

Diffuse Near Infrared Wound Monitor for Quantifying Chronic Wound Healing

Michael Neidrauer and Leonid Zubkov
Drexel University

Michael S. Weingarten
*College of Medicine,
Drexel University*

Kambiz Pourrezaei and Elisabeth S. Papazoglou
Drexel University

An optical wound monitor that is based on diffuse near infrared spectroscopy (DNIRS) was used to interrogate twenty human diabetic foot ulcers. Weekly measurements were conducted until there was wound closure, limb amputation or 20 completed visits without healing. Wound size and degree of wound contraction were measured by image analysis of digital photographs and the results were compared with the NIRS results. Temporal changes of oxy- and total hemoglobin concentration were significantly different in healing versus nonhealing wounds.

Modeling of Chicken Meat Blade Cutting Using Finite Element Method

Debao Zhou
UMD

Robotic devices have been widely used in biomaterial processing, for example, the cutting operations, also called deboning operations, in a chicken meat harvesting factory. The cutting force will be one of the most useful information for automating the deboning process to maintain the best yield and obtain the satisfied products, i.e., obtaining meat with no bone chips. In this area, a lot of problems need to be studied. This research mainly con-

centrated on the investigation of the cutting force difference at the initiation of the fracture and those needed to sustain the continuous fracture during the progressive cutting of chicken meat. First, the microstructures of both the blade cutting edges and those of chicken meat were observed and analyzed. The chicken meat cutting fracture was then explained. Based on the parameters measured from the micro-scale analysis, the cutting procedure was simulated and analyzed using a finite element method (FEM). The simulation was realized using software called ABAQUS. From the results, it was observed that the force at cutting fracture initiation is bigger than those to keep the continuous fracture. These results provided the basic understandings for the design of force control algorithms to automate robotic cutting of bio-materials.