

Title of the project: Improving the quality of life in patients with stable maculopathy by implanting intraocular macula lenses and modulating visual plasticity by transcranial electrical stimulation

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Summary of 2018 results

Title of the presentation: Improving the quality of life in patients with stable maculopathy by implanting intraocular macula lenses and modulating visual plasticity by transcranial electrical stimulation: pilot results

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A sight loss causes severity-dependent decrement in quality of life comparable to heart diseases or cancer. Macular degenerations are leading cause of legal blindness in the developed countries because there is no definite cure for most of maculopathies. Implantation of a new Scharioth Macula Lens (SML) could be effective in visual improvement. Due to the changed optical properties of the SML implanted eye, the patient needs a targeted visual rehabilitation to stabilize his visual perception. In the project, we strive to improve the quality of life of patients with stable maculopathy through the synergistic effect of SML implantation and visual rehabilitation. In addition to assessing the quality of life, we monitor visual plasticity in elderly at the level of neural (Visual Evoked Potentials), metabolic (functional MRI) and structural (MRI and Diffusion-weighted MRI). In the first year of the project, we selected 4 patients (3 females and 1 male) from the 17 candidates eligible to participate in the macular lens implant program according to the project plan. These four patients were successfully implanted with SML and postoperatively underwent four-week transcranial electrical stimulation (TEs) in a double-blind protocol. Simultaneously with the TEs, visual rehabilitation was performed and a reading speed was tested. All selected patients were followed for 6 months, and four additional ophthalmologic, neurophysiological and psychophysical examinations were performed. Two of the selected patients underwent repeated of MRI / fMRI examination in the Brno laboratory MAFIL CEITEC. The first results are very satisfactory, patients are subjectively satisfied with the result of the surgery and visual acuity improvement, which was reflected in a personal report (<https://youtu.be/sGz9Jlfdq2M>) or another patient's written letter of thanks (which was not able before implantation). In 3 out of 4 patients, this satisfaction was also reflected in a questionnaire. During the four-week postoperative period, we observed a gradual improvement in the reading speed of all patients.

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