

Associations between Source-space EEG Functional Connectivity and Cognitive Function across the Alzheimer’s Disease Continuum

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Source-space EEG functional connectivity, especially in theta and beta bands, is associated with cognitive decline and enables discrimination across the Alzheimer’s disease continuum.

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES
- Alzheimer’s disease (AD) is increasingly recognized as a disconnection syndrome. - Identifying early network-level biomarkers of AD remains a key challenge. - EEG functional connectivity offers a scalable, non-invasive approach to characterize brain network alterations across the AD cognitive continuum.	2059 participants in MIND-China, age ≥60 y - A 3-min resting-state EEG (19 channels), with only the last 1-min analyzed - Functional connectivity: PLV, wPLI, ImC, AEC, and AEC-c - Frequency bands: δ, θ, α, and β - Data analysis: ANCOVA + Bonferroni correction - Classification: BrainNetCNN + demographic features	- MCI was associated with increased theta-band connectivity (frontoparietal & DMN regions) - AD was associated with widespread beta-band connectivity reduction - Reduced beta connectivity was correlated with increased MMSE scores - EEG FC + demographics yielded AUC = 0.85 for differentiating AD from non-dementia	- EEG functional connectivity reflects progressive network disruption across the AD cognitive spectrum - Increases in theta and decreases in beta represent key frequency-specific signatures - EEG connectivity + demographics enables robust AD classification - EEG FC is a promising scalable biomarker for AD	[1] GBD 2019. Global prevalence and trends of dementia Lancet Public Health 2022;7:e105–e125. [2] Meghdadi AH, et al. EEG functional connectivity biomarkers in AD/MCI. PLoS One 2021 [3] Kawahara J, et al. Brain network classification using connectome-based models NeuroImage 2017. CONTACT Jiahui Sun Shandong Provincial Hospital, Shandong First Medical University, Jinan, Shandong, China Email. 13355411084@163.com  ALZHEIMER’S ASSOCIATION 