

# CASE STUDY SERIES

## Using SnapshotNIR for early identification & prevention of ulcers

Presented by: Charles Andersen, MD and Homer-Christian Reiter, BSc, Research Coordinator

### CASE 1: Focused identification of shear force and pressure in advance of ulcer formation

#### Patient History

70-year-old female with bilateral Charcot deformity and diabetic neuropathy.

#### Case Details

Patient has bilateral trans-metatarsal amputation due to complications from diabetic foot disease and experiences bilateral foot friction and pressure when walking. The patient is currently being followed for maintenance foot care to prevent ulceration. She has been urged to get fitted for custom shoes and orthotics to enhance offloading. On routine visits, SnapshotNIR imaging is utilized to identify pressure points that require footwear modification.

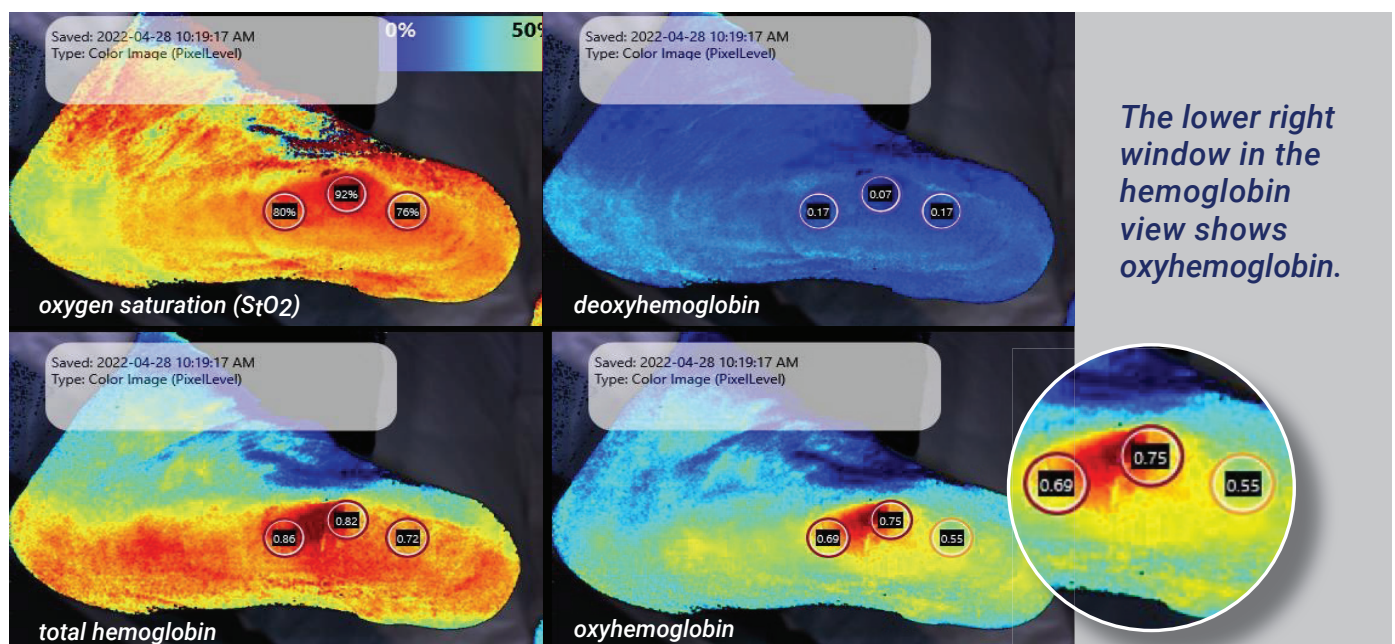
#### Observations

The patient's feet are often heavily callused and must be routinely debrided.

SnapshotNIR images in April show increased oxygenation over her fifth metatarsophalangeal joint, suggesting increased perfusion due to an inflammatory tissue response from pressure and shear forces. The hemoglobin view of the same image set confirms this observation with

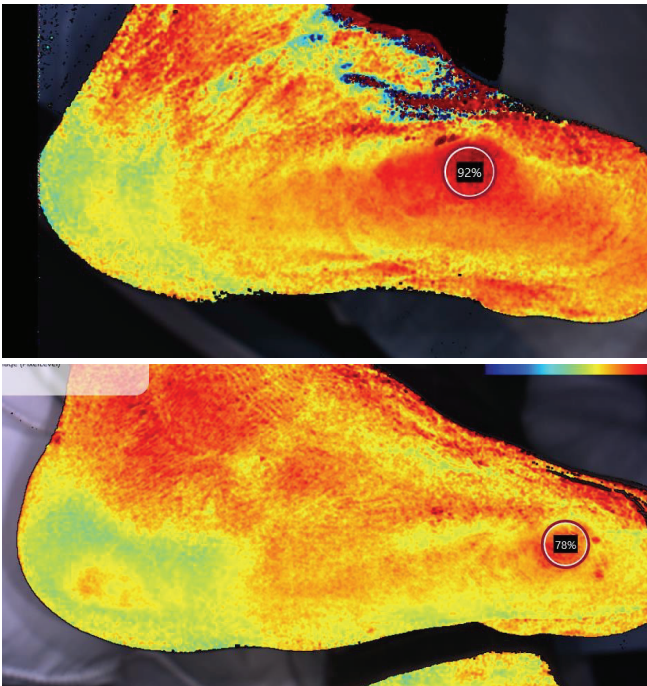
the elevated values for oxyhemoglobin over the joint compared to the surrounding tissues.

Focused offloading and footwear modification was monitored using the Snapshot imaging. Decreases in inflammation correlated with improved offloading and a reduction in pressure and shear forces. Early detection and intervention on areas of increased inflammation identified with Snapshot prevented foot ulcer formation.





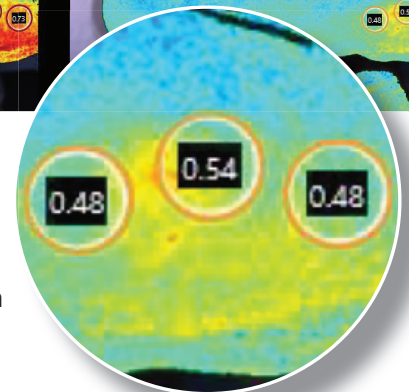
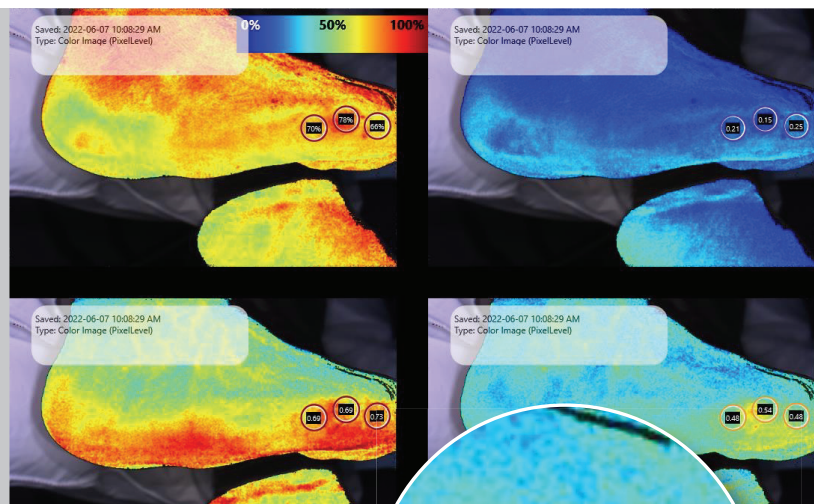
# Snapshot<sub>2</sub><sup>NIR</sup>



*Note the decrease in excessive tissue oxygen saturation ( $S_tO_2$ ), which represented inflammation, over the pressure point after 5 weeks of offloading.*



*Also note the normalization of the oxyhemoglobin markers around this pressure point in the lower right pane of the hemoglobin view image.*



## Impact

Being able to identify and manage areas of pressure or shear to prevent ulceration is very impactful. SnapshotNIR images identified areas of increased oxygenation and perfusion which corresponded to increased inflammation resulting from pressure or shear. Early identification of areas at risk supports a proactive approach to prevention through targeted offloading. Serial reimaging with Snapshot provided prospective monitoring of the tissue at risk to assess that the modification has decreased the inflammation as well as to identify new areas of pre-ulceration.



# Using SnapshotNIR for early identification & prevention of ulcers

## CASE 2: Focused Offloading to Prevent Recurrent Ulcers

### Patient History

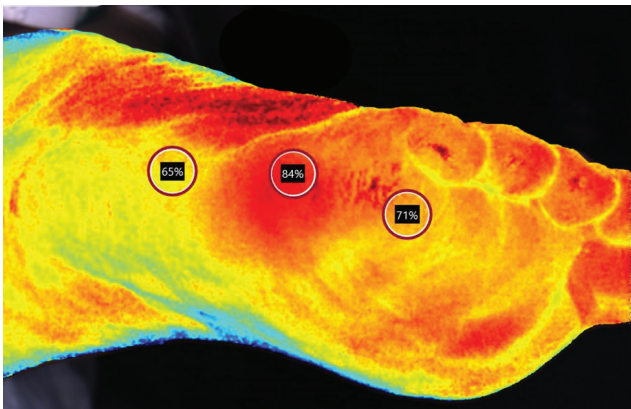
76-year-old male, with Type 2 Diabetes Mellitus, bed-bound due to morbid obesity.

### Case Details

The patient, who spends most his day in bed, has developed ulcers on his left foot at the lateral 5<sup>th</sup> metatarsophalangeal joint. Both feet are positioned in bed the same way, so his right foot was imaged with SnapshotNIR to rule out potential injury to this foot even though no ulceration was present.



The clinical image (top) and the  $S_tO_2$  image (bottom) of the patient's right foot. SnapshotNIR captures both the clinical and  $S_tO_2$  image simultaneously. Users can toggle between the images or view side-by-side.



### Observations

Due to the patient's lack of mobility, the clinic team was aware that he would be prone to pressure injuries. This prompted the team to capture tissue oxygenation images with the SnapshotNIR device to assess tissue health.

With the NIRS imaging, we were able to observe a moderate increase in oxygenation over his 5<sup>th</sup> metatarsophalangeal joint (MTPJ) when compared to his surrounding tissues. The hemoglobin view images also identified a contrast in values of oxyhemoglobin when comparing the MTPJ with surrounding tissues.

## DR. CHARLES ANDERSEN

Chief of Vascular/Endovascular/Limb Preservation services (Emeritus) Chief of Wound Care Service, Madigan Army Medical Center, Tacoma, WA; Clinical Professor of Surgery, UW, USUHS.

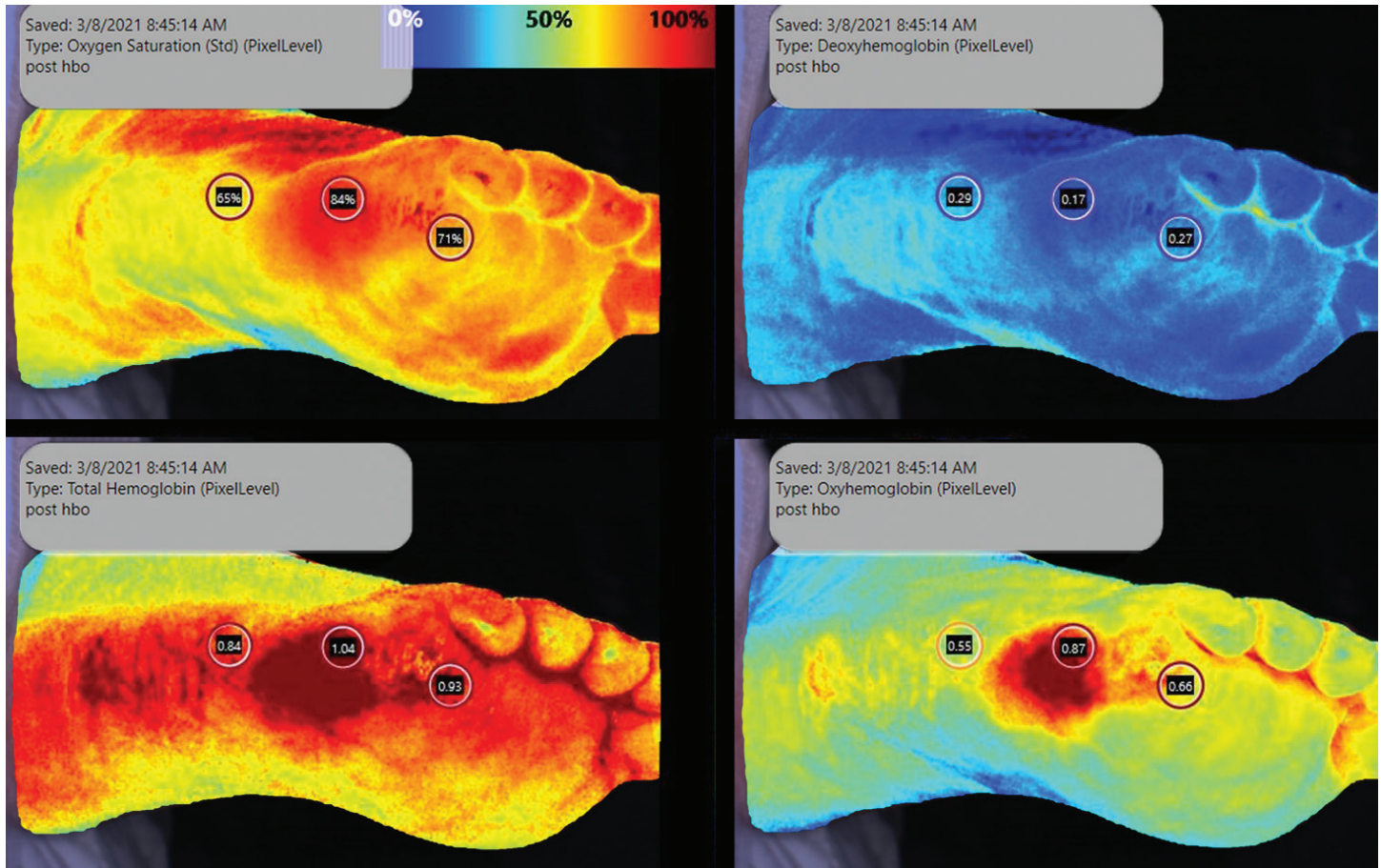
*"SnapshotNIR images support the proactive identification tissue at risk prior to ulceration and take early and appropriate steps to prevent this tissue damage."*

- Dr. Charles Andersen

### Impact

The Snapshot images identified areas of increased oxygenation and tissue perfusion suggesting significant inflammation in his right foot lateral 5<sup>th</sup> metatarsophalangeal joint, matching the wound location on his left foot. These changes are reflective of tissue trauma due to pressure forces. Early identification of an area at risk for pressure injury allowed intervention with enhanced pressure redistribution efforts including repositioning and increased foot padding avoided further tissue damage and prevented ulceration.

Near-infrared spectroscopy (NIRS) imaging can positively impact the care of a patient at risk for pressure injury. Snapshot imaging allows us to see early stages of tissue inflammation (potential deep tissue injury) and proactively optimize pressure management protocols in an effort to prevent tissue ulceration. At serial follow-up, NIRS imaging can be used to assess that the modification of the care plan has decreased the inflammation thereby protecting the tissue from injury. With ongoing NIRS assessment and early intervention with enhanced pressure redistribution efforts, we were able to successfully prevent new ulceration in this patient.



Notice the areas of increased oxygenation indicating significant inflammation in patient's right foot lateral to the 5<sup>th</sup> metatarsophalangeal joint. Note the oxyhemoglobin markers in the lower right pane of the hemoglobin view image.