

M-C. PAI, S-H. TSAO, S-S. JAN. **Sense of Location (SoL) in people with Alzheimer's disease.** *Gerontechnology* 2016;15(suppl):114s; doi:10.4017/gt.2016.15.s.742.00

Background When navigating in a specific space, a sense of being at the current location is of great help for the navigators to reach their destination or to go back to the start more precisely. To accomplish this work, interwoven neural structures and neurons are called for play. This system is called head direction-place cell-grid cell circuit¹. Evidence from neuropathological, neurophysiological and neuroimaging studies revealed that the regions responsible for this circuit are damaged in the early stage of Alzheimer's disease (AD)². This may explain why wayfinding difficulty is one of the frequent symptoms in persons with AD. The aim of this study was to examine the Sense of Location (SOL) in persons with mild AD, mild cognitive impairment (MCI) and cognitively healthy controls (CHC). **Methods** We invited people with mild AD, MCI and CHC to participate. The venue of the experiments was located at the university campus. The participants were instructed to point their current location on a tablet PC at five test points when they were walking along a route of 660 meters. All participants were assessed for their perception of distance, perception of time lapsed and the estimation of the vector to the start position. Moreover, the test campus space was divided into 192 grids on a tablet and we measured the deviation of the location by grids. A tracing of the path of each participant was recorded by GPS (Global Position System) and analyzed later. **Results** A total of 34 AD (17 females) 32 MCI (18 females) and 30 CHC (18 females) completed the study. Their Mini-mental State Examination was 20.1±3.4, 25.2±3.6 and 27.0±2.8 respectively. No difference was found in perception in distance and time lapsed and vector to the start. Regarding the SoL, the hit rates of location for five points within 16m were 0.12, 0.36 and 0.53 for AD, MCI and CHC respectively (p<0.000, post hoc comparisons AD vs MCI p< 0.000; AD vs CHC p<0.000; MCI vs CHC p<0.05). AD showed the most inconsistency and CHC the least inconsistency for the traces recorded. **Conclusion** The performance of SoL is profoundly impaired in mild AD and even in MCI. This model can be used to develop more precise devices or instruments for detecting, monitoring and aiding spatial navigation ability in people with MCI and mild AD.

References

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