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Abstract Title: Deformation of Retrobulbar Fat Analysis With Optical Flow Technique

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Purpose:

The rectus muscles pull the eye back into the orbit and, hence, the retrobulbar fat bears the eye. In order to understand its function, the deformation of the orbital fat was investigated with MRI with an optical flow technique. Together with assessment of material properties of the fat, its deformation must be known for development of the finite element analysis model of orbital mechanics introduced by Schutte et al. (ARVO, 2003).

Methods:

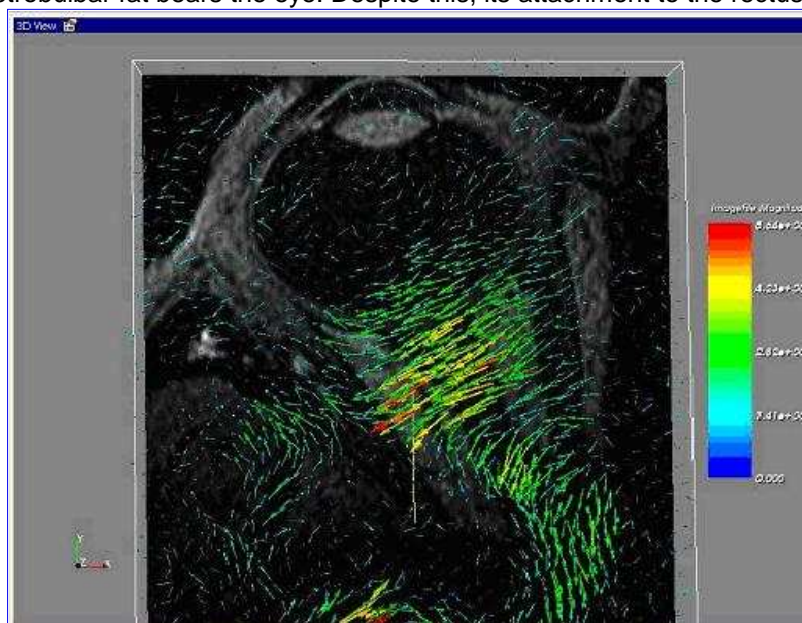
Seven T1-weighted scans of 84 slices each were made of the eyes during seven horizontal gaze directions with a 1.5T MRI scanner. Deformation of the fat was analysed with an optical flow technique. Vectorfields describing the non-rigid deformation in 3D were generated for 6 steps between 7 gaze directions. Regions of interest were: between muscle and posterior sclera, around the optic nerve head and the apex.

Results:

The region between muscle and sclera could not be resolved in sufficient detail. The optic nerve moved through the fat with little attachment to it. Motion of the fat around the optic nerve head was apparent. In the apex, the motion of the fat was primarily transverse (fig).

Conclusions:

The retrobulbar fat bears the eye. Despite this, its attachment to the rectus muscles and to the optic nerve seemed



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