

Semi-automated detection of High Frequency Oscillations in MEG and surface EEG with Morlet-Wavelets and simultaneous visual detection.

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Abstract

Introduction: The detection of high frequency oscillation (HFO) in surface electrodes or SQUIDS remains awkward and very time-consuming. Reasons causing these problems are artifacts caused by muscles or minor movements of the patient mimicking HFOs (especially after applying filters) which are disturbing the analysis and are probably best detected by visual control.

Methods: We developed a program where a Morlet-Wavelet scan for HFO is displayed together with the normal EEG or MEG. Moreover different filter-options are provided to further process the data. This allows the researcher to check for HFO in real-time together with a visual control for artifacts.

We scanned 10 Minute episodes of epilepsy patients with focal epilepsy who received a simultaneous 256channel MEG and 10/10 EEG for HFOs in the surface EEG or MEG.

Results: Together with the pre-selection of the Morlet-Wavelet the semi-automated detection of HFO in MEG and EEG is feasible and able to handle a big amount of data. The artifacts can be easily assessed by visual control.

Conclusion: Parallel displayed Morlet-Wavelets are helping to detect HFO in surface electrodes/SQUIDS and are reducing the time-consuming analysis of data.