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OPTICAL CLASSIFICATION OF DIABETIC WOUNDS AS HEALING OR NON-HEALING

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Of the nearly 246 million people diagnosed with diabetes worldwide, an estimated 15% of all patients suffering with diabetes will develop Diabetic Foot Ulcers (DFUs). About half of these DFUs will become infected resulting in 20% of patients left to face some form of a lower extremity amputation. To date, clinicians employ visual inspection of the wound site during its standard 4-week of healing process via monitoring of surface granulation. In many cases, surface granulation is not an implication of internal healing. There is a need to develop on-site, low-cost imaging tools that can objectively classify healing from non-healing wounds. Herein, a portable, low-cost, non-invasive, and non-contact based Near-Infrared Optical Scanner (NIROS) was implemented to optical differentiate healing from non-healing Diabetic Foot Ulcers (DFUs). Non-contact, non-radiative real-time imaging was performed on diabetic subjects with foot/leg ulcers. The near-infrared optical images acquired from the foot were processed to obtain optical contrast ratio between the wound and its background under various conditions of imaging location, selection of wound and background regions and analysis by different researchers (to remove operator variability). Statistical analysis was carried out to determine the accuracy of the imaging approach to classify healing from non-healing wounds. Preliminary analysis from diabetic foot ulcers showed an accuracy >90% in differentiating a wound as healing or non-healing. The optical classification was based on the differences in the optical contrast between the wound and its peripheries. Currently, work is carried out to classify wounds based on hemodynamic changes.

Biography

Anuradha Godavarty received a Ph.D. in chemical engineering from Texas A&M University, Texas and worked as a Post-Doctoral Associate in the Department of Computer Science, University of Vermont, Burlington. She started as an Assistant Professor in the Department of Biomedical Engineering at Florida International University, Miami, Florida since 2004. Currently, she is a tenured Associate Professor in the Department of Biomedical Engineering at Florida International University. Her research interests are in developing near infrared optical imaging technologies and applying them for breast cancer imaging, functional brain mapping and wound care monitoring.

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