

**Conclusion:** The average coherence fluctuations in the range 1–32 Hz do not differ between two groups evaluated. They do not reflect changes in the brain during ageing.

doi:10.1016/j.clinph.2006.06.237

#### **P04.21 Eliminating high-amplitude artefacts in electroencephalograms of epileptic patients**

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**Background:** Electroencephalogram (EEG) recordings are often distorted by high amplitude artefacts (from diverse origins) which hamper its visual inspection.

**Objectives:** To use different methodologies of signal analysis to extract components, to identify artefacts in EEG records and to compare the effectiveness of methodologies used.

**Methods:** Two methods to correct the recordings were used. One based on independent component analysis (ICA) and uses all the recording channels to extract components which are visually identified with the artefact and then eliminated in the reconstruction process; the other one is called local singular spectrum analysis (SSA) and is applied directly to the channel that shows up a very prominent artefact. The user can choose to process a subset of channels keeping others unprocessed which allows a comparison of the outcomes of the algorithm with non-processed channels.

**Results:** The results of the analysis of segments preceding an epileptic seizure where several types of artefacts can be found such as interference of ocular movements in frontal channel and low-frequency baseline drifts of electrodes were shown.

**Discussion:** The methods being of distinct nature have different impact in the corrected EEG. The ICA is very easy to apply when the artefact is an EOG interference because it is easy to identify the components related with the artefact. While the local SSA works automatically with the same parameters wherever is the type of artefact as long as it has high amplitude.

doi:10.1016/j.clinph.2006.06.238

#### **P04.22 Nonlinear analysis of EEG during monitoring of carotid endarterectomy**

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Although various methods have been proposed to determine if the brain is at risk during carotid endarterectomy, the common procedure is still the visual assessment of the EEG. We examine two new parameters, nominally the fractal dimension (FD) and the zero crossing (ZC), that may assist in real-time decision whether or not shunting is needed. By means of a retrospective analysis of 300 carotid endarterectomy, the correlation between the two parameters and the visually based interpretation is discussed. FD was estimated by means of the Higuchi's algorithm which is based on the measure of the mean length of the curve  $L(k)$  by using a segment of  $k$  samples as a unit of measure. If  $L(k)$  is plotted against  $k$ , for  $k$  ranging from 1 to  $k_{\max}$ , on a double logarithmic scale, the data should fall on a straight line with a slope equal to  $-FD$ . ZC, that we used to identify possible changes in dominant spectral components during carotid clamping; was computed by counting the number of baseline crossings in a fixed time interval; this results faster than the calculation of other parameters obtained from spectral analysis. The investigation was carried out during the three minutes before and three minutes after the artery clamping. Both FD and ZC were calculated on subsequent 5 s epochs of the EEG and averaged among all the derivation of the same hemispheric side. The baseline for both parameters was evaluated from the first 35 epochs (3 min preceding clamping procedure) by using the mean value in this period. Both parameters were able to correctly identify cases with mono- or bi-lateral hemispherical suffering, in fact dividing the examined case in two subgroups, depending on the presence of EEG changes, no significative changes in FD and ZC were present in the group without EEG changes opposite to significative ones in the group where visual EEG analysis showed changes. FD and ZC parameters provides measures for hemispheric complexity changes.

doi:10.1016/j.clinph.2006.06.239

#### **P04.23 Quantitative electroencephalographic changes during two years of follow up in temporal lobe epilepsy surgery**

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**Purpose:** To analyze visual and quantitative resting electroencephalography during the first two years of postsurgical evolution in patients with intractable medial temporal lobe epilepsy (MTLE) subjected to temporal lobectomy.

**Methods:** Sixty visual and quantitative EEGs (broad band spectral analysis) from TLE patients were analyzed in order to evaluate the evolution of interictal epileptiform discharges (IED) and base activity. The postsurgical out-