

## Effects of virtual reality as a therapeutic approach for the improvement of cognition in healthy elderly.

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**Introduction:** Evidence indicates an increase in the elderly population in the forthcoming decades. It is essential to emphasize that aging is a process that involves motor, cognitive and sensorial losses that altogether can lead to the functional dependence of this population. In this context, cognitive training through virtual reality has been proposed as a new possibility of approach [1], since it allows prevention and enhancement of cognitive functions through dual tasks in a multi-sensorial, challenging, ludic environment with a high degree of motivation and patient involvement [2,3]. This study aimed to verify the efficiency of training through the Nintendo Wii videogame on the cognitive performance of the elderly through the Wechsler Intelligence Scale for Adults (WAIS-III) and to correlate the performance obtained with their evolution.

**Materials and Methods:** Twenty-eight healthy elderly people, of both genders, aged 60-89 years participated in the study. Thirty-six training sessions were held with the Nintendo Wii videogame, each lasting 45 minutes, totaling 12 weeks. A neuropsychological evaluation was performed by a psychologist before the beginning of the training and at the end of the 36 sessions, where the WAIS-III was applied in order to obtain information about the cognitive aspects stimulated. The training consisted of two games: Table Tilt, controlled by a platform with sensors of discharge of weight that captures and reproduces in the screen the body movements, demanding attention, concentration, perception, reasoning and quick response to visual stimuli, and a game of dance (Just Dance), that through a control sensitive to changes of direction and speed projects on the screen the movements generated by the participant, stimulating memory, learning, attention, visual and motor coordination.

**Results:** The results obtained through WAIS-III indicated an improvement in verbal IQ that assesses acquired knowledge, formal education, attention to verbal materials, verbal reasoning, memory, comprehension and language and in the VCI (verbal comprehension index) related to comprehension (verbal reasoning) and the mental process needed to answer the questions.

**Discussion:** The results demonstrated that sensorimotor stimulation provided through a virtual environment favored the information processing speed and may have allowed the strengthening of synaptic connections contributing to the recovery of information previously learned through the cognitive reserve, benefiting the working memory and the ability to solve problems. It can be postulated that there was neuroplasticity, observed through learning and consequent improvement in performance during games, making the maintenance of cognitive abilities that tend to decline in old age possible.

**Conclusion:** The present study suggests that the Nintendo Wii videogame is viable as a therapeutic approach for cognitive enhancement in healthy elderly, since through multisensory stimulation it allows the double task training, favoring the cerebral plasticity, which implies in improving functions like processing speed and work memory, the main skills that decline with aging, resulting in an improvement in the quality of life and autonomy of this population.

**References:** [1] de Bruin E.D. et al., Z Gerontol Geriatr. 43(4): 229-234, 2010; [2] Batista J.S. et al. RBCEH, 9(2): 293-299, 2012; [3] Zimmermann R. et al., Neurology 82(14):1219-1226, 2014.