

## **SPECTRAL SIGNATURES OF EEG SOURCE DENSITY DURING MILD COGNITIVE IMPAIRMENT IN COMPARISON TO HEALTHY SUBJECTS**

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Background: Retrospective EEG data analysis with concomitant psychometric testing from 89 volunteers (age > 40 years) was performed in order to see if one could discriminate subjects with Mild Cognitive Impairment (MCI) from Healthy Controls (HC).

Methods: Spectral signatures of current source density (CSD) were calculated from 16 channel EEG using the CATEEM® software. Recording took place during eyes open in a relaxed state, performance of the d2-test, a mathematical calculation test and a memory test. Subjects were divided into two groups according to their DemTect score: score of 13-18 (HC; n=44; mean age 51.8 y) or 8-12 (MCI; n=45; 57.2 y). Absolute electric power derived from Fast Fourier Transformation was chopped into six frequency ranges (delta, theta, alpha1, alpha2, beta1 and beta2).

Results: In subjects with mild cognitive impairment all three mental challenges revealed statistically significant worse performance in comparison to healthy volunteers (all  $p < 0.03$ ). Highly significant correlations were found between the test performances and the DemTect score (d2-test:  $r = 0.51$ ; calculation test:  $r = 0.39$ ; memory test:  $r = 0.42$ ).

In the MCI group significantly higher median spectral delta power was produced during relaxed state ( $p < 0.05$ ), during calculation test ( $p < 0.005$ ) and memory test ( $p < 0.05$ ). Median spectral power values of the combined electrode positions F3,4;C3,4;P3,4 and O1,2 correlated significantly with the DemTect score (during relaxation:  $r = -0.25$ ;  $p < 0.01$ ), during performance of the d2-test ( $r = -0.17$ ,  $p < 0.09$ ), calculation test ( $r = -0.33$ ;  $p < 0.001$ , memory test ( $r = -0.26$ ;  $p < 0.01$ ).

Conclusion: Spectral signatures of EEG source density in the delta frequency range may help to objectify MCI before dementia develops.