

# Effect of Simultaneous Dual-Task Training on Regional Cerebral Blood Flow in Older Adults with Amnesic Mild Cognitive Impairment

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## Introduction:

It is important to develop new treatments and interventions that restore cognitive function to the normal range in older adults with mild cognitive impairment (MCI), in whom the condition may progress to dementia. Several metaanalyses have reported the effects of dual-task training in combination with physical exercises and cognitive tasks as a method to prevent and treat cognitive decline in older adults. However, no previous study has examined the effect of dual-task training using changes in regional cerebral blood flow (rCBF) using single-photon emission computed tomography (SPECT) as an outcome. This study aimed to examine the effects of simultaneous dual-task training of exercise and cognitive tasks on rCBF using SPECT in older adults with amnesic mild cognitive impairment (aMCI).

## Methods:

In this non-randomized control trial, 40 older adults with aMCI participated from May 2016 to April 2018. Outpatients in the intervention group (n=22) underwent 24 sessions (12 months) of dual-task training twice a month for 60 mins per session. Participants in the control group (n=18) continued to have regular outpatient visits. The primary outcome was rCBF at baseline and after 12 months, which was compared in each group using the two-sample t-test. The secondary outcomes were the rate of reversion and conversion from aMCI after 12 months.

## Results:

Of the 22 participants in the intervention group, six dropped out; therefore, 16 were included in the analysis. The intervention group showed more significant increases in rCBF in multiple regions, including the bilateral frontal lobes, compared with the control group ( $p < 0.001$ ). However, the rates of reversion (the intervention group 6.2% vs the control group 0.0%,  $p = 0.471$ ) or conversion (the intervention group 6.2% vs the control group 27.8%,  $p = 0.116$ ) from MCI were not significantly different.

## Discussion:

Our results suggest that dual-task training may be useful for activating frontal lobe regions and other areas at risk for reduced rCBF in older adults with aMCI. However, this study was a validation of a longitudinal intervention with a short period of time and a small sample size with rCBF by SPECT as the only outcome, and future studies should also examine changes in cognitive and physical function as outcomes.

## Conclusion:

Dual-task training for older adults with aMCI increased rCBF in the frontal gyrus but did not promote reversion from MCI to normal cognition. Future intervention studies, such as follow-up examinations after the intervention, are warranted to consider long-term prognosis.