Institutional Review Board for Baylor College of Medicine and Affiliated Hospitals

Protocol Number: H-41361
Status: Approved
Initial Submit Date: 5/18/2017
Approval Period: 10/3/2023 - 10/2/2024

Section Aa: Title & PI

A1. Main Title

EVALUATION OF OXYGEN DELIVERY WITH OXYGENI TO STUDY SUCCESS RATE OF SURGICALLY CLOSED WOUNDS - A RANDOMIZED CONTROLLED TRIAL.

A2. Principal Investigator

Name:	BIJAN NAJAFI	Phone:	713-798-7536
Id:	191680	Fax:	
Department:	SURGERY: VASCULAR SURGERY DIV.	Email:	najafi@bcm.tmc.edu
Center:		Mail Stn:	BCM390

A3. Administrative Contact

Name:	MARIA NOUN	Phone:	7137987537
Id:	204533	Fax:	
		Email:	noun@bcm.edu
		Mail Stn:	BCM390

A3a. Financial Conflict of Interest

Does any member of study personnel (Investigator (including investigator's spouse and/or dependent children)) that are involved in the design, conduct, or reporting of the research have a Significant Financial Interest (SFI) that would reasonably appear to be affected by the research for which funding is sought and/or associated with an entity/business that would reasonably appear to be affected by the research?

No

Section Ab: General Information

A4. Co-Investigators

Name:	JEFFREY ROSS	Phone:	713-798-8944
Id:	024225	Fax:	713-790-9439
Department:	SURGERY: VASCULAR SURGERY DIV.	Email:	jeffross@bcm.tmc.edu
Center:		Mail Stn:	SM1025
Name:	JAMES SULIBURK	Phone:	7138734381
Id:	168586	Fax:	
Department:	SURGERY: GENERAL SURGERY DIV.	Email:	suliburk@bcm.edu
Center:		Mail Stn:	BCM390
Name:	MIGUEL MONTERO	Phone:	713-798-8940
Id:	193000	Fax:	
Department:	SURGERY: VASCULAR SURGERY DIV.	Email:	mmontero@bcm.tmc.edu
Center:		Mail Stn:	BCM390

Name:	CHAD WILSON	Phone:	7138734314
Id:	195897	Fax:	
Department:	SURGERY: GENERAL SURGERY DIV.	Email:	cw20@bcm.edu
Center:		Mail Stn:	BCM390
Name:	BRIAN LEPOW	Phone:	713-798-2301
Id:	197467	Fax:	
Department:	SURGERY: VASCULAR SURGERY DIV.	Email:	lepow@bcm.tmc.edu
Center:		Mail Stn:	BCM390
Name:	ARELI FLORES CAMARGO	Phone:	
Id:	227179	Fax:	
Department:	SURGERY: SURGICAL ONCOLOGY	Email:	207179@bcm.edu
Center:		Mail Stn:	
Name:	ALEJANDRO ZULBARAN Y ROJAS	Phone:	7137982556
Id:	231680	Fax:	
Department:	SURGERY: SURGICAL ONCOLOGY	Email:	231680@bcm.edu
Center:		Mail Stn:	
Name:	RASHA BARA	Phone:	
Id:	240838	Fax:	
Department:	SURGERY: SURGICAL ONCOLOGY	Email:	u240838@bcm.edu
Center:		Mail Stn:	
Name:	SHALINI PATEL	Phone:	7137987536
Id:	247197	Fax:	
Department:	SURGERY: VASCULAR SURGERY DIV.	Email:	u247197@bcm.edu
Center:		Mail Stn:	BCM390
Name:	MAARIA MUSTAFA	Phone:	7137987640
Id:	247330	Fax:	
Department:	MOLECULAR & CELLULAR BIOLOGY	Email:	u247330@bcm.edu
Center:		Mail Stn:	BCM215
Name:	MANUEL PACHECO	Phone:	7137987536
Id:	247522	Fax:	
Department:	SURGERY: VASCULAR SURGERY DIV.	Email:	u247522@bcm.edu
Center:		Mail Stn:	BCM390
Name:	MIGUEL BARGAS OCHOA	Phone:	
Id:	251804	Fax:	
Department:	SURGERY: SURGICAL ONCOLOGY	Email:	u251804@bcm.edu
Center:		Mail Stn:	
Name:	TYLER COYE	Phone:	
Id:	252582	Fax:	
Department:	SURGERY: VASCULAR SURGERY DIV.	Email:	u252582@bcm.edu
Center:		Mail Stn:	BCM390
Name:	PEDRAM BAYAT	Phone:	650-208-4914
Id:	Non-Baylor	Fax:	
Institution:	Mountain View High school	Email:	pbayat123@gmail.com
Address:			

A5. Funding Source:

Organization: EO2 CONCEPTS, INC (US)

A6a. Institution(s) where work will be performed:

BCM: Baylor College of Medicine
Baylor St. Luke's Medical Center (BSLMC)
HCHD: Harris County Hospital District Ben Taub

A6b. Research conducted outside of the United States:

Country:
Facility/Institution:
Contact/Investigator:

Phone Number:

If documentation of assurances has not been sent to the Office of Research, please explain:

A7. Research Category:

A8. Therapeutic Intent

Does this trial have therapeutic intent?
Yes

A9. ClinicalTrials.gov Registration

Does this protocol/trial require registration on ClinicalTrials.gov due to it: meeting the definition of an Applicable Clinical Trial, being required under the terms and conditions of an award, or being proposed to be published in ICMJE journals?
Yes

Who will be responsible for registering and maintaining the registration of this Applicable Clinical Trial?
The BCM PI will register the trial because either:

- the trial is BCM PI-initiated,
- BCM is the lead site of this multicenter trial, or,
- the industry sponsor has instructed the BCM PI to register the trial, or,
- registration of this trail is required as a term and condition of the reward by the funding agency.

ClinicalTrials.gov Identifier:
NCT03960463

Section B: Exempt Request

B. Exempt From IRB Review

Not Applicable

Section C: Background Information

Lower extremities surgical intervention such as minor amputations (e.g. toe amputation) and reconstructive foot surgery (e.g. surgical offloading to fix chronic deformities) have become an important component of limb salvage effort to prevent major amputations (i.e. above ankle) and preserve maximum function in patients with diabetes and loss of protective sensation. Surgical wounds post lower extremities surgical interventions are mainly closed surgically. However, surgical wound complications such as infection, dehiscence, necrotic tissue, surgical revision, and poor cosmesis are unfortunately highly prevalent in patients undergoing lower extremities surgical interventions. In most cases surgical wounds are managed with a simple island dressing, orthopaedic wool padding and a light retention bandage. It could be argued that such low cost, traditional dressings are adequate for most surgical wounds. However, amputees with poor tissue integrity often require modern wound care products that offer additional benefits, in particular among those with vascular and poor tissue oxygenation problem. Poor tissue oxygenation and poor skin perfusion could lead to surgical wound complications such as wound inflection, tissue necrosis, phantom pain, trauma and untimely surgical revision as well as major amputation.

In particular, the presence of non-viable, necrotic tissue (estimated to occur in 15-25% of cases) is significant as it can be responsible for delaying healing, prolonging the inflammatory response, mechanically obstructing contraction and impeding re-epithelialisation. It also provides a focus for wound infection and surgical revision.

The problem associated with necrotic tissue is not limited to lower extremities and could be seen in other surgical closures leading to excessive scar formation. Many of these scars can be problematic, being aesthetically unpleasant and causing discomfort. Blood supply is a significant factor in wound healing, and area of the skin with rich supply of vasculature is known to heal with finer scars. Several studies have demonstrated that mild hypoxia (lack of transcutaneous oxygen) is present in early scars, moderate hypoxia in proliferative scars, and severe hypoxia in regressive scars. Oxygen levels then

return to normal in mature scars, which is consistent along with the dynamic change in microvessel density. Therefore level of transcutaneous oxygen could be a determinant factor in formation of excessive scar formation.

Dressing materials are known to influence postoperative surgical wound healing and scar formation. A particular dressing that could promote wound hydration is key to ensure quick epithelialization and decrease excessive scar formation. The current standard of care in wound healing is to promote a moist wound environment by regular changing dressing and hydrate wound when needed. Some new advanced dressing and products have been also suggested with promising results in reducing excessive scar formation such as the use of silicone sheeting, hydrogel wound dressing, etc. However, level-1 evidence studies for effectiveness of such interventions are still lacking. Using advanced dressing enabling effective oxygen delivery to the wound bed could promote tissue hydration, which in turn could accelerate epithelialization and reducing the likelihood of formation of necrotic tissue and excessive scars.

In this study, we hypothesis that using novel dressing allows delivery tissue oxygenation via OxyGeni Oxygen Delivery System will reduce the likelihood of necrotic tissue as well as severe incisional scar post-surgical closure by improving transcutaneous oxygen levels during wound healing process. OxyGeni Oxygen delivery system is a novel wound healing therapy that promises to enhance tissue hydration, which in turn may lead to quick epithelialization essential to reduce the likelihood of formation of necrotic tissue and excessive scars. We will examine the validity of this hypothesis using a pilot randomized controlled trial using a convenient sample of 60 people (30 subjects per arm) with surgical wound closure.

Section D: Purpose and Objectives

We are proposing a clinical study at Baylor College of Medicine, to test the efficacy of the novel OxyGeni Oxygen delivery system for use in caring for patients with surgically closed wounds. We will assess the benefits of this novel therapy on successful closure, vascular parameters and quality of life. The study device OxyGeni is a Class II medical device which has US Food and Drug Administration (FDA) 510(k) clearance, CE-Mark approval and a Health Canada license for the treatment of wounds.

Here are the aims and hypotheses for this study:

Aim1: To assess effectiveness of OxyGeni oxygen delivery system in reducing the likelihood of wound complication post-surgical closure.

H1: OxyGeni oxygen delivery system will reduce the likelihood of surgical wound complication including tissue necrosis and its volume, infection, surgical revision, and amputation compare to standard of care dressing.

Aim2: To assess changes in skin perfusion in patients treated with OxyGeni oxygen delivery system.

H2: OxyGeni oxygen delivery system will improve perfusion in >50% of the patients as compared to baseline (measurements at baseline, 2 weeks, and 4 weeks).

Aim3: To evaluate changes in quality of life, anxiety during dressing change, and psychosocial parameters in patients with a surgical wound treated by OxyGeni oxygen delivery system

H3: Oxygen delivery will improve subject quality of life, reduce anxiety, and reduce perceived pain and physiological stress response during dressing change compared to the control group.

Aim4: To assess acceptability, user-friendliness, and Perception of benefit.

H4: OxyGeni oxygen delivery system will be considered to be practical to use, easy to use, and is perceived to be beneficial from both practitioner and subject as assessed by user friendliness questionnaire adapted for the purpose of this study (assessment at the conclusion of the study). This questionnaire is attached to the protocol.

H5. OxyGeni oxygen delivery system therapy will improve scar cosmetic appearance as assessed practitioner using the Scar Cosmesis Assessment and Rating (SCAR) Scale.

This is an exploratory study and our parameters of interest are: ¿ Complete wound healing post surgical intervention. ¿ % of wound complication post-surgical wound closure ¿ Perfusion improvement at 2 weeks, 4 weeks and 6 months compared to baseline and compared to the control group. ¿ Differences in pain, stress, anxiety, and quality of life compared to the control group ¿ Device acceptability and perception of benefit

Section E: Protocol Risks/Subjects

E1. Risk Category

Category 2: Research involving greater than minimal risk, but presenting the prospect of direct benefit to the individual subjects.

E2. Subjects

Gender:
Both

Age:
Adult (18-64 yrs), Geriatric (65+ yrs)

Ethnicity:
All Ethnicities

Primary Language:
English, Spanish

Groups to be recruited will include:
Patients

Which if any of the following vulnerable populations will be recruited as subjects?

Vulnerable populations require special protections. How will you obtain informed consent, protect subject confidentiality, and prevent undue coercion?

E3. Pregnant woman/fetus

Will pregnant women and/or fetuses (as described in 45 CFR 46 Subpart B) be enrolled in the research?
No

E4. Neonates

Will neonates of uncertain viability or nonviable neonates (as described in 45 CFR 46 Subpart B) be enrolled in the research?
No

E5. Children

Will children be enrolled in the research?
No

Section F: Design/Procedure

F1. Design

Select one category that most adequately describes your research:
c) Pilot

Discuss the research design including but not limited to such issues as: probability of group assignment, potential for subject to be randomized to placebo group, use of control subjects, etc.

This study will be a 4 weeks prospective (or up to wound healing or surgical revision, whichever came first), experimental study with N=60 consecutive patients, who are undergoing surgical closure.

Subjects will be randomized to either control or intervention group. The intervention group will receive the OxyGeni device and place the oxygen delivery within SOC dressing. The control group will receive standard of care wound dressing.

All patients will have baseline assessment including visual, dermal, neuropathy (Vibration Perception Threshold) and vascular assessment (ABI and Skin Perfusion Pressure). Then, the status of wound closure and presence of wound complication will be monitored every week. Each subjects will need up to 5 visits including baseline assessment, and weekly assessment up to 4 weeks or full wound healing or surgical revision, whichever came first, and an additional follow-up visit at a minimum 6 months after the surgery. At each visit, patients will be provided standard of care treatment including physical assessment, debridement and offloading. Table 1 in attachments' section summarizes the key measurement at each study visit.

Please note that no screening activities will take place prior to the patient signing a consent form.

Inclusion Criteria:

18-85 years of age. Ability to provide informed consent. Presence of a wound due to surgical intervention and closure. Subject or responsible caregiver is willing and able to maintain the required offloading (as applicable for the location of the wound) and applicable dressing changes

Exclusion Criteria:

Charcot Arthropathy Bilateral AK/BK amputation Active Drug/alcohol abuse (or history of drug/alcohol abuse in last 1 month) Dementia or impaired cognitive function Subjects with osteomyelitis or extreme gangrene. Excessive lymphedema Presence of active infection Subject has a history of or any intercurrent illnesses or conditions that would compromise the safety of the subject according to judgement of a qualified wound specialist.

F2. Procedure

Please note that subjects will be consented before performing any study related measurements. This study will not bring any direct costs to the subject. The subject's medical insurance will be billed for all standard of care procedures.

Subjects who are randomized in the intervention group will receive the OxyGeni therapy into their SOC dressing. Those subjects allocated to the control group will only receive Standard of Care treatment. We will be reviewing the billing records for our patients to explore costs of both groups.

We may visit the patient's home for an appointment that doesn't require the physician present or to fix any issues with the device.

There will be a follow up phone call up to three months after the last visit. Additionally, there may be an optional six month follow-up that can be conducted remotely (via a video or phone call) or in-person. During the virtual six month follow-up the patient will be asked to answer questionnaires electronically via REDCAP. This will also involve uploading a photo of the neck area to allow for virtual assessment of scarring/wound healing. Finally, the subject will be asked to upload a video of them performing 20 seconds of elbow flexion-extension to allow for virtual frailty assessment. Should the subject be available for an in-person visit, questionnaires will be conducted in clinic. Upper-extremity frailty test will also be conducted in the clinic per description listed below. Digital images of the neck area and images using the Kent camera will be taken to assess scarring and tissue perfusion.

Study Tasks:

Medical History: The presence of diabetes will be based on American Diabetes Association criteria if applicable. This will include: duration and type of diabetes, type of diabetes medication (insulin, oral, combination therapy, diet), previous history of foot ulcers, amputation (toe, foot), lower extremity bypass, lower extremity angioplasty, Coronary artery bypass surgery, cardiac angioplasty, arthritis, liver disease, osteoporosis, malignancy, and bone tumors. We will use the Kaplan co-morbidity index to record disease severity. We will measure height and weight to determine body mass index (BMI). We will evaluate and record glycated hemoglobin, albumin and prealbumin at baseline only in those patient charts where it is available due to the patient's standard of care treatment. Lab results will only be obtained only at the Baseline visit. Please note that patients will be recruited from an existing clinic population where they are already receiving Standard of Care procedures. These results will be obtained from your medical record at screening/baseline visit.

Social Factors: We will evaluate the following factors: marital status, years of education, type of work, tobacco history (pack years, current smoker, current use of chewing tobacco, previous smoker, no tobacco history), drug history (current, previous history, no drug history), and alcohol history. These factors will be collected at screening/baseline visit.

Peripheral Neuropathy: We will use Vibration Perception Threshold (VPT) Testing. VPT will be evaluated at the distal great toe, heel and 5th metatarsal head using a Biothesiometer. (Measurements will be done on screening/baseline visit and visit 4)

Heart Rate Monitoring: Zephyr BioHarness is an FDA approved wearable sensor which monitors physiological signs such as heart rate (electrocardiograph), breathing rate, skin temperature, and physical activity. This device will be comfortable placed on the sternum attached with either with two electrocardiograph (ECG) electrodes or elastic straps for subjects that report sensitive skin. Researchers will attach this device on the subject only for the duration of the visit. (Measurements will be done at all visits).

Vascular Assessment: We will assess perfusion of the macro-circulation with arterial Doppler studies and micro-circulation with Skin Perfusion Pressure measurements and Ankle Brachial Index (ABI) will be measured on both extremities. Therefore, we will use the SensiLase system (Väsamed) to measure Skin Perfusion Pressure (SPP) in mmHg. The SensiLase is a device that will record the amount of Skin Perfusion Pressure. (Measurements will be done at screening/baseline visit and visits 2 & 4). We will also obtain oxygen tissue saturation images using Kent Camera or HyperView Camera (every visit)

-Ankle-Brachial Index: This test is to measure blood pressure of the ankle and arm while the subject is at rest. (Measurements will be done on screening/baseline visit and visits 2 & 4). Research Staff will: 1. Attach correct sized cuff on ankle and arm 2. Doppler probe will be placed on ankle and arm. 3. Cuffs will be inflated above your blood pressure. 4. The cuffs will deflate 5. Research Staff will document values in the subjects records. 6. Research Staff will remove the cuffs from the subjects¿ ankle and arm.

-Skin Perfusion Pressure: This test will help the physician and researchers know if the tiny blood vessels in the subjects feet are blocked, damaged or if wound are getting enough blood to heal properly. (Measurements will be done on screening/baseline visit and visits 2 & 4) Research Staff will: 1. Ask the subject to lie flat 2. Research staff will place correct

sized pressure cuffs around the subjects ankles. 3. Research staff will also place an adhesive pad along with a sensor as (sensors will not be touching the skin directly) it will measure Skin Perfusion. 4. The cuffs will inflate above systolic blood pressure. 5. Research Staff will document values in the subjects record 6. Research Staff will remove cuffs from the ankle.

Adverse Event Reporting: Research Staff will document and report any study/non study related incident as per institution regulations. (Subjects will be asked on screening/baseline visit and visits 1- 4 and at the optional 5 visit).

Wound Assessment: A digital photo/video and thermal photo of wound will be taken for wound size verification and evaluate the area of inflammation. (Measurement will be performed at every visit). Photo may be taken with digital camera, KENT NIR camera, or eKARE camera.

Questionnaires: Quality of Life, Frailty Status, Cognitive Assessment, Sleep Quality and Device Acceptability: To evaluate functional status, we will use well accepted and validated general functional assessment instruments, Promise Global for Quality of Life, Sleep Quality questionnaire (PSQI), TSFI for frailty status, MOCA for Mental Exam. (All questionnaires will be done on screening/baseline visit and visit 4. MOCA will only be done at baseline/screening visit). At the visit 5 (optional) follow-up visit SCAR assessment (the Scar Cosmesis Assessment and Rating Scale), Patient and Observer Scar Assessment Scale (POSAS), and Patient Attitude to Scarring Scale (PASS). Questionnaires may be collected in person or in RedCap.

Dressing Change: All patients will have their dressing changed weekly (screening/initial visit and visits 1-4), the intervention group will be treated continuously with oxygen from the OxyGeni device.

Prior to application of the OxyGeni, the research staff will: 1. Select a dressing that will cover the wound. 2. Apply absorbent wound padding (e.g. calcium alginate) 3. Place and steri-strip cannula on top of padding. 4. Apply additional padding on top of cannula 5. Wrap dressing as directed by physician.

We may also use an oxygen delivery dressing named Oxyspur instead of traditional dressing based on the judgment of the surgeon. This may facilitate delivery of oxygen to the incision site or wound bed as well as ease of dressing.

Device Acceptability Questionnaire: The subject will be handed a questionnaire to evaluate the study device and provide feedback to the research team. (Visit 4)

SCAR assessment scale will be done to assess the appearance of the scar. In addition, a digital photography will be taken (Visit 5). If the patient is unable to attend, the visit can be done remotely.

Upper Extremity Test: Investigators will measure arm motion from each participant by implementing a validated technology based on wearable sensor system named LegSys. This system will assess respectively spatio-temporal parameters of arm motion in a clinical setting. The LegSys system will be used with 2 sensors to capture arm motion, one placed at the subject's wrist and another at their elbow. While being at a comfortable position, the subject will be asked to flex and extend their arm for 20 seconds at a fast speed. Subject will also be asked to repeat this task but counting backwards as they flex and extend their arm (dual task).

Pain Intensity Assessment (VAS): The subject will be provided with a numeric pain scale where he/she will report pain intensity. Research staff will document subject's pain level. (Measurements will be done at every visit)

WIFI wound classification (Wound, Ischemia, and foot infection): Podiatric (foot) physician will evaluate the health and wellness of the subject's feet in compliance of standard of care. (Will be done on screening/baseline visit and visit 4)

Screening/Baseline Visit *duration of visit 90 minutes This visit research staff will perform as described above: Medical History, Questionnaires (Pain, Social Factors, and Quality of Life, Sleep Quality, Cognitive Assessment, Frailty), Upper Extremity Test, Peripheral Neuropathy, Heart Rate Monitoring, Vascular Assessment, Wound Assessment, Wound Monitoring, Wifi Wound Classification, Dressing Change and Device Education.

Visit 1, One Week Later *duration 50 minutes This visit research staff will perform as described above: Pain Questionnaire, Heart Rate Monitoring, Adverse Event Reporting, Wound Assessment, Dressing Change and Device Education.

Visit 2, Two Weeks Later *duration of visit 80 minutes This visit research staff will perform as described above: Pain Questionnaire, Vascular Assessments, Heart Rate Monitoring, Adverse Event Reporting, Wound Monitoring, Wound Assessment, Dressing Change and Device Education.

Visit 3, Three Weeks Later *duration 60 minutes This visit research staff will perform as described above: Pain Questionnaire, Heart Rate Monitoring, Adverse Event Reporting, Wound Assessment, Dressing Change and Device Education.

Visit 4, Four Weeks Later *duration of visit 80 minutes This visit research staff will perform as described above: Questionnaires (Quality of Life, Acceptability, Pain, Frailty, Sleep Quality), Vascular Assessments, Heart Rate Monitoring, Adverse Event Reporting, Wound Monitoring, Wound Assessment, Dressing Change.

Visit 5, at a minimum of 6 months after surgery. This visit research staff will perform the SCAR assessment scale, POSAS,

and PASS questionnaires and take a digital picture of the scar. If the patient is unable to attend, the visit can be done remotely.

Section G: Sample Size/Data Analysis

G1. Sample Size

How many subjects (or specimens, or charts) will be used in this study?

Local: 60 Worldwide: 60

Please indicate why you chose the sample size proposed:

This is a pilot study. We plan to recruit a convenient sample of 60subjects (30 subjects per group), which we anticipate to be sufficient to observe a trend between groups to examine proof of concept of EO2 OxyGeni oxygen to reduce the likelihood of wound complication post-surgical wound closure. Based on our initial prevalence chart review, we anticipate that 20-30% of patients in the control group will have failure in wound closure (e.g. necrosis, tissue necrosis and its volume, infection, surgical revision). We anticipate to reduce the incident of wound complication to less than 5%. Using a chi-square test and assuming an alpha level of 5%, and ratio risk reduction of 25%, we anticipate to have statistical power of 95% using a 30 sample per group.

Based on this pilot study, we will calculate power and will design a clinical trial accordingly.

G2. Data Analysis

Provide a description of your plan for data analysis. State the types of comparisons you plan (e.g. comparison of means, comparison of proportions, regressions, analysis of variance). Which is the PRIMARY comparison/analysis? How will the analyses proposed relate to the primary purposes of your study?

The primary outcome of this study is the percentage of wound complication incidents post surgical interventions. We will use chi-square to estimate whether the number of wound complication incidents is less in the intervention group compared to the control group. The secondary outcomes of this study are: improvement in skin perfusion and reduction in perceived pain, anxiety, and stress. We will use general linear model (GLM) univariate analysis (UNIANOVA) to examine significant difference between groups for the secondary parameters of interest. Results will be adjusted by demographic information (age, gender, BMI) and clinical information (size of initial wound, A1C level, baseline skin perfusion).

Section H: Potential Risks/Discomforts

H1. Potential Risks/Discomforts

Describe and assess any potential risks/discomforts; (physical, psychological, social, legal, or other) and assess the likelihood and seriousness of such risks:

As any new investigational device, there are some risks, which are anticipated to be minimal in this study. Some of potential risks could be: * Skin related discomfort, erythema (redness), skin rash, dryness and itching. * Skin allergic reaction to dressing adhesive. * Tenderness/minor ache around the dressing application area * Heat sensation and/or perspiration with wearing dressing * Some impairment of mobility due to dressing unit

Some of the study devices (OxyGeni LegSys, SensiLase) and technology are completely non-invasive, safe, non-toxic and non-ionizing. The potential risks are minimal. However, like any battery powered systems, there is a minimum risk of sensor malfunctioning. In addition, the study devices are not waterproof, and although they use a low powered battery (similar to a cell-phone battery), in order to avoid any risk of shock the monitor should not be submerged or saturated with fluids during operations or cleaning.

When wearing the study devices, there is a small risk of tripping. The dressing will be connected to the OxyGeni device through a thin tube that will be placed comfortably along the subject's legs underneath their clothing. We will instruct the subject to place the tube correctly to minimize any risk of tripping.

There is a minimal risk of interference from Zephyr Bioharness in the functionality of pacemaker/ICD devices. Therefore, to avoid any adverse events, it is recommend by the American Heart Associates to avoid the use of this wearable device on subjects with a pacemaker/IDC. There are no hazards or adverse events reported regarding Zephyr Bioharness.

Subjects must be willing to charge device battery daily. Otherwise they will not receive benefit from treatment.

The assessments described above are expected to be minimal risk and probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

A vibration perception device will be used to monitor progress and diagnose severity of DPN in lower extremities. The vibration range will be from 0-25 Volts. Participants may feel slight discomfort from the vibration. This device is compliant with medical electrical device safety according to IEC 601-1.

Please note that there is also the possibility for loss of confidentiality. The PI and the research team will minimize the possibility of for loss of confidentiality by keeping all the physical data locked in cabinets only accessible to the research team. The electronic data will be kept on network password protected institutional computers. . Data collected during the study may be published and made publicly available. Data may also be shared with other research groups. However, data that could in any way identify the subject will not be made public or shared. And, subject PHI will be coded as much as possible to minimize the potential for loss of confidentiality.

H2. Data and safety monitoring plan

Do the study activities impart greater than minimal risk to subjects?
Yes

NOTE: The answer to the questions in H2 requires the completion of the form: 'Section H â€“ Data and Safety Monitoring Plan' as an attachment in Section S.

H3. Coordination of information among sites for multi-site research

Is the BCM Principal Investigator acting as the SPONSOR-INVESTIGATOR for this multi-site research?
No or Not Applicable

Is BCM the COORDINATING CENTER for this multi-site research?
No or Not Applicable

Section I: Potential Benefits

Describe potential benefit(s) to be gained by the individual subject as a result of participating in the planned work.
There may be no direct benefit to the subject by being in this study. What the researchers find out from this study may help other people with surgical wound closures. This research utilizes a new dressing with active oxygen supply to the surgically closed wounds to reduce the likelihood of developing necrotic tissue.

Specialized wound dressings have the ability to improve specific physiological processes that facilitate healing. However, their specific benefits and target wounds is not well understood. Consequently, these are either underutilized in clinical practice or over utilized without any well-defined criteria. TransCu O2 oxygen delivery system is a novel wound healing therapy that promises to enhance vascular conditions at the wound bed and expediting wound healing.

Describe potential benefit(s) to society of the planned work.
It is part of a larger prevention initiative to reduce the high number of surgical closure failures and development of necrosis.

The body of work in this area suggests opportunities for better patient care using a simple, inexpensive approach that has few adverse effects.

Do anticipated benefits outweigh potential risks? Discuss the risk-to-benefit ratio.
Although there some risks involved in this study associated with the device and some of the procedures involved, the study does provide the possibility of benefit to subjects. Therefore, the benefits outweigh the risks involved.

Section J: Consent Procedures

J1. Waiver of Consent

Will any portion of this research require a waiver of consent and authorization?
Yes

Please describe the portion of the research for which a waiver is required. (Example: chart review to determine subject eligibility)
We will be reviewing our subject's chart for screening and to verify subject eligibility.

Explain why the research and the use or disclosure of protected health information involves no more than minimal risk (including privacy risks) to the individuals.
The PHI will not be reused or disclosed to (shared with) any other person or entity, except as required by law, for authorized oversight of the research study, or for other research for which the use or disclosure of the PHI would be permitted under the Privacy Rule.

There is the possibility for loss of confidentiality. However, the PI and his team will employ ample measures to ensure that the data is coded as much as possible and that it is stored under lock and key at all times. Also, electronic data will only be kept on our network password protected computers.

Explain why the waiver will not adversely affect the privacy rights and the welfare of the research subjects.

Subjects will receive the same standard regardless of their participation in the trial.

Explain why the research could not practicably be conducted without the waiver and could not practicably be conducted without access to and use of the protected health information.

Patients will receive the same standard of care whether or not they participate in the research. Subjects are patients of the PI in his clinic. So, their participation will not affect the current or future care in the clinic by their physician. By being able to review the patient charts, we can identify eligible patients. This also allows us to verify their eligibility which is crucial to being able to enroll a patient.

Describe how an adequate plan exists in order to protect identifiers from improper use and disclosure.

The PI and his designated research coordinator have both received training in the protection of confidential patient information. All study information obtained will be coded. The use or disclosure of PHI involves no more than minimal risk to the individuals and the waiver will not adversely affect the privacy rights and the welfare of the individuals. As there is a possibility of a loss of confidentiality in this study, the PI and his team will employ ample measures such as coding as much of the data as possible. In addition all physical information will be kept in locked file cabinets. All electronic data will be stored on our network password protected computers.

Describe how an adequate plan exists in order to destroy identifiers at the earliest opportunity consistent with conduct of the research, unless there is a health or research justification for retaining the identifiers or such retention is otherwise required by law.

We will destroy identifiers at the earliest opportunity consistent with conduct of the research absent a health or research justification for retaining them or a legal requirement to do so. The use or disclosure of PHI involves no more than minimal risk to the individuals and the waiver will not adversely affect the privacy rights and the welfare of the individuals. PHI is not disclosed to any other person or entity except for the authorized oversight of the research study by the PI and the clinical database administrator. The Division uniformly adheres to all patient and patient data security and confidentiality rules and regulations set forth by the College.

Describe how adequate written assurances exist in order to ensure that the PHI will not be reused or disclosed to (shared with) any other person or entity, except as required by law, for authorized oversight of the research study, or for other research for which the use or disclosure of the PHI would be permitted under the Privacy Rule.

The PHI will not be reused or disclosed to (shared with) any other person or entity, except as required by law, for authorized oversight of the research study, or for other research for which the use or disclosure of the PHI would be permitted under the Privacy Rule.

Information from health records such as diagnoses, progress notes, medications, lab or radiology findings, etc.

Yes

Specific information concerning alcohol abuse:

Yes

Specific information concerning drug abuse:

Yes

Specific information concerning sickle cell anemia:

No

Specific information concerning HIV:

No

Specific information concerning psychiatry notes:

No

Demographic information (name, D.O.B., age, gender, race, etc.):

Yes

Full Social Security #:

Yes

Partial Social Security # (Last four digits):

No

Billing or financial records:

No

Photographs, videotapes, and/or audiotapes of you:

Yes

Other:

No

Will additional pertinent information be provided to subjects after participation?
Yes

If Yes, explain how subjects will be provided additional pertinent information after participation.
If a patient was screened and was not enrolled, they will not receive any study information. Those patients who were enrolled will have access to that information once the study has been completed.

J1a. Waiver of requirement for written documentation of Consent

Will this research require a waiver of the requirement for written documentation of informed consent?
No

J2. Consent Procedures

Who will recruit subjects for this study?
PI
PI's staff

Describe how research population will be identified, recruitment procedures, any waiting period between informing the prospective participant and obtaining consent, steps taken to minimize the possibility of coercion or undue influence and consent procedures in detail.
in order to recruit or identify subjects, we will screen our patient charts for eligible subjects.

The subject will be fully informed about the study, and will verbalize understanding and voluntarily agree to participate with the guidelines as stipulated in the informed consent. The subject will be informed if he/she can withdraw from the study at any time without loss of benefits. Consent forms will be signed and dated by the subject and by the Principal Investigator or Investigators. The original (with patient's signature) will be maintained per IRB policy. Any critical information will be sent for inclusion in the medical records, if it affects patient¿s wellbeing and any future treatment. A signed copy of the consent form will be provided to the patient. Informed consent will be obtained prior to performance of any study procedures. Specifically: 1. No minors will be consented. 2. Subjects are given as much time as needed to ask questions and read over the consent. They are will be given a copy of the consent and can return at a later date if they need to discuss it with family members, etc.

Reconsent plan: Patients will be called and asked it they would like to participate in the optional visit. Patients that agree to participate in the optional Visit 5, will be reconsented physically (in-person) or the consent form will be mailed to them and they will be asked to sign and mail it back. Either way, the patient will receive a copy.

Subjects will be recruited from the COI's own practice. He may get some referrals from his colleagues that work in the same clinic such as Dr. Jeffrey Ross, Dr. Brian Lepow, Dr. Miguel Montero-Baker and other collaborators. We have included a Waiver of Partial Consent to cover our screening process. The COI will identify eligible subjects and alert the coordinator. The coordinator will review all the details of the study with the subject and/or their family. If the subject agrees to participate in the study, they will be screened and then enrolled into the study.

Subjects may also be contacting Research Coordinators independently as we will distribute a recruitment flyer as described in section R and S.

This study will include patients who are age 18-85. We understand that subjects who are older age may be at a greater risk for cognitive impairments. However, if the PI feels that a subject may have diminished cognitive capacity, he will determine that the patient can not be enrolled in the study. Therefore, the research team will have this information available when they consent the patient. As there is a risk of loss of confidentiality, the PI and staff will take ample measures to code as much of the information as possible.

Please note that all subjects will be consented before any screening procedures are done.

Spanish speakers will be consented using a full Spanish version of the consent. We have Spanish speaking coordinators on staff that can receive consent from Spanish speaking patients.

Are foreign language consent forms required for this protocol?
Yes

Which of the following ways will you document informed consent in languages other than English?
A full-length informed consent document

J3. Privacy and Intrusiveness

Will the research involve observation or intrusion in situations where the subjects would normally have an expectation of privacy?
No

J4. Children

Will children be enrolled in the research?
No

J5. Neonates

Will non-viable neonates or neonates of uncertain viability be involved in research?
No

J6. Consent Capacity - Adults who lack capacity

Will Adult subjects who lack the capacity to give informed consent be enrolled in the research?
No

J7. Prisoners

Will Prisoners be enrolled in the research?
No

Section K: Research Related Health Information and Confidentiality

Will research data include identifiable subject information?
Yes

Information from health records such as diagnoses, progress notes, medications, lab or radiology findings, etc.
Yes

Specific information concerning alcohol abuse:
Yes

Specific information concerning drug abuse:
Yes

Specific information concerning sickle cell anemia:
No

Specific information concerning HIV:
No

Specific information concerning psychiatry notes:
No

Demographic information (name, D.O.B., age, gender, race, etc.):
Yes

Full Social Security #:
Yes

Partial Social Security # (Last four digits):
No

Billing or financial records:
Yes

Photographs, videotapes, and/or audiotapes of you:
Yes

Other:
No

At what institution will the physical research data be kept?
The physical research will be kept in our BCM offices housed in the Mcnair Building room B10.401.

Additionally the data will be stored in Redcap, a secure, online data base.

How will such physical research data be secured?
Data will be kept in locked file cabinets that only the research team has access to.

At what institution will the electronic research data be kept?

Electronic data will be kept on network computers in our BCM offices, under the password protected server. Address : \\discovery1.ad.bcm.edu\bcm-dept-icamp.

Data for this study may be stored electronically via RedCap in addition to physical storage. Electronic data will be stored using the REDCap (Research Electronic Data Capture) software. This software is used to electronically collect and manage research data. REDCap is a secure, web-based platform.

Such electronic research data will be secured via BCM IT Services- provided secured network storage of electronic research data (Non-Portable devices only):

Yes

Such electronic research data will be secured via Other:

No

Will there be anyone besides the PI, the study staff, the IRB and the sponsor, who will have access to identifiable research data?

No

Please describe the methods of transmission of any research data (including PHI, sensitive, and non-sensitive data) to sponsors and/or collaborators.

Transmissions, if any, will only happen via secure emails.

Will you obtain a Certificate of Confidentiality for this study?

No

Please further discuss any potential confidentiality issues related to this study.

NA

Section L: Cost/Payment

Delineate clinical procedures from research procedures. Will subject's insurance (or subject) be responsible for research related costs? If so state for which items subject's insurance (or subject) will be responsible (surgery, device, drugs, etc). If appropriate, discuss the availability of financial counseling.

Participating in this study will take the subject's time and will not involve any direct cost to him/her. The subject's medical insurance will be billed for all standard of care related expenses including:

¿ Wound care (CPT 97597), Post-op visit (99024) on visits 0, 2, and 4, ¿ Hba1c (CPT 83036) at visit 0 only if not previously available on EPIC

If subjects will be paid (money, gift certificates, coupons, etc.) to participate in this research project, please note the total dollar amount (or dollar value amount) and distribution plan (one payment, pro-rated payment, paid upon completion, etc) of the payment.

Dollar Amount:

450

Distribution Plan:

Subjects will be compensated $75 per visit. We will be also providing parking validations. Visit 5 (Optional), in person visit compensation $75. Remote visit compensation $25.

Subjects will be given a ClinCard where payments will be loaded after a study visit is completed. Additional information will be provided to the subject about how to manage the card.

We will be requesting subjects SSN for payment purposes. This is required in order to provide them with a ClinCard.

Section M: Genetics

How would you classify your genetic study?

Discuss the potential for psychological, social, and/or physical harm subsequent to participation in this research. Please discuss, considering the following areas: risks to privacy, confidentiality, insurability, employability, immigration status, paternity status, educational opportunities, or social stigma.

Will subjects be offered any type of genetic education or counseling, and if so, who will provide the education or counseling and under what conditions will it be provided? If there is the possibility that a family's pedigree will be presented or published, please describe how you will protect family member's confidentiality?

Section N: Sample Collection

None

Section O: Drug Studies

Does the research involve the use of ANY drug* or biologic? (*A drug is defined as any substance that is used to elicit a pharmacologic or physiologic response whether it is for treatment or diagnostic purposes)

No

Does the research involve the use of ANY gene transfer agent for human gene transfer research?

No

O1. Current Drugs

Is this study placebo-controlled?

No

Will the research involve a radioactive drug?

No

Section P: Device Studies

Does this research study involve the use of ANY device?

Yes

Device 1: Transcu O2 device

Device 2: Sensilase

Device 3: Zephyr Bioharness

Device 4: Legsys

Device 5: Kent camera

Device 6: hyperview camera

Device 7: OxyGeni

Device 8: inSight

Section Q: Consent Form(s)

EO2 Concepts Study

Section R: Advertisements

None