

P6

Tissue Classification and a Volumetric Model of the Foot from Magnetic Resonance Imaging Vaeggemose M, Ringgaard S, Blankholm A, Fleischer J, Ejlskjær N. Dept of Endocrinology and MR-Center, Aarhus University Hospital, Denmark

Background: Magnetic resonance imaging (MRI) of soft tissues can be utilized to describe diabetic ulcer composition and produce a volumetric model. This provides the physician with an efficient method of determining the depth, size and composition of a diabetic foot ulcer. Image processing methods makes tissue classification available resulting in an ulcer model with colorations of different tissue types (e.g. Granulation, Slough and Necrosis). The model information can support crucial clinical decision making and is a valuable tool in scientific evaluation of other non-invasive diagnostic methods. These pilot studies were performed on healthy subjects to validate the method before including diabetic patients. **Objective:** To develop an accurate method to produce a volumetric model of the foot (and diabetic foot ulcers) from MR images. **Methods:** MR images were acquired from a 1.5T Siemens Achieva scanner with a grey scale resolution of 256x256 pixels. A 3D ultrafast T1 weighted gradient echo scan sequence (MPRAGE) was used to record DICOM images. Examination of the MR images showed ghosting artefacts in the read direction and background noise elements, which were eliminated by image filter techniques. The filtered images were processed morphologically and afterwards a connected compartments model was applied allowing description of the foot. A volumetric model of the foot was calculated and described on this basis. **Results:** Image processing combined with MPRAGE sequencing makes it possible to create a volumetric model of the scanned foot of a healthy person. **Conclusion:** MR imaging combined with image processing methods offer the possibility to classify tissues and create volumetric models. This study is the initial step toward a volumetric model of a diabetic foot ulcer. Our results show that MR images can provide the data needed to create a volumetric model with depth, size and tissue composition of a diabetic foot ulcer.