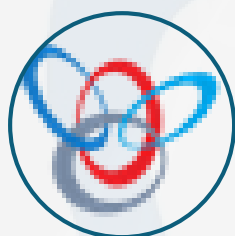


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Effect of Resistance Training on Cognition, Physical Performance, and Brain Anatomy in Older Adults with Mild Cognitive Impairment

Abstract:

INTRODUCTION: Alzheimer's disease is the most prevalent dementia in the world and has a high socioeconomic impact. Mild cognitive impairment (MCI) refers to the unnatural cognitive loss of aging with preservation of independence in activities of daily living. Individuals with this diagnosis have a higher risk of developing dementia. Non-pharmacological interventions, such as physical exercise, are beneficial for the cognition of this population. However, the impact of resistance training (RT) on the brain anatomy of elderly with MCI has not yet been clarified. This study aimed to investigate the impact of RT on cognition, functionality and brain anatomy (gray matter volume and white matter integrity) of elderly individuals with MCI. **METHODS:** Forty-four elderly individuals diagnosed with MCI were evaluated, 22 in the training group (TG) and 22 in the control group (CG). Participants were evaluated in neuropsychological tests and magnetic resonance imaging at the beginning and end of the study, which lasted 24 weeks. The TG was also evaluated for physical performance. We used repeated measures ANOVA within a general linear mixed model to compare moments (pre- and post-intervention) and groups (control and training). We included age and education as covariates. The values were corrected for multiple comparisons using False Discovery Rate. **RESULTS:** The TG showed better performance in the Rey Auditory Verbal Learning Test, body mass index, waist-to-hip ratio, physical activity level, Timed Up and Go test, Sit-to-Stand Test and upper and lower limb muscle strength after 24 weeks of training. The CG showed a significant decrease in gray matter volume in the hippocampus and precuneus (right and left hemispheres), while the TG showed no reduction in the right hippocampus and precuneus. However, it showed a decrease in the volume of these regions on the left side and in the left superior frontal gyrus. In the analysis of white matter integrity, fractional anisotropy increased in the TG and decreased in the CG. Axial diffusivity decreased in the TG, while radial diffusivity increased in the CG, and mean diffusivity varied, increasing and decreasing in both groups according to the tract evaluated. **CONCLUSION:** RT improved memory performance, anthropometric measures, and functional capacity in elderly individuals with MCI. Furthermore, it appears to play a protective role against atrophy of the hippocampus and precuneus (right hemisphere) and positively influences white matter integrity parameters.

Keywords: Dementia; Alzheimer Disease; Resistance Training; Magnetic Resonance Imaging; Diffusion Magnetic Resonance Imaging.