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Effects of Exercise on Inhibitory Control, Metabolic Markers, Lipid Indices, and Physical Function in Older Adults with Mild Cognitive Impairment: Pilot Study

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INTRODUCTION:

Mild cognitive impairment (MCI) affects around 10–20% of adults over 65 and increases the risk of developing dementia [1,2]. With few effective treatments available, identifying practical, modifiable strategies is essential. Exercise supports both brain and metabolic health and may promote neuroplasticity while reducing inflammation [3,4]. Therefore, this study examined how training influences inhibitory control, metabolic markers, lipid profiles, and physical function in older adults with MCI, and whether age and baseline cognition shape these responses.

METHODS:

Older adults with MCI completed supervised strength and stretching training for six months, assessed at baseline, 3, and 6 months. Baseline cognition was evaluated using the Montreal Cognitive Assessment (MoCA) [5]. Cognitive outcomes included inhibition accuracy and reaction time to correct responses in the Go/No-go test. Additional measures were glycated hemoglobin (HbA1c), C-reactive protein, MTL, and non-DTL cholesterol, fat mass, gait speed, and chair rise performance. Repeated-measures General Linear Models (SPSS 29.0) included age and baseline MoCA as covariates. Significance was set at $p < .05$. Effect sizes are reported as partial eta-squared (η^2) and observed power (1-beta).

RESULTS:

No significant between-group differences were found. A trend-level group x time interaction was observed for inhibition reaction time ($p = .040$, $\eta^2 = .125$, 1-beta = .617), indicating faster responses in the strength group. Inhibition control accuracy showed a trend-level association with age ($p = .070$, $\eta^2 = .105$, 1-beta = .527). Metabolic markers showed no main effects. Baseline MoCA was associated with HbA1c (%) ($p = .049$, $\eta^2 = .146$, 1-beta = .512) and HbA1c (mmol/mol) ($p = .024$, $\eta^2 = .188$, 1-beta = .637). Trend-level group x time interactions were observed for MTL ($p = .015$, $\eta^2 = .145$, 1-beta = .753) and non-DTL cholesterol ($p = .019$, $\eta^2 = .137$, 1-beta = .724). Fat mass interacted with baseline MoCA ($p = .025$, $\eta^2 = .218$, 1-beta = .691) and showed a trend toward a time x group effect ($p = .074$, $\eta^2 = .159$, 1-beta = .515). Age was associated with fat mass ($p = .045$), gait speed ($p = .051$), and chair rise performance ($p = .056$).

CONCLUSION:

Six months of training did not significantly improve cognitive, metabolic, or functional outcomes. However, moderate effects and interaction patterns suggest modality-specific adaptations influenced by age and baseline cognition. Early changes in metabolic regulation and inhibitory control may precede broader cognitive gains, supporting exercise as a promising early intervention in MCI [3,4].

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