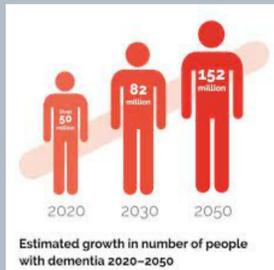
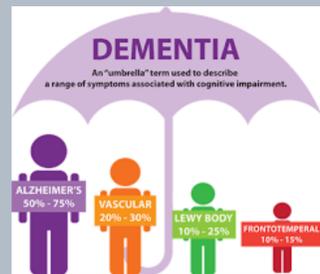


INTRODUCTION TO PATHOLOGY

Dementia is defined by the loss of cognitive abilities such as thinking, remembering and reasoning. It also affects behavioral abilities and interferes with daily life and activities. Each person may experience several signs and symptoms depending on severity, from mild to severe (Jacobs et al., 2018).



Worldwide, 50 million people have dementia, and 50-8% of people over 60 years old are diagnosed. Rates of dementia are also increasing, projecting to reach 152 million by 2050 (World Health Organization, 2020).

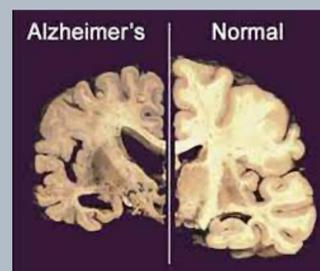


Alzheimer's Disease destroys memory and thinking skills due to abnormal clumps, or amyloid plaques, tangled bundles of fibers (tau), and loss of connections between neurons. Most damage takes place in the hippocampus, which is the memory center, and widespread damage leads to brain tissue shrinking.

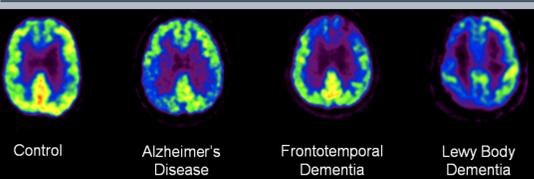
Frontotemporal Disorders result from damage to the neurons in the brain's frontal and temporal lobes. As neurons die, these lobes atrophy and this damage causes difficulty in thinking and behaviors controlled by these parts of the brain.

Lewy Body Dementia is caused by abnormal deposits of a protein called alpha synuclein in the brain, these Lewy body deposits affect chemicals in the brain which leads to problems with thinking, movement, behavior and mood.

Vascular Contributions to cognitive impairment and dementia (VCID) is a condition which arises from stroke and other vascular brain injuries. VCID causes change to memory, thinking and behavior. (World Health Organization, 2020)



To diagnose dementia, underlying conditions such as abnormal thyroid, hydrocephalus or vitamin deficiency must first be ruled out. Neurological tests are then used to assess balance, sensory response, reflexes and other cognitive functions. Brain scans such as CT, MRI and PET scans can also identify changes in brain structure (World Health Organization, 2020).



There is no treatment currently available to cure dementia or to alter its progressive course (World Health Organization, 2020). Numerous new treatments are being investigated in various stages of clinical trials.

EXERCISE TESTING

Pre-screening through memory clinic (Cat Scan, MRI, or EEG) (Hooghiemstra et al., 2012)

Functional Mobility Testing: Speed of performing daily movements (Chang et al., 2011)

Use of questionnaires to help assess Mobility, Strength, Cognition, Emotions, and overall quality of life (Long et al., 2020)

EXERCISE PRESCRIPTION

Type of Exercise	Frequency	Intensity	Volume
Resistance Training - Weight training - Machines & free weights - Body weight - Elastic Tubing	Begin with 1-2 sessions per week Increase to 2-3 weekly sessions	Begin with very light to light and progressively increase to 8-10RM Recovery periods of 2-4 min	Start with 1 set per exercise of 8-12 reps and increase to 2-4 sets Rest 1-2 minutes between sets
Aerobic Training - Treadmill walking - Cycling - Arm and leg cycling - Rowing - Aquatic exercise - Aerobic dance	Begin with 1 session per week Progress to 3-5 sessions per week	Begin with light to moderate (30-60% VO2 max or HR reserve) Progress to moderate intensity (40-60% VO2 or HRR) Progress to high intensity (60-90% VO2 or HRR)	Begin with 10-20 minute sessions Progress to 20-60 minute sessions

Table 9.1 (Jacobs et al., 2018 p. 323)

Results of EXRX



Improve memory and brain function

Maintain ADLs

Increase cerebral perfusion

Improve quality of life

Prevent further mental deterioration

Improve neuropsychiatric symptoms, depression and reduce mortality

(Atley et al., 2020; Bailey et al., 2019; Forbes et al., 2015; Hooghiemstra et al., 2012; Long et al., 2020)

SPECIAL CONSIDERATIONS

How are individuals with this pathology unique?

The diversity of cognition ability between dementia patients so use of functional movements and variety of exercise can have a variety of effects on cognition and quality of life.

What types of things should be anticipated?

- Setting and accessibility is very important for these patients (i.e. access to bathrooms, sitting places, refreshments)
- Socialization in group exercise classes seem to be beneficial for EOD patients provided beneficial accessibility (Hooghiemstra et al., 2012)

Possible Exercise Intervention Options

- Setting: Rehabilitative Center or In-home Program
- Mixed Exercise: Functional, Resistance, Aerobic Training



Contraindications

In some previous studies, exercise has not proven effective in improving cognitive function in dementia patients. In cases, even further cognitive deterioration has occurred, but is attributed to late Alzheimer's conditions (Long et al., 2020).

CONCLUSION

Dementia is a widespread disease which affects cognitive abilities such as memory, thinking and reasoning (Bailey et al., 2019). It affects mainly the older population, but can also impact people who have experienced significant frontotemporal damage. While there is no current cure for dementia, exercise has been shown to improve memory by increasing cerebral perfusion, prevent further mental deterioration, maintain ADLs, improve quality of life and improve neuropsychiatric symptoms (Long et al., 2020; Hooghiemstra et al., 2012; Chang et al., 2011). It has also been shown that physical inactivity is a clear modifiable risk factor to dementia (Atly et al., 2020; Bailey et al., 2015). Exercise prescription should include resistance training for 1-2 sessions a week with light intensity and aerobic training beginning with 1 session per week at a light to moderate intensity for 10-20 minutes (Jacobs et al., 2018). In creating a program, consider using group rehabilitation therapy that includes in-home accountability to provide clients with familiarity in their pursuit of healthy living (Hooghiemstra et al., 2012). Overall, early diagnosis of dementia coupled with early establishment of exercise included in the rehabilitation program is critical for maintaining quality of life and slowing the progression of the disease.

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