Bubtech: Micro-Nanobubble Wound Healing Device
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Introduction

20M people in the US suffer from chronic wounds costing over 6.5B dollars in national health care costs.

Micro nanobubbles of oxygen in a fluid solution provide a new and less expensive technology that can promote the wound healing process, remove necrotic tissue and deliver oxygenated fluid, with a very low risk of infection and low cost, which surpasses its predecessors in ability of treating diabetic foot ulcers.

Hardware Design

1) Air Compression
Micro-nano bubbles are generated by sheering in a gear pump and fed to patients through air compression.
2) Vacuum Pump
Negative wound pressure therapy is performed by utilization of a vacuum pump.
3) Negative Pressure
Device utilizes negative pressure feedback to ensure the device operates properly.

Software Design

An Arduino UNO and relays are used to control the solenoids and read data from the sensors. The Arduino UNO will be coded to process feedback from the sensors and control the solenoids accordingly. Furthermore, an app will be created to allow the machine to be controlled and adjusted through Bluetooth low-power.

Project Concept

Bubtech can prevent infection, oxygenize the wound of by two parts: Micro-Nanobubble Cleaning Technology and Negative Pressure Therapy.
1) Micro-Nanobubble Cleaning Technology
Micro-Nanobubble can deeply clean wounds.
2) Negative Wound Pressure Therapy
Involves the control system and pump to promote the treatment

Benefits

Bubtech system will become a new link of treatment process, it is a initial investment in hospital and surgery use. Advantage Bubtech combine:
1) Necrotic Tissue Remove
2) Healing Performance
3) Improved Dissolved Oxygen Content
4) Coast Very Low
5) Incredibly Low risk of infection

Acknowledgement

Current Progress

The basic model for the current condition of the portable devices has been built. Most of our components, have been connected for both electrical and mechanical parts. At this point, we are trying to work out the cycle control code. For the future development of this device, the Bluetooth function will be included.

Time Line

Fall 2018 ---- Update the schematics. Finish the wiring and integration. Implement Arduino code.


2019 ---- Apply for patents. Conduct trials on animals by using Bubtech. Submit a 510(k) premarket notification.

2020 ---- Conduct clinical trials.