

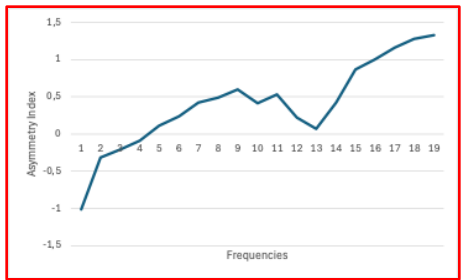
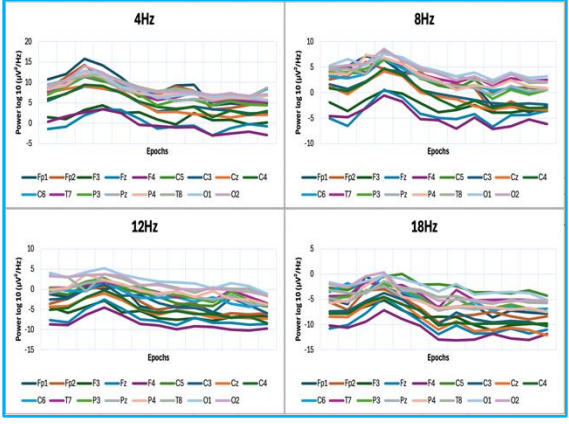
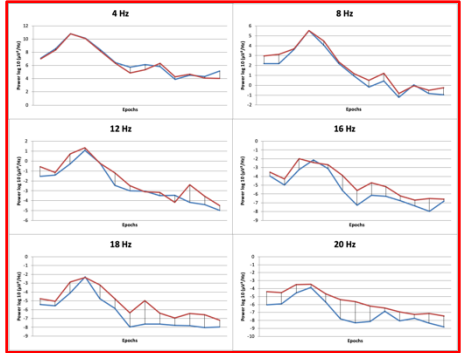
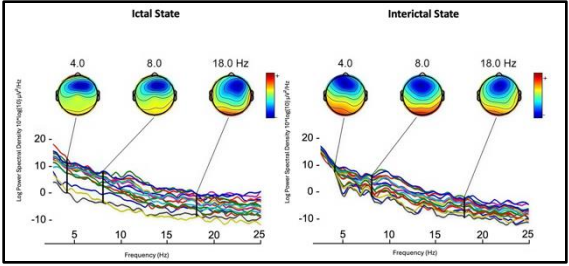
EEG recording during visual aura in migraine: results by quantitative analysis

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BACKGROUND AND AIMS. Migraine with aura represents 20-30% of all forms of migraine; usually precedes the migraine attack, lasts from 5 to 60 minutes and is characterized by transient neurological deficits. Quantitative Electroencephalography (qEEG), a powerful tool used to study cerebral cortical activity, was employed to investigate the variation of cortical activity during a complete visual aura.

MATERIALS AND METHODS. A 24-year-old female patient with diagnosis of migraine with visual aura, according to ICHD-3 criteria, underwent an EEG recording during an ictal manifestation of visual aura. We recorded an EEG for the entire duration of a visual aura. Using “EEGLAB” software, firstly we performed a quantitative spectral analysis of the entire ictal trace and compared it with the spectral maps of interictal EEG in order to confirm the aura; then, the EEG trace was divided into 13 epochs and quantitative analysis was performed on each epoch, evaluating the evolution of cortical activity over time in relation to 19 frequencies (from 2 to 20 Hz). Finally, we compared the time trend between left and right hemisphere derivations as a functions of the 13 epochs calculating an “index of asymmetry”.



RESULTS. We observed that alpha-band spectral power over posterior regions is higher during the interictal phase, whereas during the ictal phase posterior alpha power is reduced. Performing the mean \pm standard deviation of Power among all the recording channels, in the initial phase of aura a sudden increase in power activity was encountered, followed by a depression of cortical activity. Finally, by calculating the mean \pm standard deviation only on the derivations of the right hemisphere and on the left hemisphere, we noticed a deviation of the two curves with an “asymmetry index” that progressively increases over the frequencies studied and starting immediately after the observed power peak

DISCUSSION. This result may have important clinical implications in the neurointensive monitoring of cerebral acuities that use the Cortical Spreading Depression (CSD) as a neurophysiological biomarker where, until now, the depression of cortical activity has been considered as the only negative prognostic factor. Furthermore, for the first time, this neurophysiological study supports the neurobiological data of Pietrobon et al. (1), detecting a cortical depression *in toto* and not only in the posterior regions. Finally, we confirmed the data present in the literature regarding the depression of hemispheric cortical activity, but the present study gives an additional contribution by highlighting in detail the timing of this neurophysiopathological mechanism.

1. Pietrobon D, Brennan KC. Mechanisms underlying CSD initiation implicated by genetic mouse models of migraine. J Headache Pain. 2025;26(1):17. Published 2025 Jan 27. doi: 10.1186/s10194-025-01948-x.