



Physical exercise and its therapeutic effects on the wellbeing of people with dementia

With the notion that “if exercise could be packed into a pill, it would be the single most widely prescribed and beneficial medicine in the nation”¹, an active lifestyle has long been proposed to be the medicine for frail adults², and recent research has suggested that as brief as 20 minutes of brisk walking a day would lower the risk of early mortality³.

Exercise has a protective effect against cognitive impairment⁴, but for people whose cognitive degeneration has already begun, the evidence supporting physical activities remains favorable yet inconclusive⁵. However, some types of exercises have been found effective to promote the wellbeing in multiple domains. For instance, a traditional mind-body exercise that integrates cognitive and motor coordination is found to carry a bigger protective effect over stretching and toning exercise on cognitive decline among people at risk of dementia⁶.

Moderately intensive metabolism, generated by exercises such as Tai Chi and brisk walking, could benefit cognitive performance. Evidence associating functional improvements with cognitive changes support late-life alterations in brain plasticity and morphology. It is reported that aerobic exercise enlarged the size of the hippocampus, an area which contributes to long term memory, visual-spatial and verbal storage, to the extent of 1-2 years of reversed age-loss in older adults⁷. A local study by Cheng et al reported that practicing Tai Chi for an hour per session, 3 times per week for 12 consecutive weeks improved the MMSE score of elderly people with dementia up to a statistically significant level and maintained the performance of forwarding digit span over nine months⁸.

The improvement in agility and mobility is associated with executive control, which can be reflected by the ability in performing activities in daily living (ADL), tasks that require the combination of “sustained attention, motivation, and motor performance”⁹. A large scale Tai Chi randomized controlled study involving 160 institutionalized people with dementia supports the effect of exercise. The intervention was carried out four times a week for 24 weeks, with 30 minutes per session. Compared with another light-intensity exercise, the Tai Chi group performed significantly better in ADL at one year’s time¹⁰.

The therapeutic elements of Tai Chi proposed by Wayne et al¹¹ and their work *The Harvard Medical School Guide to Tai Chi* suggested that the process of learning and memorizing body movements might help sharpen working memory. On enhancing brain flexibility, Wollesen



and Voelcker-Rehage ¹² also pointed out that balance and cognitive dual-tasking performance could be trained by exercise. And therefore the multitasking requirement in Tai Chi could improve executive functions such as working memory and divided attention.

Besides the aforementioned therapeutic potentials of mind-body exercise, low intensity exercise such as casual walking also promotes physical performance, reducing the chance of fall. In a meta-analysis involving 781 participants with cognitive impairment and seven trials including balancing and strength training flexibility, walking, coordination training, and exercise involving executive function, exercise was documented to improve mobility, balance, muscle strength, and physical function in the older population ¹⁴. There is some evidence that exercise improves walking performance, even when exercise was performed individually ¹³. A recently published meta-analysis also showed that home-based balance and mobility exercises significantly reduced the mean number of fall and reduced fall risks of people with dementia. Existing evidence of such exercises, including sideways walking, calf raises, and step-overs, favored the effectiveness of in-home training, although supervision and regular follow-up by family caregivers and physiotherapists were recommended ¹⁵.

There has been some evidence supporting the immediate therapeutic effects of exercise in general on ability in activities of daily life ¹³ and psychological indicators such as depression ¹⁶, yet the results have not been definitive ⁵. However, there are two highlights worth mentioning from a meta-analysis conducted by Qiu, De Ronchi, and Fratiglioni ⁴. First, activities involving physical, mental, and social components could yield the most beneficial outcomes on older adults, therefore group exercise such as Tai Chi that emphasized on social component might bring additional health impact. Second, physical fitness and its associated brain performance could yield cumulative achievements over long term practice. According to the cross sectional study by Lam et al¹⁷, among 782 samples of Hong Kong Chinese, those who regularly performed aerobic or mind-body exercise for more than five years had a higher cognitive score, attention, and short term memory performance than their peers who did not have the same exercise experience, thus echoed the conclusion of Warburton, Nicol, and Bredin's review ¹⁸ on exercising: that a more physically active lifestyle is likely to generate more health benefits.



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