

Physical Fitness And Its Relationship With Brain Age And Pace Of Aging: preliminary findings for dementia prevention

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KEY TAKE AWAY: Simple fitness measures may serve as accessible markers and intervention targets to preserve brain health, reduce the brain age and slow the pace of aging in high-risk populations.

INTRODUCTION

Older brain age and faster aging are linked to cognitive decline and Alzheimer's disease.

Modifiable factors

may help slow aging, especially in older adults and individuals with coronary artery disease.

AIM To explore associations between physical fitness and brain age and pace of aging in older adults and individuals with coronary artery disease.

Hypothesis: Higher physical fitness will be associated with lower brain age and a slower pace of aging in both cohorts.

METHODS

Cohorts

- 91 cognitively unimpaired older adults (AGUEDA trial; 72±4 y)
- 105 individuals with coronary artery disease (Heart-Brain trial; 62±7 y)

Physical fitness

- handgrip strength
- muscular endurance (30-s arm curl, 30-s chair stand, 2-min step tests)
- functional capacity/agility (6-min walk and timed up & go)

Outcomes (T1-weighted 3T brain MRI-derived)

- Brain-PAD (brain-predicted age difference; negative = younger-appearing brain)
- DunedinPACNI (pace of aging; lower = slower aging)

Analysis

- Linear regression adjusted for age, sex, image quality

RESULTS

	Brain-PAD	DunedinPACNI
	Std β (95% CI)	p-value
Handgrip strength	-0.38 (-0.77, 0.01)	0.058
30-s arm curl	0.00 (-0.21, 0.21)	0.994
30-s chair stand	-0.01 (-0.22, 0.19)	0.888
2-min step	0.09 (-0.12, 0.29)	0.384
6-min walk	-0.17 (-0.39, 0.06)	0.148
Timed up & go	0.17 (-0.05, 0.40)	0.125

	Brain-PAD	DunedinPACNI
	Std β (95% CI)	p-value
Handgrip strength	-0.04 (-0.34, 0.26)	0.802
30-s arm curl	-0.11 (-0.33, 0.10)	0.3
30-s chair stand	-0.14 (-0.34, 0.07)	0.194
2-min step	-0.10 (-0.31, 0.10)	0.327
6-min walk	-0.17 (-0.40, 0.05)	0.126
Timed up & go	0.21 (0.00, 0.42)	0.048

Associations between physical fitness and brain-PAD and DunedinPACNI by study. Negative β indicates better fitness is associated with younger brain (lower brain-PAD) and slower pace of aging (lower DunedinPACNI), except timed up & go, where positive values indicate the same. *p < 0.05.

CONCLUSIONS

Specific aspects of physical fitness were associated with brain age and the pace of aging in cognitively unimpaired older adults and in individuals with coronary artery disease.

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