sit up to the starting position. On the next exhalation, repeat the motion, only turning to the opposite side. The movement should be reversed again on the inhale, returning to the starting position.

These are just a few poses to help begin focus and stretch the body. There are many poses available which should be tailored to the patient while keeping safety in mind. Seated exercises may be most appropriate for patients who are in the advanced stages of Alzheimer's. It is important to prioritize safety to avoid falls which can be dangerous to those of advanced age. Falls are to be avoided with all seniors, but more so with those who suffer from dementia due to the trauma negatively impacting cognitive function in those with Alzheimer's, and the increased difficulty with mobility that would be a consequence.

Section 4 Summary

Exercises that focus on strengthening, balance, mobility, flexibility, and functional ability are most beneficial to Alzheimer's patients. Tai Chi and yoga are often utilized due to the slow-moving, repetitive, relaxing motions involved. Gait should be monitored and observed during the Physical Therapy process with proper documentation performed to ensure that stride length, step height, and balance continue to be appropriate for the patient's safety. Exercise is important in those with Alzheimer's disease to improve and maintain balance and stability, endurance, and flexibility. It has been shown to positively impact mood, promote blood flow around the body, and of course to build muscle strength. When exercising with seniors who have cognitive impairments, it is important to implement short blocks of exercise, keep the exercise simple and easy to follow, and to keep them interested and motivated to ensure adherence and short term attention. Music, exercise videos, group activities, and games can be incorporated to assist with the enjoyment factor. Patients who suffer from dementia are more likely to be agreeable to do an activity that they feel is enjoyable, or that is engaging in some way.

Section 4 Key Concepts

- *Brain volume* - The adult human brain weighs on average about 1.5 kg (3.3 lb). In men, the average weight is about 1370 g (3.02 lbs), and in women the average about 1200 g (2.6 lbs). The volume is around 1260 cm^3 in men and 1130 cm^3 in women, although there is substantial individual variation. As the body ages, brain

atrophy occurs, which results in dementia, seizures, loss of motor control, and difficulty with speaking, comprehension or reading

- *Default mode network* - A system of connected brain areas that show increased activity when a person is not focused on the outside world. Involved in activities like daydreaming or thinking about the past and future.
- *Executive function* - Executive function and self-regulation skills depend on three types of brain function: working memory, mental flexibility, and self-control. These functions are highly interrelated, and the successful application of executive function skills requires them to operate in coordination with each other.
- *Frontal cognitive functions* - The frontal lobe of the brain is vital to our consciousness, as well as functions that appear uniquely human, such as spoken language. It is one of four paired lobes in the brain's cerebral cortex, and it plays vital roles in memory, attention, motivation, and numerous other daily tasks.
- *Hippocampal volume* - The volume associated with the hippocampus, which is a brain structure embedded deep in the temporal lobe of each cerebral cortex. It is an important part of the limbic system, a cortical region that regulates motivation, emotion, learning, and memory.
- *Insulin-like growth factor* - Insulin-like growth factor (IGF), formerly called somatomedin, any of several peptide hormones that function primarily to stimulate growth but that also possess some ability to decrease blood glucose levels.
- *Neurogenesis* - Neurogenesis is the process by which nervous system cells, the neurons, are produced by neural stem cells.
- *Neuroplasticity* - The brain's ability to reorganize itself by forming new neural connections throughout life. Neuroplasticity allows the neurons (nerve cells) in the brain to compensate for injury and disease and to adjust their activities in response to new situations or to changes in their environment.

Summary

Although there is no known cure for Alzheimer’s disease, Physical Therapy and other clinical treatments can help to manage and improve the symptoms of this disease. Physical therapy can help to improve strength, increase flexibility, improve gait, enhance functional ability, restore balance, and provide a great social interaction opportunity. A regular exercise program is important to increase endurance and blood flow to the body, and lessen the risks of falls. It is also important because it can be difficult for seniors to maintain mobility, resulting in muscle atrophy, weakened joints, decreased range of motion, and declining energy levels. Research has shown

that physical activity can improve brain function and memory, may delay the onset of Alzheimer's disease, and may delay a decline inability to perform tasks in Alzheimer's patients by improving strength, balance, safety, and gait patterns. Walking is the easiest way to improve stamina, endurance, and strength, and has been shown to improve the brain's resistance to Alzheimer's disease and mild cognitive impairments. It is a wonderful way to promote activity as no special equipment or setting is necessary, and it is low impact for those with limited strength and poor joints. Gait speed, stance time, quality, and stride should be observed when with the patient to monitor for decline and dysfunction. When exercising, the practitioner should remember to include cues for the visual, auditory, and tactile senses in symmetrical load bearing to help enforce and ingrain these cues in multiple ways to assist the patient in remembering. Mirrors are helpful to provide visual cues and to assist with correcting improper form. Therapists should utilize the cognitive tests such as the Clock Drawing Test, the Mini-Cog test, the Six Item Cognitive Impairment Test, the Self Administered Gerocognitive Exam, and the Abbreviated Mental Test Score to gauge the severity of cognitive decline and monitor the progression of the disease. When exercising, it is important for the Therapist to keep the exercises simple, repetitive, fun, engaging, and safe. With this in mind, programs that include Tai Chi, meditation, or yoga can be beneficial to motivate the patient and help keep them calm and learn breathing exercises to assist with frustration management. Problem-solving skills are compromised in those with Alzheimer's, which makes it all the more important to avoid difficult exercises. Physical Therapists should be encouraged to implement music, videos, or group sessions to keep the exercise sessions interesting and appealing to the patient, as they can be easily distracted. The clinician must never make assumptions about the patients' ability to perform or communicate, as this disease affects every patient differently. Each patient should be evaluated and treated as an individual with personally tailored sessions. The patient should never be excluded from discussions with family and should be included in decision making if at all possible. For those who have more difficulty with problem solving and communication, the Therapist should maintain eye contact and speak slowly and clearly. Be patient in conversation and with exercise treatments, giving the patient time to respond and react. Directions should be provided in a clear, step by step manner. In the later stages of this disease, tactile and visual cues are more important. A regular exercise program can also improve mood and promote social interaction, which can significantly benefit the patients' overall wellbeing.

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