



Utility of the P300 EEG biomarker in the early identification of Alzheimer's Disease:

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Objectives: Investigation of the current literature surrounding EEG's role in AD diagnosis and management will guide the HPN-Advanced Brain Monitoring BEAM project in future EEG applications and data collection.

Introduction: Alzheimer's disease (AD) is a progressive, chronic, neurodegenerative disease and the leading cause of dementia worldwide. With no cure, an early diagnostic tool that can identify mild cognitive impairment (MCI) in AD is critical. Electroencephalogram (EEG) biomarkers have been proposed to be a noninvasive tool in identifying and managing AD.

Design/Methods: Databases used included PubMed with a search term of "Alzheimer's disease p300". Inclusion criteria included articles that were found in PubMed, peer-reviewed, and a minimum sample size of 20 participants. Studies included either discussing auditory oddball tasks, ERP, or neuropsychological battery exams. Exclusion criteria included studies not published within the last 12 years, not published in English, and did not only use human subjects.

Results: The keyword search yielded 308 articles. After filtering by the exclusion criteria, 108 articles remained. 36 articles were selected based on their relevance to the P300 biomarker and its association with AD/MCI. The studies consistently found that AD patients exhibited reduced P300 amplitudes and prolonged P300 latencies compared to healthy controls at the Pz electrode site. P300 has also been used to evaluate cognition in other pathologies and measure clinical efficacy of pharmacologic treatments for AD/MCI.

Conclusions: The review suggests that P300 can be used as a biomarker to detect AD. These findings highlight the need for standardized protocols and further validation to establish the clinical utility of P300 in AD. The varying ways in which studies use the P300 biomarker highlights the utility of the it and other EEG biomarkers not limited to P300.