

Systematic monitoring of wound healing using a hand-held near-infrared optical scanner

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Abstract Details

According to the American Podiatric Medical Association, about 15 percent of the patients with diabetes would develop a diabetic foot ulcer. Furthermore, foot ulcerations leads to 85 percent of the diabetes-related amputations. Foot ulcers are caused due to a combination of factors, such as lack of feeling in the foot, poor circulation, foot deformities and the duration of the diabetes. To date, the wounds are inspected visually to monitor the wound healing, without any objective imaging approach to look before the wound's surface. Herein, a non-contact, portable handheld optical device was developed at the Optical Imaging Laboratory as an objective approach to monitor wound healing in foot ulcer. This near-infrared optical technology is non-radiative, safe and fast in imaging large wounds on patients.

The FIU IRB-approved study will involve subjects that have been diagnosed with diabetes by a physician and who have developed foot ulcers. Currently, in-vivo imaging studies are carried out every week on diabetic patients with foot ulcers at two clinical sites in Miami. Near-infrared images of the wound are captured on subjects every week and the data is processed using custom-developed Matlab-based image processing tools. The optical contrast of the wound to its peripheries and the wound size are analyzed and compared from the NIR and white light images during the weekly systematic imaging of wound healing.

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