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S05-4: The Role of Movement in the Elderly: Dance as Prevention and Therapy for Neuro-Degenerative Diseases

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Purpose: Dance is a complex form of human movement that activates our body and brain. Recent reviews summarising epidemiological, cross-sectional, and interventional studies support physical activity, especially dance as a propitious method to induce neuroplasticity, physical fitness, and mental wellbeing in late adulthood. Cardiovascular fitness training, combined with coordinative exercise and cognitive training, have been shown to induce white and grey matter plasticity, enhance cognitive and physical functions in older adults. Therefore, we created three dance studies to analyse the effects of dance on: 1) healthy seniors, 2) seniors with mild cognitive impairment (MCI), and 3) seniors with dementia.

Methods: The studies were designed as an 18-month or a 6-month RCT intervention study. The studies were approved by the Ethics Committee of Otto von Guericke University Magdeburg. Study 1: Dance as promotion for healthy ageing; Study 2: Dance prevention for dementia (Diadem); Study 3: Dance for people with dementia for emotional balance. Healthy elderly individuals (aged 63–80), individuals with MCI (aged 58–80), and patients with dementia (aged 75–84) were recruited via announcements in local newspapers and were screened for the study.

Participants attended a newly designed training programme in which they were constantly asked to learn new movement sequences. These choreographies required the coordination of different body parts (i.e. legs, arms, trunk) under different conditions (physical strain, precision, situation and time pressure). The subjects had to learn choreographies independently or by following a model.

Cognitive and physical performance were assessed in pre- and post-test intervention design, including: an extensive battery of neuropsychological tests, CERAD test battery, MR images were acquired on a 3 Tesla Siemens MAGNETOM Verio (Syngo MR B17), balance master, spiroergometry, TMG measurements, fNirs, gait analysis, and other tests.

Results and Conclusions: As a main finding, we observed in the dancers that after six months of training, the volumes in the left precentral gyrus had increased, and after another 12 months of training, an additional volume increase was observed in the right parahippocampal gyrus. The cardiovascular fitness levels over the course remained constant. In sum, our results so far demonstrate that sportive dancing training can improve and/or stabilise muscular and cardiorespiratory fitness in older patients with MCI and dementia. Dance-based interventions enhance balance, mobility, strength, and quality of life in individuals with dementia, as highlighted by previous research (Bandaru et al., 2024).

Keywords: Degenerative diseases, dance intervention, neuronal flexibility, cognitive and physical functions, MCI, dementia