STUDY PROTOCOL

Title of Study: A single center pilot study to examine the effect of NATROX® Oxygen Wound Therapy on non-healing wounds and the practical implication of introducing a remote monitoring and telehealth solution to manage these complex patients in the home care setting.

Study Title:	A single center pilot study to examine the effect of NATROX® Oxygen Wound Therapy on non-healing wounds and the practical implication of introducing a remote monitoring and telehealth solution to manage these complex patients in the home care setting.
Rationale:	There is a wealth of evidence to support the benefits of oxygen therapy on wound healing[1-7]. Oxygen is required for all major processes of wound healing and wound hypoxia is common. Skin wounds can receive oxygen from the blood stream via perfusion and from oxygen uptake through the skin. Yet, both wound perfusion and blood oxygen levels are frequently insufficient in patients with chronic wounds due to poor circulation, vascular disruption, and vasoconstriction, thereby reducing the wound's capacity to heal. Diabetic ulcers, vascular ulcers (venous or arterial), and pressure injuries are all chronic wounds. The pathologies underlying chronic wounds can differ widely. However, common shared features include prolonged or excessive inflammation, persistent infections, and the inability to respond to reparative stimuli[8,9]. Adults with vascular disease and/or diabetes are at highest risk for chronic leg and foot wounds. The ischemic (reduced tissue perfusion) and/ or hypoxic lower limb conditions which result from these conditions reduces availability of both oxygen and nutrients, making these wounds especially hard to heal. These wounds last on average 12 to 13 months, but this varies widely; many will remain open for years or never heal[8,9], and up to 30% of DFUs go onto amputation[10]. Even when they do heal, wounds recur in 60-70% of patients, decrease quality of life, and are a significant cause of morbidity[8,9]. The need for telehealth and remote patient monitoring in the current climate is critical and reinforces the VA's strategy to protect and care for Veterans, their families, heath care providers and staff in the face of this pandemic. The VA's tactic to shift outpatient care to a "telehealth" mode, with phone, video and/or electronic communication to meet the needs of the ambulatory patient is difficult to achieve in wound care as clinicians relies heavily on the visual appearance of the wound to direct their therapy decisions. Thus, it is imperative to validate a remote monitoring tool that offers standard telehealth care as well as accurate, consistent, and simple wound measurement and imagery. Having the ability to manage complex wounds accurately should enable quick identification of early warning signs that the wound is deteriorating thus facilitating appropriate triaging of patients that need urgent face to face medical review.
Study Design:	Consecutive case series

Patient population	6 - 12 patients meeting eligibility criteria
Number of Sites:	Single Site
Inclusion criteria: Patients must fulfil all the following criteria to be eligible for inclusion into the study:	1. Male or female 18 years of age and older 2. Subjects having a non-healing wound of any etiology, except 3rd degree burns 3. No visible signs of healing objectively, less than 30% reduction in wound size in the last 4 weeks 4. Wound present for at least 4 weeks but less than 12 months 5. Subjects' wound size is minimum of 1 cm^2 and maximum of 25cm^2 6. Subject is able and willing to participate in self care 7. Subject is able and willing to follow the protocol requirements 8. Subject has signed informed consent
Exclusion criteria Patients who met any one of the following criteria during screening visit are not eligible to participate into the study:	1. Subject has a life expectancy < 1 year 2. Subject is unable to manage the NATROX® device (charge and change the batteries daily) 3. Subject unable or reluctant to use iPhone and imaging technology 4. Subject has ulcers that are completely necrotic or if the clinician felt it was clinically necessary to cover the wound surface in gel or creams that would prevent the transmission of oxygen to the wounds surface 5. Subject has major uncontrolled medical disorder(s) such as serious cardiovascular, renal, liver or pulmonary disease, lupus, palliative care or sickle cell anemia; 6. Subject currently being treated for an active malignant disease or patients with history of malignancy within the wound 7. The subject has other concurrent conditions that in the opinion of the investigator may compromise subject safety 8. Known contraindications to the NATROX® 9. Known allergies to any of the NATROX® components 10. Know allergies to adhesives
Discontinuation criteria	1. Signs of allergic or hypersensitivity to any components of NATROX® 2. Onset of any condition that could severely interfere with investigational treatment evaluation 3. Investigator's decision to withdraw the patient 4. Patient's decision to withdraw consent 5. Need to use a prohibited medication/therapy
Endpoints	**Primary endpoint:** - Number of participate that achieve complete wound closure during the 12-week study

	- The percentage change in ulcer size at 12 weeks relative to baseline measurement – this parameter will be performed using the eKare platform. **Secondary endpoint:** The effectiveness of the remote management tool for: - Reducing number of face to face clinic visits necessary - Improved communication between hospital and home around wound progression - Ease of implementation and acceptance by the patient - Early warning and triaging wound issues - Increase confidence in proactively managing patient remotely
Method:	Prior to recruitment participants should have clinical documentation of wound progression for a minimum of 2 weeks, including wound measurements, if accurate data unavailable, participants wound progression will be monitored for 2 weeks prior to therapy intervention. Wound debridement and the use of off-loading, where appropriate will be at the discretion of the wound specialist throughout the study. On recruitment a full wound assessment will be completed in the eKare platform, this will act as the point of reference. Participants will be commenced on NATROX® Oxygen Wound Therapy with an adhesive foam dressing as a secondary dressing, frequency of dressing changes will be dictated by exudate levels and clinical judgement. The participant will be given a specially configured iphone (eKare patient App and NATROX® Patient library) along with any relevant personalised instructions, this could include a video of their dressing regime to support self application. For the first 4 weeks following recruitment, wounds will be monitored remotely by the wound specialist with a face to face clinical reviews every 2 weeks. Patients will be instructed to photograph the wound via the eKare app at each dressing change (minimum of once weekly) which will be transmitted to the wound specialist. Following the initial 4 weeks of therapy, face to face clinical reviews can be extended to every 4 weeks, based on clinical judgement. Participant will have a weekly clinical review performed via the eKare app for the duration of the study or till the wound heals, whatever comes first. Prior to the weekly review, patient will be asked 5 questions (with yes or no answers only) to help identify early warning signs of wound problems along with any compliance issues with the chosen therapy. During the study if self application, compliance, or wound issues are identified by either the participant or highlighted through the eKare monitoring tools, participants can be triaged for additional clinical intervention or support as deemed appropriate.

References

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Attachments:

Health Questionnaire prior to NATROX® Oxygen Wound Therapy + Visual Analogue Score

NATROX Schedule of Events