EEG Theta Power Is an Early Marker of Cognitive Decline in Dementia due to Alzheimer's Disease - DTU Orbit (31/12/2018)

**EEG Theta Power Is an Early Marker of Cognitive Decline in Dementia due to Alzheimer's Disease**

Background: Quantitative EEG (qEEG) power could potentially be used as a diagnostic tool for Alzheimer's disease (AD) and may further our understanding of the pathophysiology. However, the early qEEG power changes of AD are not well understood.

Objective: To investigate the early changes in qEEG power and the possible correlation with memory function and cerebrospinal fluid biomarkers. In addition, whether qEEG power could discriminate between AD, mild cognitive impairment (MCI), and older healthy controls (HC) at the individual level.

Methods: Standard EEGs from 138 HC, 117 MCI, and 117 AD patients were included from six Nordic memory clinics. All EEGs were recorded consecutively before the diagnosis and were not used for the consensus diagnosis. Absolute and relative power was calculated for both eyes closed and open condition.

Results: At group level using relative power, we found significant increases globally in the theta band and decreases in high frequency power in the temporal regions for eyes closed for AD and, to a lesser extent, for MCI compared to HC. Relative theta power was significantly correlated with multiple neuropsychological measures and had the largest correlation coefficient with total tau. At the individual level, the classification rate for AD and HC was 72.9% for relative power with eyes closed.

Conclusion: Our findings suggest that the increase in relative theta power may be the first change in patients with dementia due to AD. At the individual level, we found a moderate classification rate for AD and HC when using EEGs alone.

**General information**

State: Published

Organisations: Department of Applied Mathematics and Computer Science, Cognitive Systems, University of Copenhagen, Oslo University Hospital, Karolinska Institutet, Haraldsplass Deaconess Hospital, Landspitali University Hospital


Pages: 1359-1371

Publication date: 2018

Peer-reviewed: Yes

**Publication information**

Journal: Journal of Alzheimer's Disease

Volume: 64

Issue number: 4

ISSN (Print): 1387-2877

Ratings:

- BFI (2018): BFI-level 1
- Web of Science (2018): Indexed yes
- BFI (2017): BFI-level 1
- Scopus rating (2017): CiteScore 3.86 SJR 1.635 SNIP 0.966
- Web of Science (2017): Impact factor 3.476
- Web of Science (2017): Indexed yes
- BFI (2016): BFI-level 1
- Scopus rating (2016): CiteScore 3.62 SJR 1.584 SNIP 0.921
- Web of Science (2016): Impact factor 3.731
- BFI (2015): BFI-level 1
- Scopus rating (2015): CiteScore 4 SJR 1.834 SNIP 0.982
- Web of Science (2015): Indexed yes
- BFI (2014): BFI-level 1
- Scopus rating (2014): CiteScore 4.26 SJR 1.976 SNIP 1.053
- Web of Science (2014): Impact factor 4.151
- BFI (2013): BFI-level 1
- Scopus rating (2013): CiteScore 4.07 SJR 1.75 SNIP 1.006
- Web of Science (2013): Impact factor 3.612
- ISI indexed (2013): ISI indexed yes
- BFI (2012): BFI-level 1
- Scopus rating (2012): CiteScore 4.35 SJR 1.722 SNIP 1.046
- Web of Science (2012): Impact factor 4.174
- ISI indexed (2012): ISI indexed yes