deep dermal healing is associated with inflammation which is reflected with a localized hyperemia that increases localized tissue oxygen saturation levels.

CONCLUSION

NIRS provides visualization and an objective measure of deep dermal microvascular oxygenation to assist the clinician in knowing when deep dermal healing has occurred.