

Effects of Exercise on AD Risk

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Why Physical Activity is an Effective Way to Reduce Risk of Cognitive Decline

Research suggests that regular physical activity can reduce dementia risk by up to 20% (1), making exercise one of the most effective strategies to prevent cognitive decline and dementia. These powerful benefits may be attributable to the multiple pathways through which physical activity supports brain health, including soothing chronic inflammation, improving neuroplasticity, boosting cardiovascular health, and bolstering the effects of other preventative lifestyle modifications (2). Read on to learn more about how exercise mitigates dementia risk.



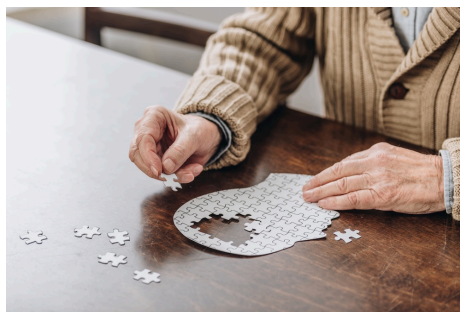
Inflammation

Chronic inflammation reflects dysregulated immune system activity that is believed to promote neurodegeneration (3). Physical activity helps recalibrate the immune system by inducing acute inflammation. Research shows that while inflammatory markers are elevated immediately after physical activity, regular exercise is associated with lower baseline inflammation (4, 5). This puzzling paradox is explained by the principle of hormesis (2), which states that moderate stress can strengthen the immune system's ability to respond and adjust to threats, while excessive or prolonged stress can wear down our natural defense systems (6). In this context, exercise acts as a mild stressor that helps "train" the immune system to function more effectively.



Neuroplasticity

Neuroplasticity refers to the brain's ability to form new brain cells and reorganize connections between them. These processes are essential for memory, learning, and overall cognitive function (7). In dementia, cognitive decline occurs when disease processes associated with Alzheimer's disease or other forms of dementia degrade brain cells and disrupt communication pathways that connect them. Boosting neuroplasticity can increase the brain's ability to compensate for or build resilience against these changes. Physical activity improves neuroplasticity by stimulating brain cell production and supporting the brain's ability to restructure connections between cells (2).



Cardiovascular Health

Exercise is widely recognized as a key contributor to cardiovascular health. A healthy heart and healthy blood vessels keep blood flowing efficiently through the body, delivering oxygen and nutrients and removing waste. In the brain, reduced blood flow is believed to actively facilitate the development of plaques and tangles, molecular signatures of Alzheimer's disease (8). Adequate blood flow is also critical to immune system functioning and neuroplastic processes discussed above (2). Thus, by supporting healthy blood flow to the brain, regular exercise can slow changes in the brain linked to Alzheimer's and strengthens the brain's resilience by enhancing protective mechanisms.



Supporting Other Lifestyle Modifications

Sleep quality, emotional stress, and cognitive engagement share links to both physical activity and dementia (2). Inadequate sleep may inhibit the body's ability to clear waste from the brain, leading to buildup of proteins associated with dementia (9). Aerobic exercise has been found to support healthy sleep habits by making falling asleep easier and improving sleep quality (10). Cortisol, a hormone released in response to emotional stress, is closely tied to inflammation. Like other inflammatory processes, physical activity helps regulate cortisol levels through hormesis (11). Cognitive engagement also helps guard against neurodegeneration by promoting neuroplasticity. Exercise may enhance these benefits when cognitive engagement occurs during or shortly after physical activity (2).

To maximize the health benefits of exercise, shoot for 150 to 300 minutes of moderate-intensity activity per week – this includes activities such as brisk walking, cycling, dancing, or yard work. However, even light physical activity, such as leisurely walking, stretching, or chores like washing dishes, preparing a meal, or grocery shopping, have been found to reduce dementia risk (12). Check out our article about accessible physical activities (link to: <https://cehs.usu.edu/pals/strength-physical-activity>) to learn about more ways that you can improve your activity levels day-to-day!

- 1) Iso-Markku, P., Kujala, U. M., Knittle, K., Polet, J., Vuoksima, E., & Waller, K. (2022). Physical activity as a protective factor for dementia and Alzheimer's disease: Systematic review, meta-analysis and quality assessment of cohort and case-control studies. *British Journal of Sports Medicine*, 56(12), 701–709. <https://doi.org/10.1136/bjsports-2021-104981>
- 2) Mansoor, M., Ibrahim, A., Hamide, A., Tran, T., Candrea, E., & Baltaji, J. (2025). Exercise-Induced Neuroplasticity: Adaptive Mechanisms and Preventive Potential in Neurodegenerative Disorders.

Medicine and Pharmacology. <https://doi.org/10.20944/preprints202503.0057.v1>

- 3) Zhang, W., Xiao, D., Mao, Q., & Xia, H. (2023). Role of neuroinflammation in neurodegeneration development. *Signal Transduction and Targeted Therapy*, 8(1), 1–32. <https://doi.org/10.1038/s41392-023-01486-5>
- 4) Koo, J.-H.; Jang, Y.-C.; Hwang, D.-J.; Um, H.-S.; Lee, N.-H.; Jung, J.-H.; Cho, J.-Y. Treadmill exercise produces neuroprotective effects in a murine model of Parkinson's disease by regulating the TLR2/MyD88/NF- κ B signaling pathway. *Neuroscience* 2017, 356, 102–113. <https://pubmed.ncbi.nlm.nih.gov/28527958/>
- 5) Jensen, C.S.; Bahl, J.M.; Østergaard, L.B.; Høgh, P.; Wermuth, L.; Heslegrave, A.; Zetterberg, H.; Heegaard, N.H.H.; Hasselbalch, S.G.; Simonsen, A.H. Exercise as a potential modulator of inflammation in patients with Alzheimer's disease measured in cerebrospinal fluid and plasma. <https://pubmed.ncbi.nlm.nih.gov/30980923/>
- 6) Wan, Y., Liu, J., Mai, Y., Hong, Y., Jia, Z., Tian, G., Liu, Y., Liang, H., & Liu, J. (2024). Current advances and future trends of hormesis in disease. *Npj Aging*, 10(1), 1–19. <https://doi.org/10.1038/s41514-024-00155-3>
- 7) Puderbaugh, M., & Emmady, P. D. (2025). Neuroplasticity. In StatPearls. StatPearls Publishing. <http://www.ncbi.nlm.nih.gov/books/NBK557811/>
- 8) Tini, G., Scagliola, R., Monacelli, F., La Malfa, G., Porto, I., Brunelli, C., & Rosa, G. M. (2020). Alzheimer's Disease and Cardiovascular Disease: A Particular Association. *Cardiology Research and Practice*, 2020, 2617970. <https://doi.org/10.1155/2020/2617970>
- 9) Understanding the connection between sleep and dementia (2021, August) Harvard Pilgrim Health Care —HaPi Guide. Retrieved May 12, 2025, from <https://www.harvardpilgrim.org/hapiguide/understanding-the-connection-between-sleep-and-dementia/>
- 10) Exercising for better sleep (2024, June 20) Johns Hopkins Medicine. Retrieved May 12, 2025 from <https://www.hopkinsmedicine.org/health/wellness-and-prevention/exercising-for-better-sleep>
- 11) Hannibal, K. E., & Bishop, M. D. (2014). Chronic stress, cortisol dysfunction, and pain: A psychoneuroendocrine rationale for stress management in pain rehabilitation. *Physical Therapy*, 94(12), 1816–1825. <https://doi.org/10.2522/ptj.20130597>
- 12) Bilodeau, K. (2022, April 1) Even light physical activity may prevent dementia. Harvard Health. Retrieved May 12, 2025 from <https://www.health.harvard.edu/mind-and-mood/even-light-physical-activity-may-help-prevent-dementia>