Concise and Focused Presentation

You are being asked to voluntarily participate in a research study. The purpose of this study is to evaluate if electrical stimulation therapy helps to manage chemotherapy-induced peripheral neuropathy which includes pain in your lower extremities associated with toxicity of chemotherapeutic agents. In this study we will place a low risk device that delivers electrical stimulation to help reduce pain in your lower extremities. No research procedures will take place before signing the consent form. Your participation in this study will be voluntary. There are minimal risks and you may benefit from this study by reducing pain in your lower extremities. You do not have to participate in this study and can continue to receive your normal care.

We propose the daily use of electrical stimulation for 4 weeks to explore the possibility to decrease your pain associated to cancer treatment. During your first visit, the research team will test the status of your lower extremities with tools that record muscle activity and blood circulation while you receive electrical stimulation therapy. You will be selected at random to receive either a functional (active) device or non-functional (placebo) device for the first 4 weeks. Randomization will be done through a computer‐generated list followed by sequential allocation. At this visit, you will be provided your assigned electrical stimulation device for daily application during the next 4 weeks. The device will be only utilized by you and will not be re-used or recycled for other patients' use. We will ask you to return to the clinic after 4 weeks from your first visit (4W visit), so that the research team can test the status of your legs after using daily electrical stimulation therapy. At this visit, you will receive a functional (active) device to take home and continue to deliver stimulation until your final visit at the 8th week. You will get to keep the functional device at the end of your participation.

Background

Chemotherapy and other cancer treatments can cause damage to the nerves away from the brain and spinal cord. Mainly, the nerves from the arms and legs are affected, presenting pain. This is called chemotherapy induced peripheral neuropathy or CIPN and occurs in over half of patients receiving chemotherapy. Additional to pain, cancer treatment may cause loss of balance which affects motor capacity and is a major cause of poor quality of life among.

Treatment for CIPN is mainly based on pain medications; however, other alternatives such as transcutaneous electrical nerve stimulation (TENS) have demonstrated its ability to manage pain in patients with CIPN. This technology works by closing the pain signals from the body to the brain. For this study, we will use a device placed around one of your calf muscles to explore the possibility to decrease your pain associated to cancer treatment.

This research study is funded by National Science FoundationThe Principal Investigator BIJAN NAJAFI for this study:receives personal income for other work for Biosensics LLC, such as payments for lectures or for consultations

A description of this clinical trial will be available on http://www.ClinicalTrials.gov, as required by U.S. Law. This Web site will not include information that can identify you. At most, the Web site will include a summary of the results. You can search this Web site at any time.

Purpose
The purpose of this pilot study is to examine effectiveness of daily use of TENS therapy to address pain due to chemotherapy induced peripheral neuropathy.

Procedures
The research will be conducted at the following location(s):
Baylor College of Medicine.

We will recruit 30 subjects with CIPN. Over the course of 8 weeks, you will receive electrical stimulation on one of your legs up to 3 hours daily to manage pain, fatigue, weakness, or leg muscle loss. Electrical stimulation may also have positive effects to improve mobility and balance, which can also be affected by CIPN.

The study will consist of three in-person visits. During your first (baseline, week 0), second (4-weeks, 4W) and third (8-weeks, 8W) visits, we will assess the incidence of leg pain, numbness, muscle weakness, mobility, balance and circulation.

During each in-person visits assessments, we will carry out the following assessments:

1) To detect sensitivity (awareness of various touch sensations), we will place a vibration knob that delivers minimal vibration on different regions of your feet or hands (vibratory perception threshold test).
2)To detect peripheral neuropathy (nerve damage usually in the hands or feet that results in weakness, numbness or pain), we will use a device that measures nerve conduction in the leg called DPNCheck. This device elicits intermittent and low impulses of electrical stimulation on your ankle to detect nerve conduction and amplitude of your sural nerve.
3) To detect your ankle strength, we will use a tool called a dynamometer.
4) To detect muscle loss, we will measure the calf muscle circumference of your leg with a measure tape.
5) To detect muscle activity, we will use a tool called surface electromyography (sEMG) while receiving electrical stimulation therapy through a band strap placed around your calf muscle.
6) To determine your levels of pain, impression of change, fatigue levels and the impact of your symptoms, we will perform the following questionnaires: Fibromyalgia Diagnostic Criteria (FMS), Symptom Impact Questionnaire (SIQR), Patients Global Impression of Change (PGIC), Brief pain inventory (BPI), Medical Outcome Study Sleep Scale (MOS) questionnaires, and Multidimensional Assessment of Fatigue (MAF), common terminology criteria for adverse events (CTCAE) v5., European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-CIPN twenty-item scale (EORTC-CIPN20), Utah Early Neuropathy Scale (UENS) , European Organization for Research and Treatment Core Quality of Life questionnaire (EORTC-QLQC30).
7) Optional assessments:
Upper Extremity Frailty Tests: The research team will measure your arms' movements using a sensor attached at your wrists and elbow with an elastic band. There will be 3 different types of Upper Extremity

Tests and you will do at least one with each arm. Flexion-extension: While being at a comfortable position, you will be asked to flex and extend your arm for 20 seconds at a fast speed. You will repeat this task while counting backwards.

Physical Activity Monitoring: You will be given a wearable device (PAMSys) and/or smart watch (Vivosmart 4), that will be measuring several parameters including number of steps taken, duration of sitting, standing, walking and lying, time taken and number of transitions from sit to stand, and walking speed for a minimum of 48 hours. You will return the wearable device and/or smart watch at the end of study participation. You will either return the device at your next research visit or be given a prepaid package to mail the device back. The research staff will provide explanation for how to return the device when it is given to you.

Oxygen Level Assessment: Oxygen saturation will be measured during study visits using a pulse oximeter.

Peripheral Neuropathy: Research staff will use a noninvasive device to assess peripheral neuropathy (nerve damage that results in weakness, numbness or pain) in your legs/feet. You will be asked to lie on your side or place your knee on a chair so that your outer ankle bone and calf are available. Research staff will place the device on the side of your ankle bone and calf, and you will feel a slight sensation. This will only take about 30 seconds. Research staff may assess this on either one or both legs.

Gait and Balance Test: You will wear 5 sensors (for example, accelerometer) named LEGSys (one on lower back, 2 on each upper thigh and 2 on each shin) attached with elastic straps to test balance and record walking pattern. Research staff will ensure that the elastic straps are not too tight in order to avoid poor circulation during the visit. You may also be asked to walk on the ground on a 20 meter walkway, or on a treadmill at a preferred walking speed and a fast speed to observe your walking patterns.

Optional Questionnaires at each visit: pain, weakness, sleep, quality of life, frailty, depression, life and space, beck anxiety scale, Katz-daily living, fatigue, and user acceptability.

After the baseline visit, you will be provided your own device to deliver electrical stimulation by yourself at-home for 4 weeks. You will be instructed on how to set up the device through a phone app. You will be asked to switch legs for electrical stimulation delivery on a weekly basis.

The study coordinator will be able to monitor your daily use through the app and will be in communication with you for any questions related to the device usage.

The supervision of this study will be by oncology specialists, and the location will be at the Baylor College of Medicine.

At the 4th week visit the research team will let you know if had an active, commercial device or a

placebo device. If you had a commercial device already, you will keep that device. If you had a placebo device, you will receive a commercial device to keep after your study participation is complete. The research team will ask for you to return to the clinic after another 4 weeks (8th week visit) for a final assessment. During this visit, study assessments described above may be repeated. After this visit, you may keep the commercial device.

The researchers will take digital photographs /videos of both of your legs throughout the study. This is done using a special digital camera for visual images and blood flow detection. This method is non invasive and does not cause any harm to you. **We will blur your face out in the photographs/videos. While we do all our efforts to mask your face in some cases (for example journal policy) this may not be practical. We will only use videos and photos of you for scientific presentations or scientific publications.

Initial your decision below.
____I agree to have my photographs/videotape presented in scientific presentation or scientific publication
____I do NOT agree to have my photographs/videotape presented in scientific presentation or scientific publication

If you are eligible, the research personnel would like to contact you in the future for participation in other research studies. You are not required to participate in these studies and your medical care or involvement with the current research study will in no way be affected if you choose not to participate . You may ask us to stop contacting you at any time.
_____I agree to be contacted for future research studies
_____I do not agree to be contacted for future research studies.
Please provide below your Emergency contact information:
Contact name:_____
Relationship: _____
Phone number:_____
Please note that the research staff may contact you for any study related questions or concerns during your participation of the study.
If you are a student or employee, note that your participation will NOT affect your academic position or employment. You may also refuse to participate without any penalty.

Clinically Relevant Research Results

The results generated from this research study are not expected to have any clinical relevance to you.

Sharing and Future Research Studies with Identifiable Private Information

Information that identifies you may be removed from your identifiable private information collected as part of this research, and after such removal, your information may be used for future research studies or distributed to another investigator for future research studies without additional consent/authorization from you.

Research related health information

Authorization to Use or Disclose (Release) Health Information that Identifies You for a Research Study

If you sign this document, you give permission to people who give medical care and ensure quality from Baylor College of Medicine to use or disclose (release) your health information that identifies you for the research study described in this document.

The health information that we may use or disclose (release) for this research includes:

- Information from health records such as diagnoses, progress notes, medications, lab or radiology findings, etc.
- Demographic information (name, D.O.B., age, gender, race, etc.)
- Full Social Security #
- Photographs, videotapes, and/or audiotapes of you

The health information listed above may be used by and or disclosed (released) to researchers, their staff and their collaborators on this research project, the Institutional Review Board, Baylor College of Medicine, BAYLOR COLLEGE OF MEDICINE (BCM) and their representatives, and NATIONAL SCIENCE FOUNDATION (NSF) and their representatives.

Agents of the U.S. Food and Drug Administration may inspect the research records including your health information. Agents of regulatory agencies such as the U.S. Department of Health and Human Services will be permitted to inspect the research records including your health information.

Use or Disclosure Required by Law

Your health information will be used or disclosed when required by law.

Your health information may be shared with a public health authority that is authorized by law to collect or receive such information for the purpose of preventing or controlling disease, injury, or disability and conducting public health surveillance, investigations or interventions.

Baylor College of Medicine is required by law to protect your health information. By signing this document, you authorize Baylor College of Medicine to use and/or disclose (release) your health information for this research. Those persons who receive your health information may not be required by Federal privacy laws (such as the Privacy rule) to protect it and may share your information with others without your permission, if permitted by laws governing them.

Please note that the research involves treatment. You do not have to sign this Authorization, but if you do not, you may not receive research-related treatment. To maintain the integrity of this research study, you generally will not have access to your personal health information related to this research until the study is complete. However, your health information that is necessary to your care will be provided to

you or your physician. At the conclusion of the research and at your request, you generally will have access to your health information that Baylor College of Medicine maintain in a designated record set, which means a set of data that includes medical information or billing records used in whole or in part by your doctors or other health care providers at Baylor College of Medicine to make decisions about individuals. Access to your health information in a designated record set is described in the Notice of Privacy Practices provided to you by representatives of the specific institution where you are being enrolled into this research study which are: Baylor College of Medicine.

Please note that you may change your mind and revoke (take back) this Authorization at any time. Even if you revoke this Authorization, researchers, their staff and their collaborators on this research project, the Institutional Review Board, BAYLOR COLLEGE OF MEDICINE (BCM) and their representatives, NATIONAL SCIENCE FOUNDATION (NSF) and their representatives, regulatory agencies such as the U.S. Department of Health and Human Services, FDA, Baylor College of Medicine may still use or disclose health information they already have obtained about you as necessary to maintain the integrity or reliability of the current research. If you revoke this Authorization, you may no longer be allowed to participate in the research described in this Authorization.

To revoke this Authorization, you must write to: Bijan Najafi, PhD
7200 Cambridge Street, Room B01.529

This authorization does not have an expiration date. If all information that does or can identify you is removed from your health information, the remaining information will no longer be subject to this authorization and may be used or disclosed for other purposes.

No publication or public presentation about the research described above will reveal your identity without another authorization from you.

Potential Risks and Discomforts

The risk to participants of this study is considered to be minimal in a controlled environment with an attendant present. This research routine will not place subjects at higher risk than normal activities of daily living, and no more risk of harm or discomfort is associated with these tests than the discomfort normally incurred while performing normal muscle stretching. Subjects will be allowed rest time between trials as needed. The EMG device will detect level of fatigue and based on that we will determine the length of the sessions.

The devices and technologies are completely non-invasive, safe, non-toxic and non-ionizing. The potential risks to subject 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 cellphone battery), in order to avoid any risk of shock the monitor should not be submerged or saturated with fluids during operations or cleaning. It does not emit any radiation to the human body, and does not offer any significant risk to the subject.

Subjects may experience mild discomfort from the band or hydrogel pads on their legs. We will inform the subject to please notify the investigators if the band or hydrogel pads are uncomfortable.

All information we will collect about the subject will be stored in a secure location and coded in a way to maintain confidentiality. Only study personnel will have access to their records. 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 them will not be made public or shared.

Some of potential risks of using TENS therapy could be: (1) Skin related discomfort, such as tingling or (2) Skin reaction to hydrogel pads (irritation, rash).

If the tingling sensation is too intense for the participant, they have the ability to reduce the intensity for their best level of comfort.

The peripheral neuropathy device (DPNCheck) has minimal risks to the subjects as it is non-invasive, safe, non-toxic, and non-ionizing. This device elicits intermittent and low impulses of electrical stimulation on your ankle to detect nerve conduction and amplitude of your sural nerve. The subjects may feel a tingling sensation during its use, and if it is too intense, the research staff will stop the test.

There may be unknown risks or discomforts involved. Study staff will update you in a timely way on any new information that may affect your decision to stay in the study. There is a small risk for the loss of confidentiality. However, the study personnel will make every effort to minimize these risks.

Potential Benefits

You will receive no direct benefit from your participation in this study. However, your participation may help the investigators better understand Study #2: We cannot promise any benefit to you or to others from you joining this research. However, possible benefits include decreasing your pain associated to chemotherapeutic agents. In addition, what the researchers find out from this study may help other people with CIPN to decrease their pain.

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Alternatives

You may choose to not participate in this study.

Investigator Withdrawal of Subject from a Study

The investigator or sponsor may decide to stop you from taking part in this study at any time. You could be removed from the study for reasons related only to you (for example, if you move to another city, if you do not take your study medication, or if you have a serious reaction to your study medication) or because the entire study is stopped. The sponsor, investigator, Food and Drug Administration, or Institutional Review Board may stop the study at any time.

Subject Costs and Payments

You will not be asked to pay any costs related to this research.

You will be given a debit card called "ClinCard" at the first day of your visit. This study will consist of 3 visits total for both groups. You will be compensated $50 per visit (total $150), with free parking.

If you have no transportation to bring you to the research site, and you do not want the research team going for the visit to your home, we may arrange an Uber trip to pick you up from your house and take you to the research site.

Subject's Rights

Your signature on this consent form means that you have received the information about this study and that you agree to volunteer for this research study.

You will be given a copy of this signed form to keep. You are not giving up any of your rights by signing this form. Even after you have signed this form, you may change your mind at any time. Please contact the study staff if you decide to stop taking part in this study.

If you choose not to take part in the research or if you decide to stop taking part later, your benefits and services will stay the same as before this study was discussed with you. You will not lose these benefits, services, or rights.

The investigator, BIJAN NAJAFI, and/or someone he/she appoints in his/her place will try to answer all of your questions. If you have questions or concerns at any time, or if you need to report an injury related to the research, you may speak with a member of the study staff: BIJAN NAJAFI at 7137987536 during the day and Maria Noun at 713-798-7538 after hours.

Members of the Institutional Review Board for Baylor College of Medicine and Affiliated Hospitals (IRB) can also answer your questions and concerns about your rights as a research subject. The IRB office number is (713) 798-6970. Call the IRB office if you would like to speak to a person independent of the investigator and research staff for complaints about the research, if you cannot reach the research staff, or if you wish to talk to someone other than the research staff.

Signing this consent form indicates that you have read this consent form (or have had it read to you), that your questions have been answered to your satisfaction, and that you voluntarily agree to participate in this research study. You will receive a copy of this signed consent form.

Subject	Date
Investigator or Designee Obtaining Consent	Date
Witness (if applicable)	Date
Translator (if applicable)	Date