

The Effects of Dual-Task Training for Older Adults With Cognitive Impairment: A Systematic Review

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PURPOSE: An aging population has doubled life expectancy compared to the 19th century, and life expectancy at age 65 has increased by more than 66% (Catillon, Cutler, & Getzen, 2018). An aging population increases the prevalence of dementia and geriatric diseases. Dementia is classified as a neurodegenerative disorder, and changes such as memory loss and thinking ability occur due to changes in the structure of the brain (Rizzi, Rosset, & Roriz-Cruz, 2014). In addition, the risk of Alzheimer's disease increases at a rate of 10% to 12% per year in the older adults with mild cognitive impairment (MCI), a pre-stage of dementia (Petersen et al., 1999). However, there is currently no direct treatment for dementia, it is important to detect mild cognitive impairment early to preserve cognitive function and improve symptoms (Tangalos, & Petersen, 2018). For the preventive purpose of preserving cognitive function, research on dual task training combining the benefits of physical activity and cognitive activity is ongoing. Therefore, in this study, literature reviews were conducted to examine the differences between the types of dual task training and the intervention methods and to inspect the therapeutic effect on cognitive function.

DESIGN: From January 2011 to September 2021, we searched the peer-reviewed manuscript related to dual-task training for dementia and MCI using the PubMed, Embase databases. Search terms were "dementia," "mild cognitive impairment," "dual task training," or "combined cognitive and physical training." The articles were selected according to the selection and exclusion criteria.

METHOD: The five studies were selected from the 3,060 clinical trial studies related to dual task training. The quality of the selected studies was evaluated according to the level of evidence. The Physiotherapy Evidence Database (PEDro) rating scale was used to evaluate the methodological quality of the study. A risk of bias assessment was performed to examine the risk on the study results through the internal validity assessment of the selected studies. The subject studies were selected according to the criteria of PICO (Participants, Intervention, Comparison, Outcome) and inspect the type of dual task training, period and intervention affect.

RESULTS: The five selected studies were randomized controlled trials with level I evidence. The total score of the selected studies evaluated using the PEDro scale was 6.2, indicating 'good' at the methodological qualitative level. Risk of bias outcomes were measured high risk in three studies was assignment concealment, blinding participants and staff, and incomplete outcome data. The type of dual task was simultaneous training in all 5 studies. The computer based program or virtual reality was used as therapeutic medium, whereas in the three studies, no medium were used. An analysis of selected studies found that dual task training had significant effects on attention, executive function, and cognitive screening tests.

CONCLUSION: As the results, the effect was found in cognitive domains such as attention, psychomotor speed, including executive function. It is expected that the results of this study will be used as reference for applying the dual task training to the older adults with mild cognitive impairment and dementia in clinical practice. Further, it is necessary to study the detailed protocol of dual task training and validate its effectiveness.

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