

Title of the project: Testing of diagnostic possibilities of a new mobile device for visual evoked potentials examination

Grant Agency: Ministry of Health

Project Number: NV18-08-0314

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Starting date: 01.05.2018

Duration (years): 4

Total funds allocated for project - Kč (thousands): 3996

Summary of 2018 results

Title of the presentation: Testing of diagnostic possibilities of a new mobile device for visual evoked potentials examination (VEPs)

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We try to develop a mobile and simply usable device for VEPs examination at any conditions (e.g. at patient bedside, at home).

The novel low-cost wearable device mounted in a headset carrier consists of a visual stimulator (a matrix of 32 light-emitting diodes with adjustable luminance and colour), producing a large spectrum of monocular or binocular stimuli and a recording part (based on a 4-channel EEG amplifier). The recorded VEPs are transmitted via a USB port to a PC for display and off-line evaluation. Long term monitoring of VEPs is desirable for certain patients (even during working activities). Easy handling of the device eliminates need for specialised staff and allows also self-examination. At the ISCEV Symposium 2018 (Reims) our mobile device was awarded with the Marmor Award for Clinical Innovation in Visual Electrophysiology.

With the described variant of the portable VEP device, we have tested reactions of healthy subjects and neuro-ophthalmological patients by the following stimuli:

- Simulation of black-white pattern-reversal with low spatial frequency of 0.12 c/deg (determined by the size of the used LEDs)
- Flash stimulation 1 Hz producing standard cortical flash VEPs
- Red-green flicker with frequency of 1 Hz generating the largest VEPs response in majority of subjects
- Motion-onset stimulation with 200 ms motions (and 1 s interstimulus interval) of LED triplets changing direction in the horizontal axis.

Although the sensitivity of this kind of VEPs examination is lower, compared to the so far used standard VEP devices, we continue in the development of the stimulation part (e.g. to increase the spatial frequency of the pattern-reversal stimulation) to achieve comparable parameters of the mobile device for diagnostic purposes in neuro-ophthalmology.

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