STRENGTH TRAINING AND COGNITIVE IMPAIRMENT: A SYSTEMATIC REVIEW

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Resumen

El deterioro cognitivo leve (DCL) es un factor de riesgo para acabar desarrollando una demencia. Para hacer frente a esta enfermedad las terapias no farmacológicas son de gran importancia y el entrenamiento de fuerza es una de ellas. Es por esto por lo que el objetivo del presente trabajo es conocer hasta qué punto resulta útil como parte de la terapia no farmacológica para frenar el deterioro cognitivo y prevenir la demencia. Para ello se ha llevado a cabo una búsqueda en la base de datos Pubmed con los siguientes criterios: 1) el estudio es un Randomized Controlled Trial (RCT), 2) se incluyen al menos dos evaluaciones cognitivas, 3) al menos uno de los programas de tratamiento se basa exclusivamente en el entrenamiento de fuerza 4) muestra de sujetos con DCL o deterioro cognitivo subjetivo y no con demencia. Tras excluirse los duplicados, se seleccionaron por título y resumen y se evaluó el texto completo, resultando en un total de 10 artículos incluidos. Las intervenciones basadas en el entrenamiento de fuerza consistían en el uso de mancuernas, bandas elásticas y máquinas. Los resultados muestran que este tipo de entrenamiento produce una mejora cognitiva global de las personas con DCL, así como un aumento de la atención y la velocidad de procesamiento. Sin embargo, no está claro si se da una mejora en la memoria. Algunos de los posibles mecanismos que subyacen a estos cambios son el incremento de la IGF-1, del BDNF, del VEGF, de la plasticidad sináptica y el crecimiento neuronal, así como una mejora del flujo sanguíneo y del sueño.

Palabras clave: entrenamiento de fuerza, entrenamiento de resistencia, ejercicio anaeróbico, deterioro cognitivo.

Abstract

Mild cognitive impairment (MCI) is a risk factor for developing dementia. To cope with this disease, non-pharmacological therapies have been highly useful, being strength training one of them. That is why the aim of this study was to discover to what extent it is useful as part of non-pharmacological therapy to slow cognitive impairment and prevent dementia. To this end, a search was conducted in the Pubmed database with the following criteria: 1) the study is an RCT, 2) at least two assessments of cognitive impairment are included, 3) at least one of the treatment programs is based exclusively on strength training 4) sample of subjects with MCI or subjective cognitive impairment but without dementia. After duplicates were excluded, we screened by title and abstract, also, the full text was evaluated, resulting in a total of 10 included articles. Interventions based on strength training consisted of the use of dumbbells, elastic bands and machines. The results show that this type of training produces an overall cognitive improvement in people with cognitive impairment, as well as an increase in attention and processing speed. However, it is not clear whether there is an improvement in memory or not. Some of the possible mechanisms underlying these changes are increased IGF-1, BDNF, VEGF, synaptic plasticity and neuronal growth, as well as improved blood flow and sleep.

Keywords: strength training, resistance training, anaerobic exercise, cognitive impairment, decline cognitive.

STRENGTH TRAINING AND COGNITIVE IMPAIRMENT: A SYSTEMATIC REVIEW OF EXPERIMENTAL STUDIES

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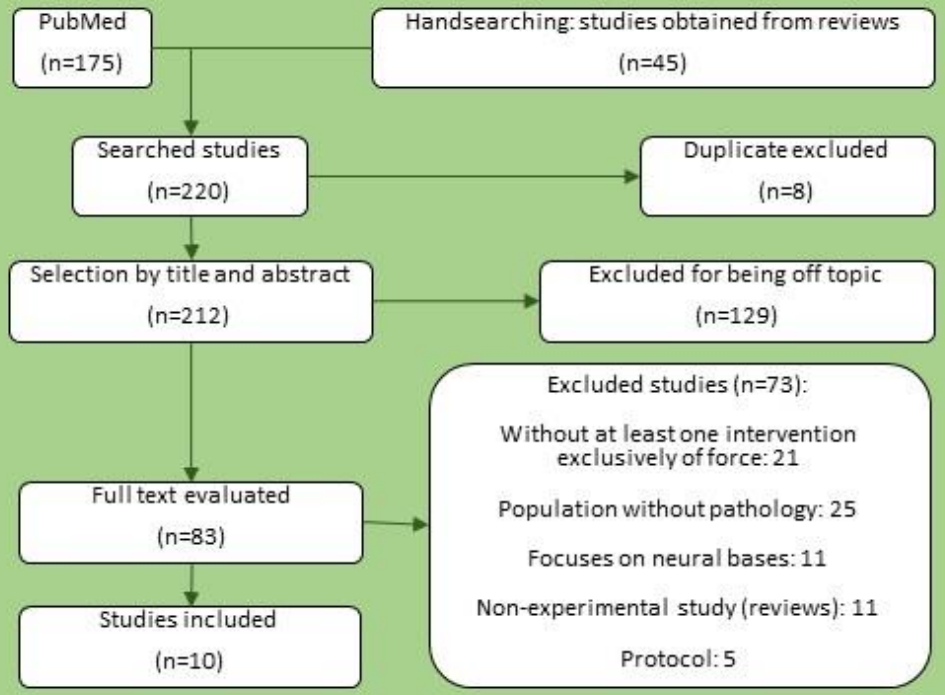
Introduction

Mild cognitive impairment (**MCI**) consists of a small decline in cognitive function, which represents the transitional state between normal aging and dementia (APA, 2022). For its treatment, non-pharmacological approaches should be considered (Barnes, 2011), and one of them is physical exercise. Strength training (**ST**) is a type of exercise that has not been given much importance, however, it brings different **health benefits**, including improved cognitive abilities (Westcott, 2012). Thus, ST seems to be a good option to cope with physical frailty and cognitive decline at the same time (Yoon, 2018).

The aim of the present review is to examine whether this type of physical exercise is **useful as a treatment** to cope with MCI and, if so, **how ST can** help to **improve** cognitive symptomatology.

Method



Results

Author	Participants	Intervention	Cognitive Assessment	Results
Busse et al. 2008	n= 31 Age: 72yo	Dumbells.	CAMCOG Rivermead (RBMT)	Improvement in memory. No differences in global cognition.
Cardalda et al. 2019	n= 77 Age: 84,8yo	Elastic bands. 2 x 1h per week. 24 weeks.	MMSE Pfeiffer	Improvement in global cognition.
Chupel et al. 2017	n= 33 Age: 82,7yo	Elastic bands. 2 x 45 min per week. 28 weeks.	MMSE	Improvement in global cognition.
Davis et al. 2013	n= 86 Age: 75yo	Dumbells and air system. 2 x 1h per week. 24 weeks.	Stroop	Improvement in selective attention.
Mavros et al. 2016	n= 100 Age>55yo	Resistance machines. 2-3 x 60-100 min per week. 24 weeks.	ADAS-Cog (and Memory Domain)	Improvement in global cognition and excecutive function. No diferences in memory.
Nagamatsu et al. 2012	n= 77 Age: 75yo	Dumbells and air system. 2 x 1h per week. 24 weeks.	Stroop TMT Verbal Digit Span	Improvement in selective attention and associative memory. Also improvement in fMRI.
Nagamatsu et al. 2013	n= 77 Age: 75yo	Dumbells and air system. 2 x 1h per week. 24 weeks.	RAVLT Spacial memory task	Improvement in spacial memory. No differences in verbal memory.
Suo et al. 2016	n= 100 Age: 70,1yo	Resistance machines. 2 x 90 min per week. 26 weeks.	ADAS-Cog (Memory Domain)	Improvement in global cognition. No differences in memory.
Yoon et al. 2016	n= 30 Age: 76yo	Elastic bands. 2 x 1h per week. 12 weeks.	MMSE MoCA-K	Improvement in global cognition.
Yoon et al. 2018	n= 45 Age: 73,9yo	Elastic bands. 3 x 1h per week. 16 weeks.	Rey 15-Item Memory Test: TMT, Digit Span, FAB	Improvement in processing speed and executive functions. No differences in memory and cognitive flexibility.

Discussion

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