

Editorial

What we know and What we do not know about Exercise Role in Cognitive Decline Prevention

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In the last decades, several studies evaluated the effectiveness of the physical exercise in influencing the cognitive performance. In fact, physical activity, as no-pharmacological therapy, may be a preventive strategy to attenuate the severity of the effects of important pathology like dementia that are characterized by a progressive cognitive impairment [1]. The strategy to reduce the severity of cognitive decline by a preventive improvement of the cognitive functioning is founded on the hypothesis of the cognitive reserve [2] that suggests that individuals with higher IQ, education, or occupational attainment have lower risks of developing dementia such as Alzheimer's disease or vascular dementia [3]. Previous studies showed that physical activity prevents cognitive decline and positively influences self-efficacy in daily life [4]. Furthermore, Barned and Yaffe [5], in a meta-analysis of the 2011, showed that a 10-25% reduction of seven modifiable risk factors, as diabetes, midlife hypertension, midlife obesity, smoking, depression, cognitive inactivity or low educational attainment, and physical inactivity, could potentially prevent 1.1-3.0 million cases of Alzheimer's disease worldwide. Furthermore, physical activity influencing the brain vascularization and oxygenation helps people with respiratory diseases, [6]. Nevertheless aging may drastically reduce physical activity levels, accelerate sarcopenia, muscle strength and power losses [7].

Moreover, despite the recognized benefits of exercise on cognitive health, it must be highlighted that there is a paucity of evidence attesting to the causal relationship between improvements in cognition and physical fitness.

Typology of Exercise Effects on Preventing Cognitive Decline

Cardiovascular training significantly improved attention and reasoning performances, whereas resistance training significantly improved praxis and the functional capacity of the elderly [8].

The combination of the two protocols, resistance and aerobic training, may have dual benefits in improving attention and executive functioning [9].

Considering the effectiveness of the exercise modalities, several studies have shown that cardiovascular training, with long period of training, may be effective in increasing the volume of the hippocampus and grey matter, and reducing white matter degradation and cerebral ischemia [10]. Recently Kelly et al (2014) [11] reported that both moderate and high intensity workouts of resistance training guaranteed beneficial effects on cognition and memory, but with a prolonged time of intervention. In contrast, a recent research has suggested that high levels of arousal, produced by high-intensity exercises, significantly improved the subjective memory in older adults [12]. As we stated previously, even if no real evidence still exists concerning the relationship between resistance training and memory and cognition decline prevention, duration seems to be the crucial parameter of an effective physical activity intervention on memory and cognition, independently from the different modalities of exercise execution and their different intensity [9]. Taking in consideration the psychological benefits physical activity, improving motor skills such as balance, coordination, muscle strength and cardiovascular health, enhances the self-efficacy and self-esteem feelings, and consequently the mood of the participants that are correlated with subjective memory beliefs [13]. Antikainien et al. (2001) [14] reported that several psychological factors such as work disabilities, subjective poor health, bad mood and other personality traits negatively influence memory complaints but not cognitive performance. Depression usually increases cognitive and subjective memory problems [12], whereas the reduction of depressive symptoms, obtained with exercise, may improve subjective memory perception, [15]. Furthermore, that indisputable benefit is that psychological well-being and consequently better cognitive self-efficacy in older adults may be influenced by the environmental enrichment that Physical Activity guarantees: the environmental enrichment determines different mechanisms of biological or physiological adaptations that may positively affect brain functioning [11]. Physical activity ensures positive cognitive stimuli due to social relations and interactions with the other subjects and trainers, methodologies of training and using training machines, even if the effects of these stimuli have yet to be fully evaluated [4].

Conclusion

In conclusion, physical activity may produce beneficial effects on the human brain and cognition by both directly increasing the wellness perception and indirectly reducing risk factors.

The combination of different kinds of exercise might guarantee a variety of stimuli that may favor biological and physiological adaptations in humans.

The environmental contexts, in which the exercises are performed, may play an important role in promote cognitive functioning.

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