

APPLICATION FOR WOUND IMAGE ANALYSIS

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Aim: Accurate wound measurement is important task in chronic wounds treatment, because changes of the wound size and tissue types are indicators of the healing progress. Towards elimination of subjective wound parameters estimation, we developed colour image processing software which analyze digital wound image, and based on learned tissue samples performs tissue classification. Wounds generally have a non-uniform mixture of yellow slough, black necrotic tissue and red granulation tissue. Information about the percentage of each area is important determining factor for the healing state of the wound.

Methods: Developed application implements advanced statistical pattern recognition algorithm to classify individual pixels of the wound image based on colour information. Classification parameters were learned from examples presented to the application during the learning process. Application includes the therapy proposition module, implemented as the fuzzy expert system with 36 rules.

Results: Results of the analysis contains the wound image represented in pseudo colours (necrotic tissue is black, granulation red, fibrin yellow and unclassified parts blue) as well as percentage of tissue types within the wound area. Therapy for the analyzed wound is also proposed, based on calculated tissue percentages and user defined wound exudation, the depth of the wound and infection.

Conclusions: Developed application for wound analysis gives objective, reliable and reproducible results, allowing unique and objective comparison of treatment results between different methods and different institutions. Expert knowledge is built into the application, which means that the quality of wound image analysis depends solely on training samples selected by a medical expert and image quality. To ensure the wound image quality it is necessary to control the lighting conditions and the camera settings.