Prevention and Management of Dementia and Frailty through Exercise

Jessica Hobbin & Maxwell Williams

Dementia

Dementia is an umbrella term for a range of neurological conditions that affect the brain over time.

Dementia can lead to:

- Decreased cognitive function
- Decreased executive function (planning, organisation)
- Changes in memory
- Changes in reasoning and communication

Frailty

Frailty refers to a weakened physical state that leave an individual more vulnerable to stressors such as:

- Higher risk of falls
- Increased hospitalisation rates
- Increased disability
- Decreased functional capacity for activities of daily living
- Decreased independence

How Exercise Helps Prevent Dementia and Frailty

1. Improved Blood Flow and Brain Health

Aerobic exercises such as brisk walking, cycling or swimming are shown to improve:

- Cardiovascular health which leads to -
- Enhancing blood flow to the brain - which crucial for maintaining cognitive function
- Preservation of brain cells and production of new brain cells

2. Neuroprotective Effects

Resistance or strength exercises such as lifting weights and impact training can:

- Strengthen muscles
- Stimulate release of a hormone named Brain-Derived Neurotrophic Factor (BDNF)
  - BDNF promotes brain cell survival, cell connection adaptability and protection
- This leads to Enhanced cognitive function - particularly in memory and executive function

3. Preservation of Muscle Mass and Function

As we age the main factor to consider to preserve long term health and function is maintaining muscle mass.

Resistance or strength exercises such as lifting weights and impact training can have many positive effects:

- Reduce risk of muscle loss & improved muscular strength - a key factor in frailty & long term function
- Maintain and improve bone mineral density
- Leading to increased functional capacity and ability to perform activities of daily living as well as reducing risk of falls and serious injury

4. Reduction of Inflammation and Oxidative Stress

Both chronic inflammation and oxidative stress are known contributors to both dementia and frailty.

Regular exercise, both aerobic and strength training helps to lower both of these factors within the body, leading to protective mechanisms being released within the body.

Exercise for Managing Dementia and Frailty

- Structured Aerobic and Strength Exercise Programs
  - Combining both exercises such as walking, stationary cycling or swimming along with light weights or body-weight exercises, gradually increasing in intensity as physical ability improves
- Balance and Stability Exercises
  - Including balance and coordination exercises like Tai chi, balancing on the spot or walking balance can improve stability and proprioception, addressing frailty vulnerabilities
- Cognitive and Physical Integration
  - Cognitive function can be further improved by exercises that involve both physical and cognitive challenges, for example: dual tasking activities or engaging in memory games
- Social Engagement through Group Exercises
  - Social isolation can exacerbate both dementia and frailty. Group-based exercise programs provide opportunities for social interaction and improving mood

Research Evidence

A study published in the *BioMed Central Geriatrics Journal*, focused on dual-task resistance exercises, where participants engaged in exercises that challenged both physical and cognitive tasks simultaneously. This form of training resulted in enhanced cognitive function, mood, and daily living activities in older adults, especially those with cognitive impairments

A study reported in the *British Journal of Sports Medicine*, showed that older adults who engaged in progressive resistance exercise for 6 months saw a 30% improvement in muscle strength and a 15% increase in functional mobility, resulting in fewer falls and improved independence, critical for managing frailty.

Jung, D., Ko, S., & Kim, H. (2024). Effects of dual-task resistance exercise on cognition, mood, depression, functional fitness, and activities of daily living in older adults with cognitive impairment: a single-blinded, randomized controlled trial. *BMC Geriatrics*, 24, Article 4942. https://doi.org/10.1186/s12877-024-04942-1:contentReference[oaicite:0]{index=0}.

Watson, S. L., Weeks, B. K., Weis, L. J., & Beck, B. R. (2021). Progressive resistance training for concomitant increases in muscle strength and bone mineral density in older adults: A systematic review and meta-analysis. B*ritish Journal of Sports Medicine, 55*(9), 468-475. https://doi.org/10.1136/bjsports-2020-103476:contentReference[oaicite:0]{index=0}.

Practical Recommendations

Frequency

Aiming to meet the Australian Physical Activity Guidelines of 150minutes of moderate-intensity aerobic exercise per week as well as 2 strength based exercise sessions focused on major muscle groups

Balance & Coordination

Incorporate balance & dual tasking exercise 2-3x per week to prevent falls

Supervision

For those with advanced frailty or dementia, it’s important to have supervised sessions tailored to individual needs by healthcare professionals

Practical Recommendations

Take Home Exercise Program – Beginner

Mode

Aerobic exercise:
10 minute walk, every day of the week at brisk pace

Resistance exercise:
Sit to stands
Kitchen bench push ups

Balance & Coordination

1. Tandem balancing with nose touching
2. Single leg stance balance with support from kitchen bench

- For bonus points Count backwards from 100 or pass an object hand to hand while maintaining your balance

Conclusion

Exercise is a powerful tool for both preventing and managing both dementia and frailty risk.

By:

- Maintaining muscle strength
- Improving cognitive function
- Reducing falls risk

Regular exercise enhances quality of life and helps older adults maintain their independence within the home and community. With proper support and tailored exercise programs we can make a significant difference in the lives of individuals facing these challenges.

Thank You

Questions?