FLEX CEUs

Geriatric Physical Therapy

Introduction

Our geriatric or older adult population are those who are greater than 65 years old, representing around 54 million people in the United States. This group are the top utilizers of healthcare in the country and have different considerations of other groups for comorbidities, treatment, and independence. In this course, physical therapists and physical therapist assistants will learn an overview of the economic impact of geriatric care, common physical therapy examination impairments, considerations of comorbidities in geriatric care, social considerations like living situations, treatment approaches to optimize mobility, and how to comprehensively care for our older adult population. This course will

prepare clinicians to guide their patients to live the most independent, functional lives through optimizing mobility and safety with aging.

Background on Geriatric Care and Impact [1]

Most countries in the world are facing strain on their healthcare systems for the treatment of older adults. The growing aging population can be attributed to advances in medicine and lifespan. By 2030, the world population of people older than 60 is expected to double from one to two billion people. Additionally, the number of people older than 80 years is expected to reach nearly 430 million by 2050. Although there are plenty of healthy elderly people who do not utilize healthcare, the top healthcare expenditures in the United States come from frail elderly or those with multiple comorbidities. Similar to any specific population, elderly patients need a patient-specific approach to healthcare to achieve the best outcomes. It is important to understand the concept of aging and the utilization of healthcare resources for the geriatric population.

Statistics and Demographics of Geriatric Care [2]

Geriatric care is a growing specialty in healthcare as the aging population continues to represent a larger percentage of the population. The baby boomer generation (those born from 1946 to 1964) is a large generation, with about 65 million still living in the United States. By 2060, the geriatric population in the United States will comprise 23 percent of the total population. The older population is working longer as well, as projected members of the workforce over age 65 in 2026 will be about one-quarter of men and nearly one-fifth of women. Life expectancy in the United States is 77 years, which has risen about nine years since the 1950s. The older population in the United States has become more racially and ethnically diverse. Between 2020 and 2060, the percentage of the non-Hispanic white older adult population will drop from 77 to 55 percent. This is

compared to much more diversity in younger generations. This is important to note for healthcare providers to provide culturally competent, informed care to persons of different backgrounds.

In terms of socioeconomics, living environment, financial stability, and marital status are important to note in the older adult population as these factors impact health. In 2018, one-fourth of women aged 65 to 74 lived alone. As for women from 75 to 84, around 40 percent lived alone. Of those women above 85 years old, 55 percent lived alone in 2018. The projected number of the population to need skilled nursing home care in 2030 is 1.9 million, which is up from 1.2 million in 2017. Financial disparities affect health and life expectancy as well. Economic disparities exist among different racial and ethnic groups and geographical areas. For older adults in 2017, 17 percent of Latinos and 19 percent of African Americans lived at or below the poverty level while just 7 percent of non-Hispanic whites did. More older adults are also unmarried and divorced, which may affect their quality of life and having a support system. The divorce rate is around 12 percent in older adults, up from under five percent in the 1980s. Divorce may affect life expectancy and health for the better or worse, depending on the situation. It is clear that loneliness negatively impacts life expectancy, but older adults may not be affected if they get divorced and have support from family and friends.

Economic and Financial Impact on Health System [3–5]

The economic impact of geriatric healthcare is significant and continues to grow as the population ages. Older adults have a higher prevalence of chronic health conditions, such as diabetes, heart disease, and arthritis, which require ongoing medical attention and treatment. As a result, the cost of geriatric healthcare services, including hospitalizations, physician visits, and prescription medications, is substantial. It is important to note that every person ages differently and there

is no typical older adult in terms of health. Some elderly people have similar physical and mental abilities as people decades younger. However, those who develop multiple comorbidities and lifestyle diseases may require more healthcare, regardless of age.

According to the Centers for Medicare and Medicaid Services (CMS), Medicare spending on healthcare services for beneficiaries aged 65 and older reached $901 billion in 2021, representing 21 percent of all national healthcare spending. Healthcare spending typically comprises just under 20 percent of the total gross domestic product (GDP) in the United States. The percentage of geriatric healthcare utilization is expected to rise as the population ages, with the number of Americans over age 65 projected to nearly double by 2060. Many older adults require assistance with activities of daily living, such as bathing, dressing, and meal preparation, which can place a significant burden on family members and caregivers. The cost of informal caregiving is estimated to be around $500 billion annually, according to the National Alliance for Caregiving.

The average cost of care varies per service within geriatric healthcare and depends on geographical location as well. An inpatient hospital stay for an older adult typically costs between $12,000 to $15,000 per stay, according to the National Institute on Aging. The average cost of a skilled nursing facility stay is approximately $7,800 to $9,000 per month. The average cost of a home health aide is $24 per hour, which is separate from occupational, physical, and speech therapy and nursing care. The cost of prescription drugs for older adults can cost hundreds per month. This is especially true considering that many older adults are currently taking five or more medications. The cost of prescription drugs can vary depending on the type of medication, the dosage, and whether the medication is covered by insurance. If medications are not covered, geriatric citizens spend upwards of $600 per year. The United States geriatric population accounts for around 40 percent of total prescription drug spending in the country. The cost of

preventive care, such as screenings and vaccinations, can vary depending on the type of service needed and whether the service is covered by insurance.

Geriatric Physical Therapy Patients [6, 7]

According to the American Physical Therapy Association (APTA), the geriatric population makes up a large portion of patients who receive physical therapy care. The APTA reports that over 50% of physical therapy patients are aged 65 years or older. Geriatric physical therapy care by setting includes outpatient, acute care, skilled nursing, and home health care. The majority of physical therapy care for geriatric patients is performed as outpatient services under Medicare Part B. Acute care hospital stays are covered under Medicare Part A. Short-term rehabilitation in a skilled nursing facility is completed after a patient has a qualifying three-day hospital stay. It is covered by Medicare Part A most often. Home health care is also covered under Medicare Part B.

Section 1 Key Words

Frailty – refers to a clinically recognizable state in older adults with vulnerability to disease and falls from decreased physiological functioning

Centers for Medicare and Medicaid Services (CMS) – United States agency that administers the Medicare and Medicaid health insurance programs including reimbursement, quality, and fraud monitoring

Section 1 Summary

The geriatric population includes those who are older than 65 years. Advances in medicine, healthier lifestyle choices, and other factors are typically increasing the lifespan in developed countries. The majority of US healthcare expenditures come from geriatric care. The top spending categories for geriatric care are hospital

stays, skilled nursing facility stays, prescription drugs, and preventative care. It is imperative to understand the background behind aging and its impact on the healthcare system. Healthcare professionals need to prepare for this shift in demographics and always evidence-based care for geriatrics.

Examination Considerations

As the body ages, it undergoes many processes that involve a decline in biological performance. The aging process looks different from person to person depending on genetic, environmental, and lifestyle factors. Generally, aging affects each system in the body including the musculoskeletal, gastrointestinal, nervous, endocrine, cardiovascular, and urinary systems. This section will explore the effects of aging that inform physical therapy treatment of older adults.

Posture, Bony, and Joint Limitations [8, 9]

The joints and bones are affected at a cellular level by aging. This results in structural changes that alter the function of joints and posture. Most of these changes are driven by a decrease in the mobility of joints.

Cellular changes occur in connective tissue as part of the aging process. Cellular senescence refers to a point where cells stop dividing and cycling to create new cells, which is expected to contribute to age-related diseases. Cellular senescence can be triggered by various factors, including DNA damage, telomere shortening, oxidative stress, and inflammation. These cells can also secrete a range of bioactive molecules, including cytokines, growth factors, and proteases. The effect of these molecules is chronic inflammation and tissue damage, which can accelerate the aging process and increase the risk of disease. Cellular senescence can occur anywhere in the body but commonly does in the joints. The aging process can lead to a decline in the quality and quantity of extracellular matrix

components in joints, which can affect joint structure and function. In addition, chronic inflammation associated with cellular senescence from aging and other stressors can promote the breakdown of connective tissue components and contribute to joint damage.

As bones age, the number of bone cells called osteoblasts decreases, leading to a decrease in bone formation. At the same time, the number of osteoclasts, cells that break down bone, increases, leading to a loss in bone mineral density. This begins around age 30 and continues with every advancing year. With aging, the balance between bone formation and resorption is disrupted, leading to a net loss of bone mass. The molecular mechanisms of this process involve changes in the levels of hormones such as estrogen, parathyroid hormone, and vitamin D, and changes in the activity of cytokines and growth factors. In addition, the structure of bone changes with age, leading to a decrease in bone strength and an increased risk of fractures. With aging, the amount and quality of bone collagen decreases, leading to a reduction in bone strength. Additionally, the size and shape of bone becomes altered and can develop into porous tissue (osteoporosis).

The age-related joint and bone degeneration contribute to common postures seen in older adults. Below is a list of different postures and the reasoning behind them.

Kyphosis is an anterior curvature of the thoracic spine that leads to a rounded or hunched back. Kyphosis is common in geriatric patients due to the loss of bone density in the spine and muscle strength, which can cause the vertebrae to collapse or shift out of position over time.

Lordosis is an exaggerated inward curvature of the lower back that leads to a swayback posture. Lordosis can occur in geriatric patients due to changes in the alignment of the pelvis, bone mineral density loss, and the weakening of the paraspinals, glutes, and abdominals.

Scoliosis is a sideways curvature of the spine that can occur at any age but may be more common in older adults due to degeneration of the spine. Scoliosis appears evident examining the patient's posture in the sagittal plane looking for uneven landmarks. The scapula, anterior or posterior superior iliac spine, and clavicle are examples of good landmarks to use.

Forward head posture is a common posture in older adults where the head is positioned anteriorly compared to the shoulders, leading to an increased curvature of the upper spine. This posture is caused by a combination of factors, including weak neck muscles, poor posture habits, and degenerative changes in the spine.

https://www.targetmassage.co.uk/accompanied-pain/

Medical Comorbidities

Medical comorbidities refer to the presence of two or more chronic medical conditions/diseases in one person. The geriatric population tends to have more age-related diseases than any other population. Although there are many comorbidities geriatric patients may be living with, the most common will be highlighted in this section. PTs and PTAs must know these comorbidities and how they affect exercise tolerance and quality of life. It is also imperative to know the

symptoms of comorbidities and establish referrals to the appropriate medical provider if a potential problem is discovered in physical therapy.

Cardiovascular Comorbidities [10, 11]

Cardiac comorbidities include hypertension, heart failure, and cerebrovascular accident. Hypertension is high blood pressure and affects older adults more than any other population. It is typically the first cardiovascular disorder that occurs and predisposes patients to heart disease, stroke, and other issues. Aging also creates cardiac hypertrophy, arterial stiffness, and increased load on the ventricles. This situation creates an increased chance of heart failure and progressive stages of heart disease. The American Heart Association estimates that the incidence of cardiovascular disease of any type is 40 percent in the fourth decade of life, 75% in the sixth decade of life, and about 86% in those above 80 years old. Cerebrovascular accident (CVA) is more common with aging as well. Around 75 percent of strokes occur in people at or older than 65 years. Atrial fibrillation is the most common cardiac arrhythmia and is most frequently seen in older adults. It develops due to fibrosis and increasing size of the atria, affecting the conduction potential and heart rate. Atrial fibrillation is managed with medication to manage clotting risk and achieve anticoagulation to prevent myocardial infarction and cerebrovascular accidents.

Pulmonary Comorbidities [12]

Chronic obstructive pulmonary disease (COPD) is the leading pulmonary comorbidity in older adults. It is a group of lung diseases including emphysema and bronchitis and develops progressively over time. Emphysema involves the deterioration of alveoli at the end of bronchioles, reducing oxygen exchange. Bronchitis is inflammation of the bronchioles causing a persistent cough for at least three months. PTs and PTAs working with patients with COPD should use pulse oximetry or other methods of detecting oxygen saturation to dose exercise

intensity properly. Patients with COPD will need supplemental oxygen as the disease progresses and it is important to manage this while exercising.

Endocrine [13]

Type 2 Diabetes Mellitus is the most common endocrine disorder in older adults. It is a leading cause of cardiovascular disease, kidney disease, and nerve damage. Complications can include loss of vision, venous stasis ulcers, necrosis leading to amputations, sleep apnea, and skin infections, to name a few. Type 2 Diabetes Mellitus develops over time due to insulin resistance and the pancreas is not able to create enough insulin to keep blood sugar at a normal level. It is linked to a sedentary lifestyle, a diet high in sugar, having a waist circumference greater than 40 inches for men and 35 inches for women, genetic factors, being older than 35, and being a race/ethnicity that is nonwhite. Patients of Black, Hispanic, Native American, Asian, and Pacific Island ethnicities have higher incidences of Diabetes Mellitus than Whites.

Mental Health [14–16]

Mental health conditions like anxiety and depression are common in older adults. Many factors like loneliness, life experience, genetics, medical conditions, stress, and lack of exercise can contribute to depression in older adults. Major depressive disorder lasts two weeks or longer and interferes with the ability to live daily life. Persistent depressive disorder is a depressed mood that lasts longer than two years, but the person is still able to live daily life. Substance or Medication-Induced Depressive Disorder is depression from or related to the use of drugs or alcohol. Anxiety affects around 20 percent of older adults, and many are not treated. Older adults may experience specific phobias, social phobia, generalized anxiety disorder, post-traumatic stress disorder (PTSD), obsessive-compulsive disorder (OCD), and panic disorder. Symptoms of anxiety disorders are important to recognize in the older adult population. For physical therapy care, it may affect

a patient's ability to complete exercises or even come to their appointments. Dementia is another cognitive disorder that represents a group of conditions that cause memory loss and reduced cognitive function. Dementia affects around one third of people over 85 years old and around 10 percent of those above 65 years old. Alzheimer's Disease is the most common type of dementia and is caused by the formation of amyloid plaques in the brain. Lewy body dementia is caused by the deposition of alpha-synuclein in the brain. Dementia is progressive, but each patient experiences progression at a different rate. It is important to note that dementia is not a normal part of aging, but aging is the biggest risk factor. Dementia in older adults can have a significant impact on their quality of life and independence. The condition can affect memory, language, attention, and problem-solving skills. Individuals with dementia may also experience changes in behavior, such as agitation, depression, and apathy. It is important to consider appropriate patient centered language and techniques to successfully treat those with dementia.

Other Comorbidities [17–19]

Chronic kidney disease (CKD) is a medical condition where the kidneys become damaged and lose their ability to function properly over time. It affects ten percent of the world's older adults. The kidneys have several important functions, including filtering waste products and excess fluids from the blood, regulating electrolyte balance, and producing hormones that help regulate blood pressure and red blood cell production. CKD is typically diagnosed when the kidneys have been damaged for more than three months and are no longer able to perform their normal functions. The condition is often classified into stages based on the severity of kidney damage and the level of kidney function, as measured by the glomerular filtration rate (GFR). There are many potential causes of CKD, including diabetes, high blood pressure, glomerulonephritis (an inflammation of the kidney's filtering units), polycystic kidney disease (an inherited disorder that

causes cysts to form in the kidneys), and prolonged use of certain medications or toxins. Unfortunately, symptoms of CKD may not appear until the later stages of the disease, when kidney function is severely compromised. These symptoms may include fatigue, weakness, loss of appetite, difficulty concentrating, trouble sleeping, and swelling in the legs and feet. In some cases, CKD can also lead to complications such as anemia, bone disease, and cardiovascular disease.

Treatment for CKD aims to slow the progression of kidney damage and complications. This may involve medications to control blood pressure and blood sugar levels, dietary changes to reduce the workload on the kidneys, and, in severe cases, dialysis or kidney transplantation to replace lost kidney function.

Cancer incidence increases with age, and the geriatric population is more likely to develop cancer than younger counterparts. Approximately 60% of all cancer diagnoses in the United States occur in adults aged 65 and older. The most common cancers in older adults include prostate cancer in men, breast cancer in women, and lung cancer. Other types of cancer that are more common in older adults include colorectal cancer, bladder cancer, and pancreatic cancer. The increased incidence of cancer in older adults is thought to be due to a combination of factors, including longer exposure to risk factors, age-related changes in the body's ability to repair DNA damage, and reduced immune function.

Osteoporosis is more common in women than in men, and the risk increases with age as the bone resorption outpaces bone formation on a cellular/molecular level. It affects 10 million people in the United States and another 44 million have osteopenia (the stage before osteoporosis). Other risk factors for osteoporosis include a family history, low calcium and vitamin D intake, sedentary lifestyle, smoking, excessive alcohol consumption, and the use of medications like corticosteroids. The loss of bone density in osteoporosis typically occurs without

noticeable symptoms, making early detection and prevention important. As it progresses, people with osteoporosis may experience back pain, height loss, and an increased risk of fractures, especially in the spine, hip, and wrist. This is the most common cause of fractures from falls in older adults.

Impairment of Senses [1, 20]

Age-related sensory impairment is the gradual decline in the ability to sense and process information from the environment that occurs in older adults. There are several types of age-related sensory impairment, including vision and hearing loss, decreased taste and smell, and reduced sense of tactile sensation/touch.

Vision loss is a common sensory impairment in older adults. As people age, cataracts, glaucoma, and macular degeneration are common. Cataracts occur when the lens inside the eye becomes cloudy, leading to progressive vision loss. Glaucoma is an eye condition that damages the optic nerve. It is often a result of high pressure inside the eye, but it can also occur with normal or low eye pressure. Macular degeneration, also known as age-related macular degeneration (AMD), is the leading cause of vision loss in older adults in developed countries. AMD is a progressive eye disease that affects the macula, the central part of the retina responsible for sharp, central vision. The macula either deteriorates over time or is surrounded by abnormal blood vessels that create scarring from bleeding. These conditions impair the ability to see clearly or distinguish colors. Additionally, the ability to adapt to changes in lighting conditions may also decrease with age.

Hearing loss is another common type of age-related sensory impairment. Presbycusis, a type of hearing loss that affects the ability to hear high-pitched sounds and distinguish speech in noisy environments, is common in older adults. This can lead to difficulty understanding conversations and participating in social

activities. It is present in approximately half of those over the age of 75 and combated by hearing aids.

Taste and smell can also be affected by aging, mostly marked by decreased perception though these senses. Older adults may have a decreased ability to taste or smell certain foods, leading to changes in their dietary preferences and potentially impacting their overall health and nutrition.

Tactile sensitivity, or the ability to feel touch and pressure, declines with age. This can lead to decreased sensitivity to temperature changes and increased risk of injury due to burns or other types of trauma. This is typically due to lower elasticity in the skin and a decreased number of nerve endings in the skin.

Cognition [16,21]

A decline in cognitive function is a common issue among geriatric individuals, with age-related changes in the brain affecting memory, attention, and problem-solving. This decline can have a significant impact on daily functioning, independence, decision-making, and quality of life in older adults. The decline in cognitive function is thought to be caused by a combination of factors, including changes in the structure and function of the brain, the accumulation of amyloid plaques and tau protein in the brain, and the impact of chronic medical conditions and medication use on cognitive function. Some stages represent cognitive decline, which are outlined below.

Normal cognitive function: At this stage, the individual has no cognitive impairment and daily activities are not impacted. This is the stage of normalcy that most experience in young to late adulthood.

Mild cognitive impairment (MCI): At this stage, the person experiences some cognitive changes, like difficulty with word-finding, but is still able to complete daily activities independently.

Early-stage dementia: At this stage, the person experiences difficulty with memory, language, and problem-solving. They are still able to perform some daily activities with assistance. This is the beginning of a continuum of needing at least supervision or not living alone.

Moderate-stage dementia: At this stage, the individual requires more assistance with daily activities, as their cognitive impairment has progressed significantly. They may experience difficulty with communication, require assistance with personal care, and may have behavioral and emotional changes. People with moderate-stage dementia should be looked after and assisted by caregivers 24/7.

Severe-stage dementia: At this stage, the individual has significant cognitive impairment and requires full-time care. They may be unable to communicate or communicate in simple words. They require assistance with all daily activities and may experience significant behavioral and emotional changes.

Driving safety is an important concern for older adults, due to cognition and physical abilities. Older adults may not be receptive to this conversation but educating patients and their families on safety concerns is the healthcare provider's responsibility. Some of the age-related changes that can impact driving safety in older adults include reduced visual acuity, slower reaction times, hearing impairment, and decreased cognitive function. PTs and PTAs should educate patients to have their vision and hearing checked regularly and to have cognition assessed by primary care. Comorbidities should always be well managed to prevent things like hypoglycemia from diabetes while driving. PTs may educate their elderly patients and families to drive during daylight hours and only in good weather. In addition, they should avoid high traffic situations and follow known routes. This is only true for older adults who show signs of cognitive impairment and reduced physical ability. Some adults may be physically and cognitively able to drive into their 80s and 90s. In addition, physical therapists may educate families

and caregivers to promote driving safety in older adults by having honest conversations about their driving ability. Having a family member or caregiver that has the opportunity to ride in the car while the older adult drives (as long as it is safe) is a good step to assess and act on driving ability. There are always alternative transportation options as well, like buses, driving with family, and others.

Nutrition and Dehydration [22, 23]

Nutrition plays a crucial role in maintaining the health and wellbeing of older adults. Adequate nutrition is necessary to support healthy aging, maintain muscle mass and strength, prevent chronic disease, and support immune function. However, older adults are at an increased risk of malnutrition due to several factors such as decreased appetite, changes in the digestive system, medications, and chronic illnesses. Older adults may be on specific diets to manage cardiovascular disease and diabetes as well.

Protein is an essential nutrient for maintaining muscle mass and strength, which is especially important for older adults. Older adults need more protein than younger adults to support muscle growth and repair. Protein is also an essential building block for wound healing, if that is something the older adult is experiencing. Older adults need to consume foods rich in vitamins and minerals to support their immune system and prevent chronic disease. A balanced and varied diet that includes fruits, vegetables, whole grains, lean protein, and healthy fats can help older adults meet their nutritional needs. Complete nutrition is a crucial element to avoid malnutrition and frailty, which puts older adults at risk of mortality from falls and disease. Physical therapists, dependent on the state and certifications, should not make specific recommendations on nutrition. For patients who are malnourished or at risk of being malnourished, PTs and PTAs should refer to a Registered Dietitian for expert support.

Dehydration is a common condition among older adults and can have serious consequences, including hospitalization. Aging causes the organ systems to become less effective at conserving water. In addition, older adults have a decreased sensation of thirst, leading to inadequate fluid intake. Additionally, certain medications can cause dehydration by increasing urine output or reducing thirst sensation. These medications include diuretics which are crucial in managing cardiovascular comorbidities.

Dehydration can lead to a range of negative health outcomes, including constipation, urinary tract infections, disorientation, kidney failure, and even death. Also, dehydration can exacerbate existing chronic conditions, such as diabetes or heart disease, and increase the risk of falls.

Prevention of dehydration and malnutrition in older adults is critical to maintaining their health and wellbeing. Strategies for preventing dehydration include encouraging older adults to drink water throughout the day, leaving note reminders or phone reminders to drink water, consuming hydrating foods such as fruits and vegetables, avoiding diuretics like caffeine and alcohol, and monitoring medications that may cause dehydration. Physical therapists and assistants should also screen older adults for signs of dehydration during visits and educate them about the importance of staying hydrated.

Drug Interactions [24]

Prescription drugs are commonly utilized within healthcare treatment for older adults. Polypharmacy refers to the use of multiple medications by a patient (usually five or more according to most definitions), for the treatment of multiple chronic conditions. In geriatrics, polypharmacy is a common issue due to the higher prevalence of chronic conditions in older adults. Approximately 40% of the geriatric population take five or more medications in the United States. Around half of older adults are currently taking one unnecessary medication that does not

help them medically as well. While medications can improve health outcomes and quality of life, polypharmacy can also lead to negative health outcomes, including adverse drug reactions, drug interactions, and increased healthcare costs. Adverse drug effects (ADEs) are any harm caused by taking a prescription drug at a prescribed dose. These events cause up to 28% of hospital admissions among older adults. Most ADEs occur from the common medications for cardiovascular conditions, anticoagulants, diuretics, NSAIDs, and hypoglycemics. Risks include combining medications that should not be taken together, medication nonadherence, or prescribing cascades.

Classes of Medication and Common Side Effects [25–28]

Blood pressure medications manage hypertension but are accompanied by a few side effects. Common side effects may include dizziness, fatigue, and sexual dysfunction. Examples of hypertension medication are ACE inhibitors, diuretics, beta blockers, calcium channel blockers, and vasodilators.

Cholesterol-lowering medications are used to lower low density lipoprotein (LDL) cholesterol levels and reduce the risk of heart disease. Side effects may include muscle pain, liver damage, and digestive issues. Examples of cholesterol medications are the “statins”, also known as Lipitor, Altoprev, and Pravachol to name a few.

Diabetes medications are meant to stabilize blood glucose levels in individuals with diabetes. Common side effects may include hypoglycemia, weight gain, and gastrointestinal problems. Examples of diabetes medications are insulin, pramlintide, metformin, and bromocriptine.

Pain medications are used to relieve pain, reduce inflammation, and improve quality of life. However, many pain medications can be addictive and may cause side effects such as drowsiness, constipation, and nausea. Pain medication

examples are codeine, fentanyl, hydrocodone, oxycodone, morphine, and tramadol.

Antidepressants are used to treat depression and anxiety, which are common in older adults. Side effects are drowsiness, dizziness, and sexual dysfunction. Examples of common antidepressants are Prozac, Paxil, Xoloft, and Cipralex.

Sleep medications are used to fall asleep and stay asleep. Common side effects may include drowsiness, confusion, and falls. Examples are Alprazolam, Buspirone, Diazepam, and Loprazolam.

Medication Interactions Examples [24,29,30]

Warfarin and Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)

Warfarin is a common medication prescribed to prevent blood clots in patients with coagulation disorders or atrial fibrillation. NSAIDs are used for pain relief and inflammation. However, NSAIDs can increase the risk of bleeding when taken with warfarin, leading to serious health complications. Physical therapists and assistants should monitor the use of warfarin and NSAIDs in older adults. Because NSAIDs are sold over the counter, it is easy to assume these medications can be combined.

Benzodiazepines and Opioids

Benzodiazepines are used to treat anxiety and sleep disorders. Opioids are used for pain relief, acutely. The combination of benzodiazepines and opioids can lead to respiratory depression, and decreased oxygen levels in the body. Physical therapists should screen for the use of these medications together and refer to the patient's physician if they are being taken together.

Herbal and Dietary Supplements and Prescribed Medications

The popularity of researching and taking herbal and dietary supplements has gained popularity in recent decades. Nearly 70 percent of older adults take at least one dietary supplement. The use of these supplements, however, is not always disclosed to prescribing physicians. These can cause adverse drug reactions just as two prescribed medications can. For example, mixing serotonin-reuptake inhibitors with St. John's wort can create serotonin syndrome. Serotonin syndrome can be life threatening and causes autonomic nervous system dysregulation and altered mental status. It was found in a survey that one half of the supplements that geriatric patients take have reacted with one of their medications, causing various symptoms.

Nonadherence is either forgetting to take or purposely not taking prescribed medications. This is associated with forgetfulness, cognitive decline, and other reasons. Doses are then inaccurate which may cause a higher dose than therapeutic to be prescribed because of a return of symptoms.

Prescribing cascades are the prescription of additional medications to treat the adverse effects of other medications. This is typically from an adverse drug effect that is misdiagnosed as a new medication condition.

Medication side effects can vary widely depending on the individual and their specific health conditions, and all medications have the potential for side effects. Older adults are also more vulnerable to medication side effects due to changes in their body composition of having generally less muscle tissue and metabolism. Therefore, elderly individuals need to work closely with their healthcare providers to monitor and manage any medication side effects they may experience.

Section 2 Key Words

Age-related macular degeneration (AMD) – a progressive vision loss of the center field of vision that causes blurred vision

Mild cognitive impairment (MCI) – the individual experiences some cognitive changes, like difficulty with word-finding, but is still able to complete daily activities independently

Polypharmacy – being prescribed and taking five or more medications at the same time; typically, in the geriatric population to manage chronic medical conditions

Section 2 Summary

The process of aging typically involves a decline in biological efficiency and structure. Aging is different from person to person depending on genetic, environmental, and lifestyle factors. Generally, aging affects each system in the body, resulting in medical comorbidities and increasing the complexity of care for geriatric patients. Physical therapists and assistants should be well versed in this section to provide patient-centered geriatric physical therapy care to their patients.

Environmental and Social Considerations

Just like any other group of people, the geriatric population is influenced by environmental and social factors. Things like family support, social support, community involvement, socioeconomic status, and others can all influence geriatric healthcare. Through the subjective history in an examination and subsequent conversations with the patient, PTs and PTAs can understand the complex dynamics that influence their patients.

Family Dynamic and Social Support [31]

Social support for geriatric individuals is critical to the overall well-being of older adults. This may come in the form of family, a spouse, friends, and neighbors.

Family support is a crucial form of social support for older adults. The role of family members is dependent on each family. Most often, family can provide emotional support, help with daily activities, and offer a sense of belonging and connection. Family support has been shown to improve mental health outcomes and overall quality of life for older adults. Family dynamics vary on individual situations and may be marked by strain and caregiver burden as their loved older adult is aging and receiving healthcare. It is common to become aware of family dynamics and how they impact geriatric patients as a PT or PTA. Here are some examples of what could cause strain in families as their loved one ages:

As their loved one ages and receives treatment or becomes frail, family members may take on caregiver roles. Families may take on housing their loved one, supervising, assisting them with daily activities, and more. This works for many families but can lead to caregiver burden. Family members who take on the role of caregiver for an older adult may experience physical, emotional, and financial strain. This can lead to caregiver burnout, which can negatively impact the quality of care provided to the older adult.

Another aspect of family dynamics that could cause friction are intergenerational conflicts and communication problems. Differences in values, beliefs, and expectations between generations can create conflicts and tensions in families caring for geriatric patients. These conflicts can impact the quality of care and the overall well-being of the older adult, especially when it comes to decision making. Communication between family members can be a challenge in geriatric care. Older adults may have hearing or cognitive impairments that make it difficult for them to communicate effectively, and family members may have different communication styles or may not know how to communicate with their older loved one. This is an excellent intervention point for physical therapists and assistants to teach effective communication strategies to families.

Family members often have different ideas about the best medical care for their older loved one. This can create conflict and delay decision-making, which can negatively impact the quality of care provided. If there are conflicts in decision making and the older adult is either receiving home health care, skilled nursing care, or in a hospital stay, physical therapists and assistants should refer to social work. Most geriatric patients in hospitals, skilled nursing facilities, and home health have social support through their case manager (social worker). These professionals can ease communication and decision-making problems in families by providing insight and resources.

Navigating these family dynamics can be challenging, but it is essential for providing quality care to geriatric patients. Healthcare professionals should encourage open communication, collaboration, and acting to protect the well-being of the older adult. This can help families overcome these challenges and provide the best possible care for their loved one.

Social support can also come from outside the family. Older adults who have friends and neighbors that they regularly interact with, and a spouse they live with, often lead more fulfilling lives due to this social support. Friends, especially those who have similar life experiences and similar in age, can provide emotional support by listening, offering comfort and encouragement, and providing companionship. This support can help reduce feelings of loneliness and depression and improve mental health outcomes. Friends, especially when older adults live alone with limited transportation abilities, can provide support by helping with daily tasks such as running errands, grocery shopping, or transportation. This support can help older adults maintain their independence and stay in their homes for longer. Friends can also provide companionship to community events, provide information about community resources, health care options, and social events. This support can help older adults stay connected and engaged in their communities, which is proven to increase longevity. Older adults

with a sense of purpose often live more well-rounded meaningful lives. Having friends and social support, especially with community involvement, will help the geriatric population feel like they are valued and can contribute to their community.

Living Environment [32]

As of 2019, approximately 95 percent older adults in the United States live in a non-institutional setting. This represents about 39 million older adults. Non-institutional settings include living at home either alone or with family, friends, or a roommate. Institutionalized settings involve assisted living facilities and long-term care facilities where care is received from professional caregivers. Around 28 percent of older adults live alone, while the remaining 72 percent live with others, such as a spouse, family members, or other caregivers.

Some older adults do live in institutionalized settings to receive the care they need. About 5 percent of older adults in the United States live in nursing homes, and another 3 percent live in assisted living facilities.

Older adults who live at home alone may be vulnerable to adverse events. However, many older adults can live home alone with no trouble until death. This depends on things like cognitive status, physical abilities, and connection to the community. As a thorough clinician, PTs and PTAs either working with older adults who live alone in outpatient or home health settings should screen for risks. Risks may include falls, having a system to call for help, social isolation, and how the older adult is managing medications and making meals. Fall risk screening should be a part of any older adult physical therapy evaluation. Systems to call for help are button activated emergency alerts (like Life Alert) or educating to always have a cell phone in a pocket. PTs should always ask about social dynamics, medication management, and how the older adult is managing cooking and cleaning. If there

are concerns, it is easy to refer to social work or offer community resource suggestions like Meals on Wheels or grocery deliveries.

Older adults who live with family members or caregivers in non-institutionalized settings may have complex social dynamics, even though they are being cared for by either loved ones or professional caregivers. As a patient-centered care approach, PTs should always ask about the older adult's perceived personal safety and stressors. Similar questions about perceived safety and how the older adult perceives their environment should be asked when seniors live in institutionalized environments. Physical therapists and assistants spend time developing rapport with their patients and may be a source of trust for seniors to disclose potentially dangerous situations. This is true whether the older adult lives at home or institutionalized.

Elder Abuse [33]

Elder abuse is a term that must be addressed as a screening item in any physical therapist or physical therapist assistant treatment. All healthcare providers are mandatory reporters of elder abuse to either Adult Protective Services or local authorities. Elder abuse is any intentional or neglectful act that causes harm or risk of harm to an older adult. It can occur in many forms, including physical, emotional, sexual, and financial abuse, as well as neglect. Elder abuse can occur both at home and in institutional settings. If a healthcare professional anywhere in the United States knows or suspects elder abuse, they are required by law to report it.

Physical abuse involves the use of force or violence that causes physical pain or injury to an older adult. This can include hitting, pushing, or restraining an older adult. Emotional abuse involves verbal or nonverbal behavior that causes emotional pain or distress to an older adult. This can include threats, humiliation, and intimidation. Sexual abuse involves any unwanted sexual contact or behavior

towards an older adult. This can include sexual assault, molestation, and unwanted touching. Financial abuse involves the misuse or exploitation of an older adult's financial resources. This can include theft, fraud, and coercion. Neglect involves the failure to provide adequate care and attention to an older adult's basic needs, such as food, water, shelter, and medical care. It is important to be aware of the signs of elder abuse, which can include unexplained injuries, changes in behavior, and unexplained financial transactions.

Financial Considerations [34, 35]

The financial status/socioeconomic status of each geriatric individual varies due to many factors. Financial status affects many parts of physical therapy care such as inability to make it to appointments due to transportation costs or high copays. Healthcare providers need to be mindful of every patient's financial situation when it comes to recommending certain equipment to buy or use or frequency of appointments. Around 15 million older adults live economically insecure. This means they live around 200% below the poverty level in terms of income, with access to $25,700 or less annually. An older adult's financial status will depend mostly on the following factors: income, savings, expenses, debt, healthcare costs, and long-term care needs.

Income sources for older adults include social security, pensions, and annuities. The amount varies significantly, and the pensions and annuities are dependent on what the older adult did for a career when they were working. Income from these sources can be fixed or variable and may be impacted by inflation.

Savings are another important source of money that affects the financial situations of older adults. Older individuals who have saved consistently throughout their lives may have a comfortable retirement income while those who have not saved enough may struggle to make ends meet. Savings can come in various forms such as retirement accounts, investment portfolios, and real estate.

Living expenses can have a significant impact on geriatric financial situation. Expenses can include housing costs, utilities, food, transportation, and taxes. Many older adults are facing rising cost of living in their geographical area which is a strain on anyone with a fixed income.

Debt does not discriminate by age. There are many older adults who carry debt. These like other age groups have debt in the form of credit card balances, mortgage payments, or even student loans still. Obviously, in these situations, they may have less money available to cover living expenses or delay seeking healthcare due to cost.

Healthcare costs can be a large financial strain on older adults. The greater the number of chronic conditions, the more expensive the healthcare costs. The average annual healthcare costs for an older adult is around $11,000 for those who have one or so chronic conditions. A lot of the costs are covered by insurance, but copays, deductibles, and services are not covered under insurance and they can be a financial strain. Older individuals with multiple comorbidities will face more costs per year. Those with five or more chronic conditions may utilize $26,000 annually in total healthcare costs.

Long-term care needs are an important consideration for geriatric financial planning. Many older individuals require long-term care, in skilled nursing, long term care, or assisted living facilities. The average cost of a private room in a nursing home is $102,000 annually. This may be the highest cost of any individual factor for older adults.

Physical therapists and assistants should be well versed on the strain that finances can play in the lives of their geriatric patients. There are several ways one's finances will affect physical therapy care, and having open and honest conversations about resources is part of any good subjective history. PTs and PTAs may always refer their patients struggling financially to either social work or

community resources who will know more detailed programs to help older adults make ends meet.

Community Resources [36, 37]

As physical therapists and physical therapist assistants providing geriatric physical therapy, it is crucial to be aware of and refer patients to community resources. Key areas of resources to share with geriatric patients include transportation, senior and community centers, volunteer programs, home care options, local exercise classes, programs to increase home safety, and financial assistance.

Transportation services are crucial for older adults who either cannot or do not want to drive. Older adults may need assistance getting to appointments, grocery stores, or other destinations. Community transportation services, such as volunteer driver programs and buses can help older adults get to their destinations to run errands safely.

Senior and community centers provide a place for older adults to socialize, participate in activities, and access services such as meal programs, health screenings, and education programs. Local YMCAs or senior activity centers are available in most communities across the United States. Volunteer programs may also be available from access to the community/senior centers. Community-based volunteer programs, like the Retired and Senior Volunteer Program (RSVP) or Senior Corps, provide opportunities for older adults to give back to their communities through volunteer work. This leads to a sense of purpose and interconnectedness, which is excellent for long term mental health. Community-based health and wellness programs, such as fitness classes, yoga, or meditation, can help older adults stay active and healthy. Some insurance plans participate in “Silver Sneakers” which allow older adults access to participating fitness gyms. There are many options at senior centers for things like chair yoga, dancing, or other activities that are accommodated to the abilities of each participant.

Home care services, besides home health care, are also available in many communities. There is personal care, meal preparation, and housekeeping resources that can help older adults live independently in their homes for longer. Programs like Meals on Wheels deliver meals right to the homes of older adults. If they do not qualify for Meals on Wheels, referring older adults to grocery delivery options from stores is also a great option. This is only if they cannot go to a store or a family member or friend to take them shopping. Programs like Visiting Angel and other local community organizations provide little to no cost cleaning services to seniors as well. Several community organizations also provide home modification programs separate from home health care. They are typically nonprofit local organizations that make homes safer for older adults. They provide services for installing grab bars, wheelchair ramps, or other accessibility features. A national organization is called the Older Adult Home Modification Program (OAHMP), which provides guidance at the state and local level to provide home modifications to increase home safety for older adults. Lastly, community-based financial assistance programs, such as property tax exemptions, meal assistance through federal and state funding, and low-income energy assistance programs, can help older adults who are struggling financially. Many older adults qualify for Medicare as a primary insurance and Medicaid as a secondary insurance to offset the costs of copays.

An excellent website for community resources for older adults is the “Eldercare Locator” on the U.S. Department of Health and Human Services site. It is available by this link: https://eldercare.acl.gov/Public/Index.aspx . This site provides information organized by the local community on elder rights, housing, support services, insurance, health, and transportation.

Section 3 Key Words

Institutionalized Living – refers to a living environment with support from professional caregivers and/or medical staff

Non-Institutionalized Living – refers to a living environment with no external support from professional caregivers consistently

Mandatory Reporter – refers to the responsibility of healthcare professionals to report suspected or known elder abuse (physical, sexual, emotional, financial, or neglect) to authorities

Section 3 Summary

Geriatric healthcare requires careful consideration of both environmental and social factors to provide the best care for elderly patients. Physical therapists and assistants should always get to know these factors of their patients as they can directly influence the effectiveness of care. For example, patients with less resources financially or socially may not be able to adhere to a home exercise plan as well as others.

Treatment

Geriatric physical therapy requires an in-depth understanding of the aging process, limitations the population may face, and effective treatments for the rehabilitation of older adults. This section will overview outcome measures, the use of appropriate assistive devices, the concept of muscle wasting, how to restore strength, fall prevention, and dementia centered care.

Functional Outcome Measures

Functional outcome measures are an integral part of both the examination and treatment or progress sessions in geriatric care. This section will overview the most common geriatric safety and progress outcome measures to best inform geriatric physical therapy care.

6 Minute Walk Test (6MWT) [38, 39]

The 6MWT is used to determine aerobic capacity and endurance. It is validated in the geriatric population, along with other uses including muscle disorders, stroke, Multiple Sclerosis, and Parkinson's Disease. It has excellent test-retest reliability, making it a consistent way to measure both endurance and the potential for community mobility. An increase of 45 meters or more is indicative of positive change in one's mobility. For community dwelling geriatric patients, the following distances should be achieved in the 6MWT:

Age 60-69: 572 meters for males and 538 meters for females

Age 70-79: 527 meters for males and 471 meters for females

Age 80-89: 417 meters for males and 392 meters for females

Anything less than these values would predict impaired endurance and potentially unsafe community mobility. Patients can use any normal assistive devices during the test.

Instructions:

"The object of this test is to walk as far as possible for 6 minutes. You will walk back and forth in this hallway. Six minutes is a long time to walk, so you will be exerting yourself. You will probably get out of breath or become exhausted. You are permitted to slow down, to stop, and to rest as necessary. You may lean against the wall while resting, but resume walking as soon as you are able. You will

be walking back and forth around the cones. You should pivot briskly around the cones and continue back the other way without hesitation. Now I'm going to show you. Please watch the way I turn without hesitation." [38]

Grip Strength [40]

Grip strength is an important measure of physical function, particularly in older adults. Grip strength is the amount of force that a person can generate using their hand muscles to grip and hold onto an object and is typically measured with handheld dynamometry. In geriatrics, grip strength is often used as an indicator of overall physical health and functional status. Studies have shown that grip strength is strongly associated with a range of health outcomes, including disability, mortality, and cognitive function. In a meta-analysis, it was found that a 5 kg reduction in grip strength increases the risk for mortality.

Average grip strength is outlined here:

For men aged 60-69 years, the average grip strength is around 39 kg (86 lbs)

For women aged 60-69 years, the average grip strength is around 23 kg (51 lbs)

For men aged 70-79 years, the average grip strength is around 32 kg (71 lbs)

For women from 70-79 years, the average grip strength is around 18 kg (40 lbs)

For men aged 80-89 years, the average grip strength is around 26 kg (57 lbs)

For women from 80-89 years, the average grip strength is around 14 kg (31 lbs)

10 Meter Walk Test [41]

The 10 Meter Walk Test is used to determine gait speed and level of ambulation ability (home, community, or limited community ambulator). Gait speed is the amount of distance in meters covered divided by time it took (in meters/second).

Normative values for gait speed are below:

For ages 60-69, the average gait speed is 1.2 to 1.3 meters/second.

For ages 70-79, the average gait speed is 1.1 to 1.3 meters/second.

For ages 80-99, the average gait speed is 0.94 to 0.97 meters/second.

Gait speed for household ambulators is less than 0.4 meters/second. Gait speed for limited community ambulators is 0.4 to 0.8 meters/second. Gait speed for safe community ambulators is predicted to be greater than 0.8 meters/second. The 10 Meter Walk Test can help clinicians recommend what level of ambulation is safe for geriatric patients.

The test setup involves the patient walking without assistance for 10 meters, with the time measured for 6 meters in the middle of the 10-meter track to allow for acceleration and deceleration. The average of three trials is the score.

Instrumental Activities of Daily Living Measures [42]

The Brody and Lawton scales are both used to assess IADLs in older adults. The Lawton Instrumental Activities of Daily Living Scale measures an individual's ability to perform more complex activities required for independent living. It consists of eight items, including using the telephone, shopping, preparing meals, doing housework, doing laundry, handling medications, managing finances, and using transportation. The Lawton IADL scale is commonly used in clinical and research settings to evaluate the functional capacity of older adults. On the other hand, the Brody Scale is a tool that assesses the functional status of elderly individuals performing both ADLs (activities of daily living) and IADLs. It consists of 10 items, including dressing, grooming, bathing, feeding, toileting, transferring, walking, climbing stairs, doing housework, and shopping. The Brody scale evaluates both basic and complex activities and is used in clinical settings to identify areas of functional impairment that may require intervention. The Lawton IADL scale measures more complex activities, while the Brody Scale assesses both basic and

complex activities of daily living. Physical therapists may use these scales in conjunction with other professions (likely occupational therapy) to make referrals and recommendations of what level of assistance their geriatric patients need.

Timed Up and Go (TUG) [43]

The TUG test is a simple, commonly used test in physical therapy that assesses an older adult's mobility and fall risk. It involves measuring the time it takes for an individual to stand up from a chair, walk a distance of 3 meters, turn around, walk back to the chair, and sit down. Participants may use normal assistive devices and the average of three trials is scored. The cutoff score for prediction of falls is 13.5 seconds for older adults.

Chair Stand Test (CST) [44]

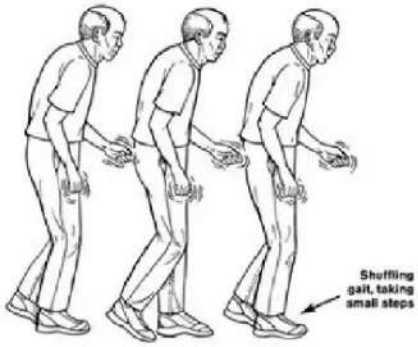
The Chair Stand Test (aka the 30 Second Sit to Stand Test) is a physical performance test that measures lower body strength, balance, and endurance. It involves counting the number of times an individual can stand up from a chair and sit back down within a 30-second period. The individual is not allowed to use their arms to help, but if they need to, this is called a modified CST. A score of less than 8 repetitions in 30 seconds is a significant risk factor for falls in older adults.

Gait Training, Assistive Devices, and Proper Footwear [45–47]

As people age, their gait pattern may change due to several factors, including decreased muscle strength, balance impairments, joint stiffness, and neurological changes. The most common gait patterns are listed below, along with suggested physical therapy interventions.

Common Gait Patterns

Shuffling gait or festinating gait is marked by small, shuffling steps with no foot clearance from the floor. It can be caused by a combination of muscle weakness, balance impairment, and neurological changes. The top causes of shuffling gait



are Parkinson's Disease, generalized weakness, poor balance, medications, peripheral neuropathy, and hip or knee osteoarthritis. Shuffling gait is hazardous due to the potential for falls after catching feet on uneven surfaces.

Intervention for shuffling gait involves specific strengthening of dorsiflexors, gluteals, and hip flexors, certain flexibility exercises (posterior chain is most likely taut), neuromuscular reeducation, and gait training with cues. With Parkinson's especially, external cues are very helpful in timing of the gait cycle. Displacing the task to cognition rather than a motor task, timing a step with an auditory or visual cue can help remediate freezing episodes.

https://samarpanphysioclinic.com/parkinsonian-gait/

Ataxic gait involves a wide base of support and an unsteady pattern. It can be caused by cerebellar ataxia, joint stiffness, Multiple Sclerosis, CVA, or muscle weakness. Other symptoms of cerebellar ataxia include poor coordination, speech slurring, fine motor skill difficulty, tremors, and abnormal eye movement.

Intervention for wide-based or ataxic gait should be multifaceted including strengthening, balance remediation, suggesting assistive devices, proper supportive footwear, and braces if necessary. Physical therapists should assess the safety of a patient's gait with and without assistive devices and recommend the least restrictive assistive device. If necessary for nerve damage, contractures, or extreme weakness, braces such as ankle foot orthoses may be used for patients with ataxic gait to reduce fall risk.

Antalgic gait is characterized by a shorter stance phase on the affected side, usually due to pain. This pattern is commonly seen in older adults with osteoarthritis, rheumatoid arthritis, or other types of joint pain.

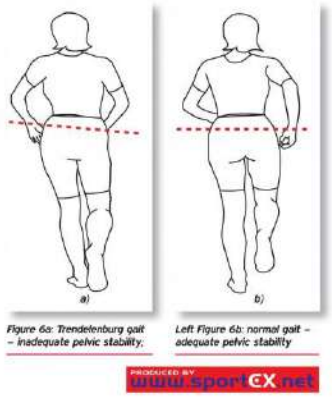
Intervention for antalgic gait is pain control on the affected joint or cause of pain, specific strengthening for weaknesses, and flexibility training.

Hemiplegic gait is characterized by weakness or paralysis on one side of the body, often due to a stroke or other neurological condition. Patients with hemiplegic gait typically circumduct their leg from the hip, hike their hip, and/or swing one arm while ambulating. This will involve less weight shift to the affected limb and could also involve foot drop or a lack of active dorsiflexion to clear the foot in the swing phase of gait.

Intervention for hemiplegic gait is highly dependent on the level of debility. It could range from gait training in parallel bars for safety in a skilled nursing facility or intensive inpatient rehabilitation to high level balance in an outpatient setting. It should involve neuromuscular reeducation and progressive strengthening (especially if the hemiplegia cause is within three months from the treatment session) to allow the best chance at muscle strength recovery. Target muscles would likely include the tibialis anterior, the quadriceps, and the hip flexors but this is dependent upon the root cause of the hemiplegia in the lower extremity. Rehabilitation may involve the use of assistive devices and ankle foot orthoses to reduce the risk of falls.

Trendelenburg gait is a gait pattern distinguished by a drop in the hip on the opposite side of the affected leg during stance phase, usually from a weakness in the gluteal muscles. Patients with Trendelenburg gait may also exhibit a lurching gait or limp.

Interventions include gluteus medius strengthening in closed chain, balance training, pain control, and manual therapy on any joint mobility issues.



Assistive Devices [48, 49]

Physical therapists should always prescribe the least restrictive assistive device, that is, the device that the patient is most mobile, yet not at a fall risk while ambulating. The most common assistive devices for the geriatric population in order of least to most restrictive are canes, crutches, walkers, mobility scooters, and wheelchairs.

Canes are typically for patients with slight balance issues, peripheral neuropathy, or who are recovering from a CVA. A straight cane has one point, and a four-point cane has four points of contact to the floor. The proper technique for cane ambulation is holding the cane in the opposite hand as the affected lower extremity. Training ideas in therapy should include a simulation of whatever surfaces the patient normally walks on, whether that is carpet, sidewalk, or uneven ground.

Crutches require significant strength to use correctly and safely. They are an option for some elderly patients, but not many, due to fragility in the skin that could produce skin tears and for fall risk. Axillary crutches are good for stair negotiation and completely non weight bearing injuries. Forearm crutches are used for mild weaknesses and balance.

Walkers are the most commonly prescribed assistive devices as older adults age. Standard walkers have no wheels, front wheeled walkers have front wheels, and four wheeled walkers have four wheels and typically a seat and brakes. Standard walkers are the most stable and four wheeled walkers require training for safe use of the brakes and seat. The most common cues for walker training in older adults are standing close enough to the walker and taking normal strides (except with a standard walker without wheels).

Mobility scooters and wheelchairs should only be prescribed to patients who need them to access the community or who need them to be safe at home. Patients prescribed scooters and wheelchairs should be unsafe to walk independently or without supervision. Scooters are motorized and patients should have adequate cognition to operate them. Another consideration with any prolonged sitting is reducing the risk for pressure injuries with cushions and education on weight shifting. Wheelchairs can be manual or powered. Manual chairs should be prescribed before power chairs, as they require some movement to operate. Patients should be educated on brake use for all transfers and efficient negotiation with the use of hands and 90-degree arm flexion to extension to propel the wheelchair as well as the use of lower extremities to assist.

Muscle Wasting and Strength [50, 51]

Preventing muscle wasting in older adults is crucial for maintaining their overall health and mobility. Muscle wasting, also known as sarcopenia, is a common problem in older adults, and it can lead to weakness, falls, fractures, and mortality. At risk groups are sedentary older adults, those who have been hospitalized and doing less activity than normal, and those with multiple comorbidities. The prevalence of sarcopenia in skilled nursing homes in older adults is around half of males and one third of females. Clinicians should have strength training as part of a comprehensive treatment plan for most older adults.

Strength training is one of the best ways to combat sarcopenia, as well as proper nutrition. At an outpatient level, physical therapy education should include prevention of sarcopenia and strength declines. Regular strength training and walking are excellent activities for both bone and muscle health. Older adults should aim for 150 minutes per week of aerobic and strength exercise. At an acute care level, early mobilization is most important to prevent sarcopenia from prolonged bed rest and immobility. Physical therapists and assistants should mobilize patients after any surgery or condition they are hospitalized for (when orders allow) as patients can lose up to five percent of their strength per day being on bed rest. In addition to that, less than 900 steps per day is associated with sarcopenia and loss of conditioning. The goal of acute care rehabilitation is to maintain as much muscle mass as possible. In subacute care (skilled nursing facility) and outpatient physical therapy, the goal needs to become recovering any muscle loss and strengthening. This is achieved through resistance training and aerobic exercise, dosed appropriately. High intensity resistance training and high intensity interval training are an option for many patients in skilled nursing facilities, even for those who are medically complex. Emerging research has proven that older adults who are deconditioned can tolerate five days per week of strength training to target the lower and upper extremities. Parameters for this

are targeting major muscle groups through exercises like lunges, sit to stands, step ups, and upper extremity exercises at eight to twelve repetitions to form failure. Three sets of each exercise should be performed, and the clinician should increase difficulty (add weight) if the patient is not compensating by repetition number twelve. It has been shown that in subacute care, patients can tolerate and even discharge earlier from around 30 minutes of high intensity strength training, five days per week. Once recovered in outpatient care, three days per week of thirty minutes each is an excellent maintenance plan for strength training, if dosed at the parameters for gaining strength (around three sets of 8-12 repetitions of each exercise).

Fall Prevention and Recovery [52]

Falls happen in around 25 percent of older adults every year. Fall prevention and fall recovery are both essential elements to safety in the geriatric population. Risk factors for falls include medication side effects like dizziness from hypertension medication, poor balance, visual and hearing impairments, and tripping hazards. Fall prevention should include addressing these risk factors. Older adults should have a regular **medication review** with their primary care provider and be screened by physical therapy as part of their evaluation and monitored throughout treatment. In addition, specific **balance training** that prepares older adults for all surfaces they will walk on, is crucial for fall prevention. This includes the proper use of an assistive device if necessary. Strength training and regular aerobic exercise is also proven to prevent falls at the recommended 150 minutes per week. Environmental safety is also an important factor in fall prevention. Physical therapists should educate their geriatric patients to clear all hallways, limit the use of throw rugs, use night lights to see at night, and to implement grab bars, shower chairs, and toilet seat risers if necessary. Even with the best fall prevention plan, fall recovery is essential to teach older adults at risk of falling. **Fall recovery techniques** include first calling for help with an alert system or a phone,

and not attempting to move if in severe pain. Next, physical therapists should have patients practice in session using furniture or other stable objects for support for standing, coming up from a lunge position. Education for falling safely should include bending the knees to protect the head and avoiding sudden movements.

Comorbidity Centered Care [53, 54]

To provide physical therapy care for medically complex older adults, several effects of comorbidities should be prioritized. Comorbidities may include the cardiovascular system, pulmonary system, endocrine, and nervous system.

Cardiovascular and pulmonary comorbidities include things like heart failure, angina, atrial fibrillation, COPD, and CVA. Physical therapists and assistants need to know any medications that affect vital signs, past series like pacemaker placements that affect the heart rate and know normative rest and activity safe vital ranges. Normative vital signs will vary based on the goal of medication therapy. Normative values for older adults with cardiac and pulmonary comorbidities are below for both rest and with exercise.

Resting Vitals

Blood pressure: less than 130/80 mmHg

Heart rate: 60-100 beats per minute

Respiratory rate: 12-20 breaths per minute

Oxygen saturation: above 88 percent on SpO2 pulse oximetry

Vitals with Exercise

Blood pressure: up to 190/100 mmHg

Heart rate: 50-85% of maximum heart rate (estimated at 220-age)

Respiratory rate: increased, but monitor for shortness of breath and fatigue

Oxygen saturation: above 88 percent on SpO2 pulse oximetry

Another comorbidity that requires attention is Diabetes Mellitus. Patients with poorly managed diabetes may experience hypoglycemia or hyperglycemia while in physical therapy care. Normal blood glucose levels should be less than 100 mg/dL fasting. Hypoglycemia is represented by blood sugar below 70 mg/dL, and emergent action is necessary below 54 mg/dL. Signs of hypoglycemia are tremors, sweating, fatigue, dizziness, irritability, headache, blurred vision, hunger, and lip tingling. Blood glucose levels should be monitored during physical therapy. Physical therapists and assistants should have something like orange or apple juice easily accessible to quickly stabilize blood sugar levels in the clinic. Hyperglycemia is the other end of the spectrum, represented by blood glucose levels above 125 mg/dL fasting. A hyperglycemic crisis involves a few different criteria, including a blood glucose above 200 mg/dL and is either considered diabetic ketoacidosis or hyperosmolar hyperglycemic state. Diabetic ketoacidosis is caused by the absence of blood sugar necessitating the body to break down fat and produce ketones. These ketones build up and cause symptoms of excess thirst, nausea, vomiting, fruity-smelling breath, and confusion. Hyperosmolar hyperglycemic state is caused by a frequently high blood glucose level and the body tries to reduce the levels by frequent urination. This can imbalance electrolyte levels and cause dehydration, seizures, and even a coma.

Contraindications to exercise or when to stop sessions for emergent care are important to keep in mind when working with any population, but especially medically complex older adults. Vital signs out of the normal range for exercise warrants stopping exercise. The following symptoms warrant an emergent action, such as calling 911 or activating an emergency response if in a hospital or skilled nursing facility.

Signs of a **CVA** include slurred speech, sudden numbness, sudden weakness, facial droop, and severe headache.

Signs of a **myocardial infarction** are chest pain, fullness, or a squeezing sensation, dyspnea on exertion or at rest, upper body discomfort, and fatigue.

Signs of **hypertensive emergency** (blood pressure above 200/100) include a severe headache, nausea, vomiting, agitation, confusion, weakness in extremities, and shortness of breath. Signs of a **hypotensive emergency** (below 90/60 but varies) include dizziness, shallow breathing, fainting, cold skin, confusion, vomiting, chest pain, and numbness in the extremities.

Dementia Centered Care [55]

Patients in physical therapy care may have moderate or severe stage dementia. There are considerations to keep in mind when providing care to patients with dementia. First of all, the therapist needs to understand the individual's cognitive abilities and limitations to ensure that the therapy program is appropriate and effective. The therapist should adapt the therapy environment to minimize distractions, noise, and other factors that could increase confusion or agitation. The PT or PTA should use clear, simple instructions and visual cues to help the individual understand and follow therapy exercises. In addition, the therapist should modify therapy exercises as needed to accommodate the individual's physical abilities and limitations and to limit frustration. No matter what setting of care or if the individual lives at home with family, the therapist should provide education and support to caregivers to help them manage the individual's physical needs and maintain their quality of life. Moderate to vigorous physical activity is proven to reduce falls and other poor health outcomes in individuals with dementia.

Section 4 Key Words

Sarcopenia – a condition that causes loss of skeletal muscle mass, strength, and function, typically as a result of aging and inactivity

Fall Recovery Techniques – a set of skills that people at risk of falling should learn to avoid injury if they fall, to call for help, and to get up from the floor

Section 4 Summary

Geriatric physical therapy treatment requires an in-depth understanding of the aging process, limitations the population may face, and effective rehabilitation strategies. Knowing outcome measures, the use of appropriate assistive devices, the concept of muscle wasting, how to restore strength, fall prevention, and comorbidity informed care are crucial to the management of the geriatric population.

Case Study

Mrs. Smith is a 75-year-old female with a history of hypertension, diabetes, chronic obstructive pulmonary disease (COPD), and osteoarthritis. Mrs. Smith reports experiencing shortness of breath with exertion, generalized weakness, and difficulty with walking and standing for prolonged periods. At the outpatient evaluation, Mrs. Smith demonstrated weakness in her lower extremities, decreased endurance, and difficulty with balance. She also exhibited signs of respiratory distress during exertion, with an increased respiratory rate and decreased oxygen saturation. Her blood pressure was within normal limits.

Reflection Questions

1. What is an outcome measure that could track Mrs. Smith's endurance throughout her bout of physical therapy care?

2. What vital sign levels would warrant Mrs. Smith resting during a physical therapy session?
3. What could contribute to Mrs. Smith feeling dizzy during fifteen minutes of bicycling to warm up for her physical therapy session?
4. What elements should a physical therapist address in Mrs. Smith's plan of care?

Responses

1. The 6 Minute Walk Test
2. An oxygen saturation below 88 percent and a heart rate greater than around 120-130 BPM (approaching her maximum heart rate of 140 BPM).
3. Dizziness could be caused by hypotension, hypertension, medication interactions, or low blood sugar.
4. The PT should work on fall prevention strategies, assess the need for an assistive device for ambulation, work on improving lower extremity strength, remediate balance, and educate Mrs. Smith on safe ambulation and a home exercise program.

Conclusion

The geriatric population in the United States represents a majority of physical therapy and other healthcare treatment. This highlights the need for clinicians to understand considerations around aging, possible comorbidities, social dynamics, financial strain, and psychological factors that face patients who are elderly. This course should prepare physical therapists and assistants to consider the complexities and effective treatment for geriatrics, no matter what setting they are treating in. The goals of interdisciplinary geriatric care are optimizing physical

and mental health, achieving the highest level of independence, achieving a supportive social structure, and much more. Rehabilitation professionals have a unique role in helping improve the quality of life of geriatric patients through independent movement and safety.

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