

Seeing is Believing in Advanced Wound Care

CASE STUDY

Use of Snapshot_{NIR} in Advanced Wound Care and Hyperbaric Oxygen Therapy

**Erin Buchness,
MHL, BSN, RN**

Mercy Hospital, Springfield, MO -
Mercy Wound Care and
Hyperbarics, a Healogics Clinic

PATIENT HISTORY:

A 67-year-old female with Type II diabetes, hypertension, and previously Covid-19-positive, presented to the ER with lethargy, acute kidney failure, and discoloration of her right foot. An arterial doppler of the limb returned a diagnosis of ischemic arterial insufficiency with arterial occlusions involving her right popliteal, peroneal and anterior tibial arteries. *Vascular Surgery* was consulted, and a heparin drip was started. Four days later, *Vascular Surgery* completed a right popliteal cutdown, as well as a popliteal and tibial embolectomy for the acute limb ischemia of the right lower leg. One day later, *Podiatry* was consulted for severe ischemic and gangrenous changes of her right great and fifth toes. The right great toe was noted to be cold to the touch with a pronounced line of demarcation. A right great toe partial first ray amputation was performed, and the patient was discharged with regular follow-up appointments within the department. The patient was also referred to *Wound Care and Hyperbarics* for hyperbaric oxygen therapy (HBOT), with the first appointment for assessment 1-month post-amputation. Prior to this initial HBOT appointment, the patient had been advised that she may require further vascular intervention and a right below-the-knee amputation.

OBSERVATIONS:

At the initial HBOT appointment, the ulcer was assessed by the *Wound Care and HBOT* staff. Following this assessment, a formal request was made to transfer care of the patient from *Podiatry* to the *Wound Care Clinic*. Eleven days later, the first HBOT session was conducted for Wagner Grade 4 - Forefoot Gangrene. Four days post HBOT, debridement was completed with eschar removal, where bone and necrotic tendon tissue were exposed.

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No matter the patient or indication, HBO therapy is a commitment. Having the ability to show the patient the benefit of this treatment keeps them focused and committed to staying on course.”

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Fig. 1: Baseline clinical image of Wagner Grade 4 – Forefoot Gangrene.



Fig. 2: Clinical image four (4) days post HBOT, debridement and eschar removal.

At the second HBOT session, 5 days post-debridement, tissue oxygenation images were captured post-therapy with Snapshot_{NIR} near-infrared spectroscopy imaging. The tissue oxygen saturation (S_tO_2) value in the wound base was 44%, while the deoxyhemoglobin value was 0.46 for the post-HBOT assessments, respectively.

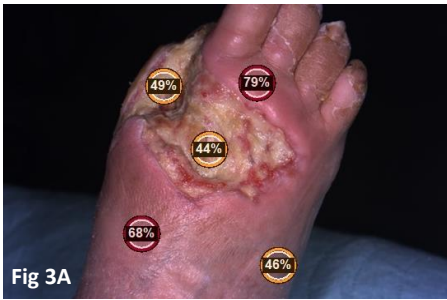
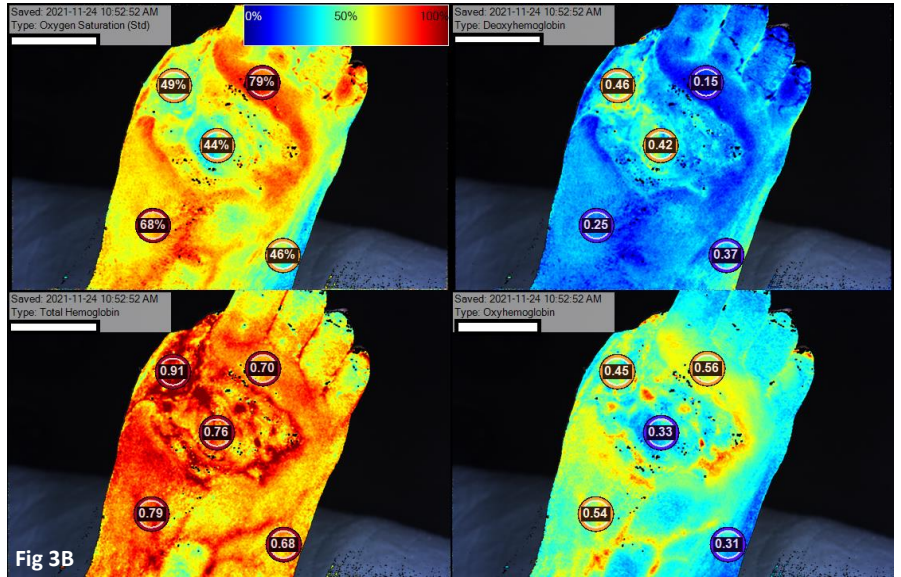


Fig. 3: Clinical image (3A) and hemoglobin view images (3B) of the wound tissue following the second HBOT session and 5-days post debridement. The hemoglobin view images are (clockwise from top-left) tissue oxygen saturation (S_tO_2), deoxyhemoglobin, oxyhemoglobin, and total hemoglobin.



During the next 3.5 months, the patient was treated with negative pressure therapy, the application of one skin substitute, and 36 sessions of HBOT.

Fig. 4: Snapshot_{NIR} imaging on Week 18 recorded S_tO_2 at 77-89% (4A) and deoxy-hemoglobin values at 0.08-0.21, as shown in the hemoglobin view images (4B).

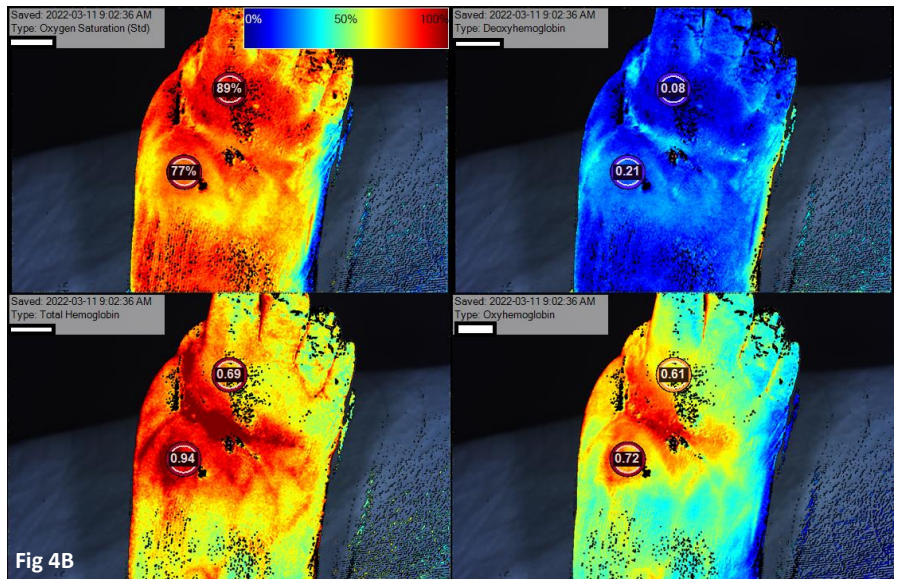
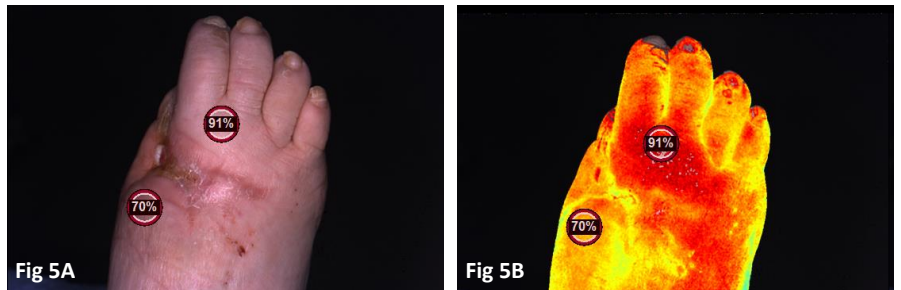


Fig 5: An additional two skin substitute applications were made, and on Week 22, Snapshot_{NIR} imaging documented S_tO_2 values of 70 - 91% shown on clinical image (5A) and S_tO_2 image (5B).



CONCLUSION:

Before the patient started care in the wound center, she was on the verge of additional surgical interventions and potentially losing her right foot, if not her entire right leg, due to her acute vascular and surgical history. With the information obtained and documented with Snapshot_{NIR}, we were able to determine that the patient had adequate tissue oxygen saturation to heal. The imaging data also demonstrated early on in her treatment the positive effects Hyperbaric Oxygenation Therapy has on non-healing diabetic foot ulcers.