The effectiveness of Action Observation Treatment (AOT) in Alzheimer Disease: Benefit on Temporal Orientation and Visuo-Prassic abilities.

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Background and Objective

- Action Observation Treatment (AOT) consists of a novel rehabilitation approach based on the stimulation of the mirror neuron system activated during action observation and execution.
- Previous studies showed that AOT is effective in the recovery of motor impairment in stroke, Parkinson's disease and cerebral palsy.
- The Mirror neuron system is involved in motor behavior but also in cognitive processing, this study aimed to investigate if this therapy might induce a cognitive and functional improvement in Alzheimer's Disease (AD) which presents deficits in both these domains.
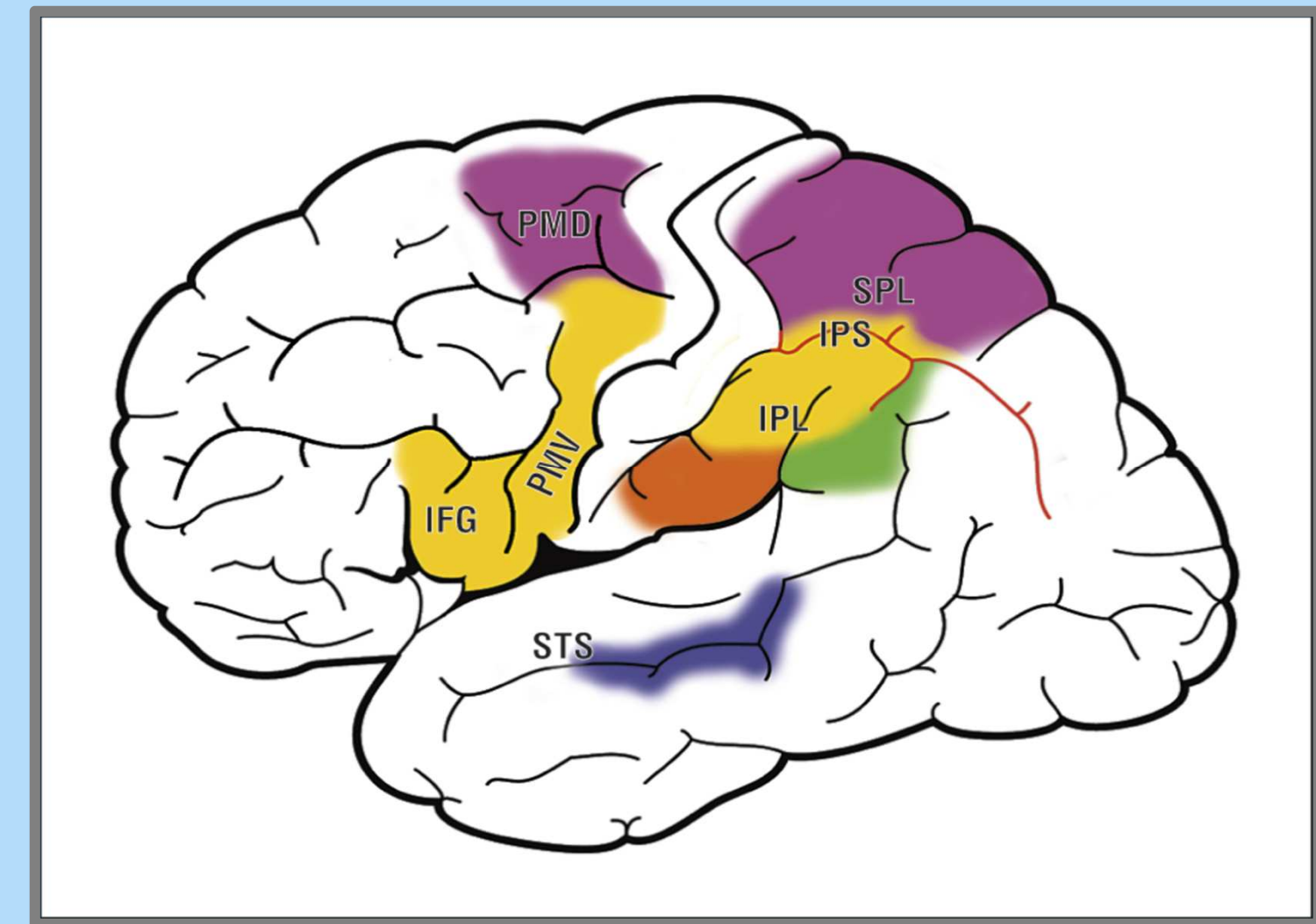

FIGURE 1. Cortical areas related to the parietofrontal mirror system responding to different types of motor acts. Yellow indicates transitive distal movements; purple, reaching movements; orange, tool use; green, intransitive movements; blue, portion of the superior temporal sulcus (STS) responding to observation of upper-limb movements. IFG indicates inferior frontal gyrus; IPL, inferior parietal lobule; IPS, intraparietal sulcus; PMD, dorsal premotor cortex; PMV, ventral premotor cortex; and SPL, superior parietal lobule. L. Cattaneo, G. Rizzolatti. Arch Neurol. 2009.

Subjects & Methods

In this randomized controlled multi-centric study, a total of 32 subjects (aged between 63-81 years, mean 75.06±5.05, 62.5% female) were half randomly assigned to the experimental and the control group. Both groups executed twenty daily actions, the experimental group previously had AOT watching videos of the same actions, whereas the control group before the execution watched videos of moving natural scenery. Both groups underwent neuropsychological assessment at pre and post treatment and followed up 3 months later, evaluating global cognitive functions (MMSE and ADAS-COG), functional abilities (DAD and DAFS), neuropsychiatric symptoms (NPI and GDS), motor behavior (UPDRS III) and quality of life (QoL-AD). A 2x3 mixed-design ANOVA was performed on each measure assessing the main effect of group (2 levels, between groups), time (3 levels, within subjects) and their interaction.

FIGURE 2. Daily Action n. 2: Taking a coffee

FIGURE 3. Daily Action n. 8: Watering a plant

Results

The Temporal Orientation domain of the DAFS and the visuo-praxis sub-item of MMSE showed significant interaction effects. The control group exhibited a pattern of worsening in the DAFS (while experimental group remained stable) and lower scores at the post treatment assessment of the visuo-praxis sub-items of MMSE.
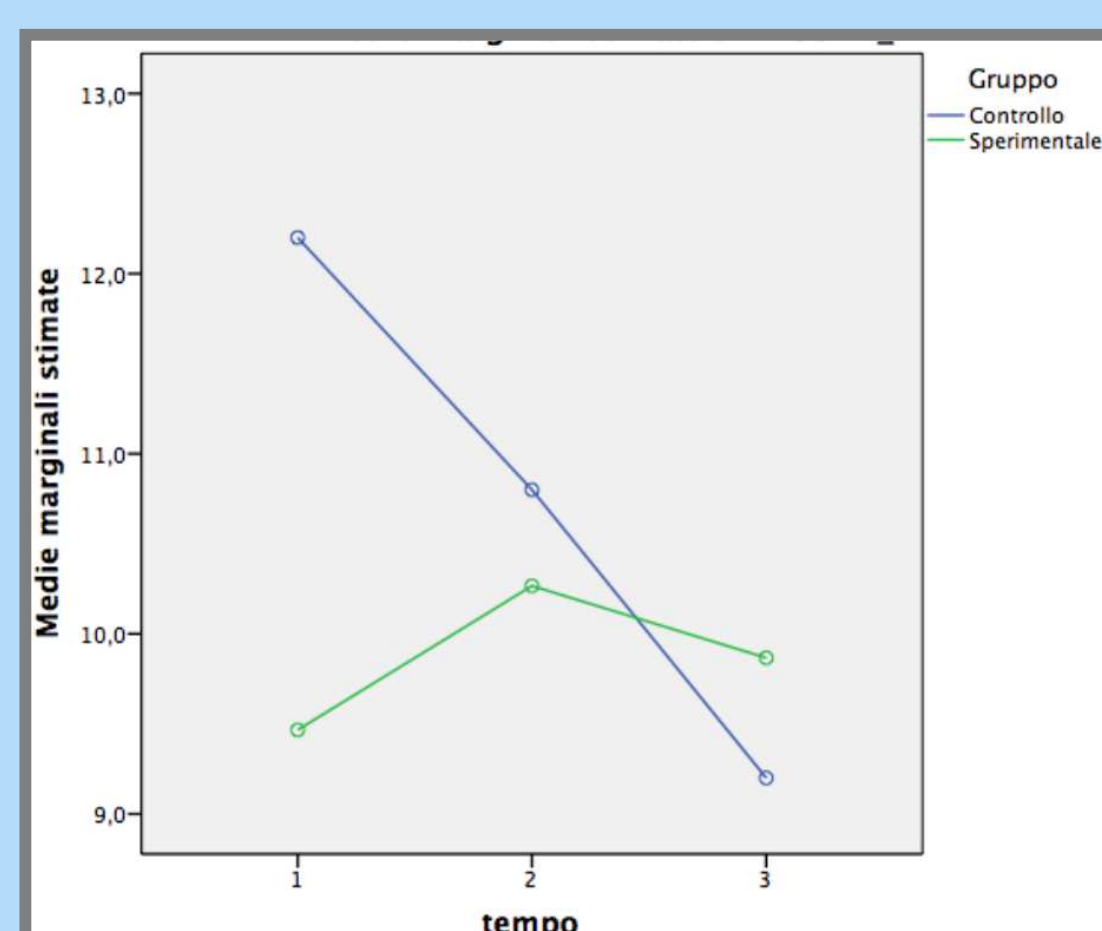

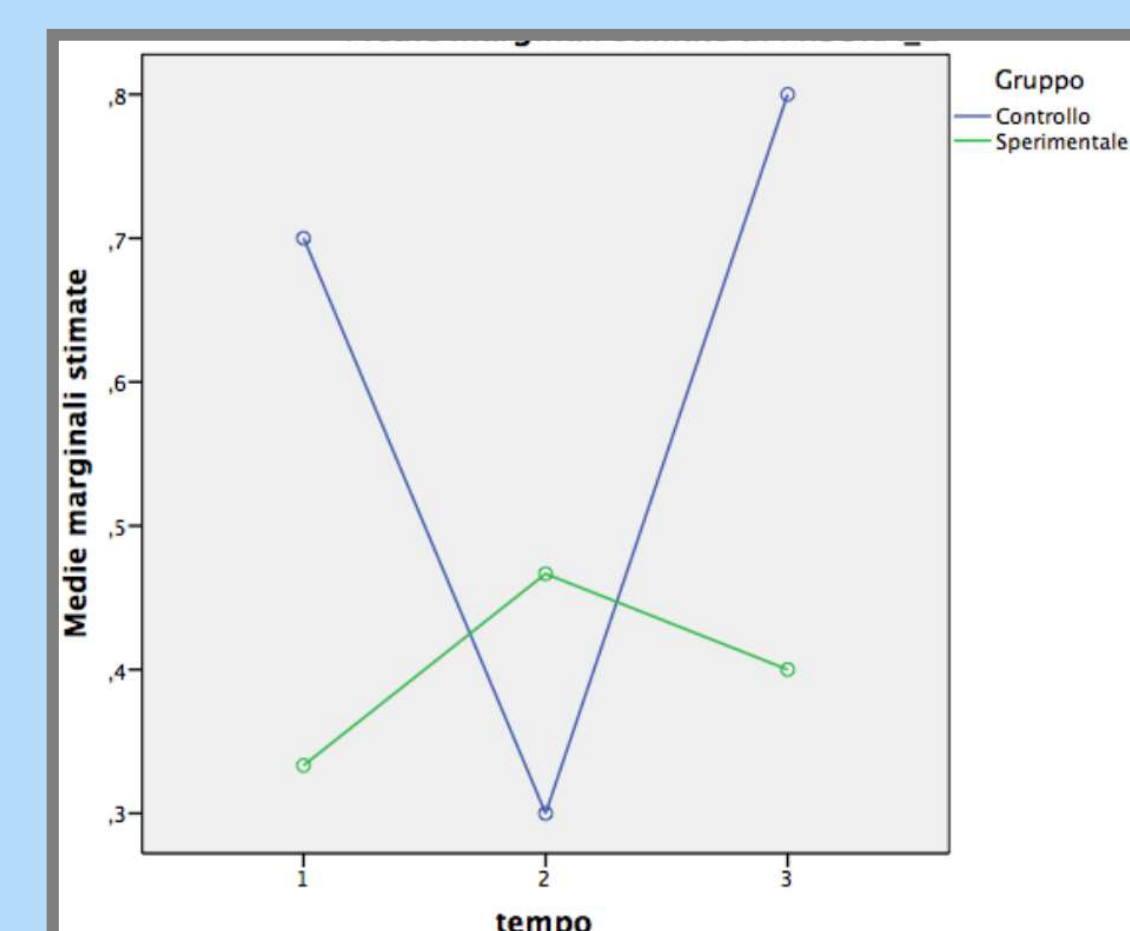**FIGURE 4.** Temporal orientation (DAFS)

FIGURE 5. Constructional praxis (MMSE)

Conclusions

- This preliminary results obtained from *at interim* analysis of the project indicated that AOT seems to be effective in improving both temporal orientation and visuospatial/constructional impairment in AD.
- This therapy tapping the mirror neurons system seems to influence both cognitive and visuo-motor coordination processing.

References

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