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Motion for Wellness: Integrating Physical Therapy in Parkinson's Disease Management

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ABSTRACT
Parkinson's disease (PD) is a prevalent neurological condition in older adults that causes motor and non-motor symptoms as well as effects. Impulse control disorders (ICDs) such as pathological gambling, compulsive shopping, compulsive sexual behaviors (hyper-sexuality), and binge eating disorder impact 13.6% of the Parkinson's disease (PD) population. The discovery that dopamine deficiency is the primary pathogenic characteristic of Parkinson's disease (PD) and the subsequent development of levodopa have transformed the area of PD therapies. This review will discuss the significant progress that landmark discovery in the 1960s, tremendous progress has been achieved in developing new pharmaceutical and surgical methods to treat PD motor symptoms. However, we will also highlight some of the difficulties that the area of Parkinson's disease therapies has faced over the years.

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Introduction

Parkinson's disease (PD) is the most prevalent type of primary Parkinsonism, as well as the second most common progressive neurodegenerative disease. It affects approximately 1% of the population over the age of 50 and approximately 2.5% of the population over the age of 70. The lifetime chance of developing Parkinson's disease is 2.0% in males and 1.3% in women. Idiopathic Parkinson's disease, also known as sporadic Parkinson's disease, is the most frequent type of Parkinson's disease, affecting predominantly older persons. In general, Parkinson's disease (PD) is linked with motor symptoms such as resting tremor, bradykinesia/akinesia, and rigidity as a result of dopamine deficit in the basal ganglia caused by Neurodegeneration of dopaminergic neurons in the substantia nigra pars compacta (SNpc) [1]. Idiopathic Parkinson's disease must be understood from other types of Parkinsonism due to differences in therapy and prognosis. According to studies, the accuracy of diagnosing idiopathic Parkinson's disease is as low as 76% and as high as 90%, even in the hands of neurological specialists using autopsy results [2]. All therapeutic techniques are aimed at addressing the dopaminergic motor symptoms of Parkinson's disease, which remain the present focus of therapy development [3].

Epidemiology

The prevalence of Parkinson's disease is 13 per 100,000 person-years. It is most common in elderly people, affecting 2-3% of those over the age of 65, but it can start as early as the third or fourth decade, especially in inherited cases [1].

Parkinson's disease (PD) affects nearly one million people in the United States. This figure is expected to rise to 1.2 million by 2030. Following Alzheimer's, Parkinson's disease is the second most common neurological condition. Every year, almost 90,000 people in the United States are diagnosed with Parkinson's disease. Parkinson's disease affects about 10 million individuals globally. Although incidence rises with age, an estimated 4% of people with Parkinson's disease are diagnosed before the age of 50. Men are 1.5 times as likely as women to suffer Parkinson's disease [4].

Underlying Pathology and Prevalence

A. Pathophysiology

- The hallmark of Parkinson's disease is the degeneration of melanin-containing dopaminergic neurons of the substantia nigra and typical neuronal inclusions known as Lewy bodies.
- The dopamine in the basal ganglia participates in a complex circuit of both excitatory and inhibitory pathways.
- These pathways are part of a loop that connects the brain to the thalamus and back to the frontal cortex via the basal ganglia.
- This loop serves to modulate the motor system.
- The BG participates in several parallel circuits or loops. The direct motor loop through the BG is made up of impulses that travel from the cortex to the putamen to the globus pallidus, to the thalamic ventrolateral (VL) nucleus, and back to the cortex (supplementary motor area [SMA]). This VL-SMA connection is excitatory and facilitates the discharge of cells in the SMA.
- The BG thus activates the cortex through a positive feedback loop and aids in the start of voluntary movement. The hypokinesia exhibited in Parkinson's disease is caused by the BG's inhibition of the thalamus.

As Americans age, the prevalence of Parkinson's disease is predicted to rise considerably over the next 20 years. As a result, it will continue to be a significant health issue and economic drain due to its direct and indirect expenses. The economic and human costs could be significant, particularly in wealthy countries where average lifespan is increasing [6].

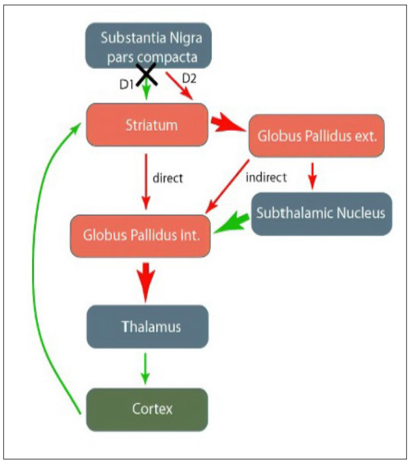

Figure 1

Table 1: The Impact of Living with Parkinson's Disease [7]

Patient Need	Example
Changed requirements for dealing with day-today demands	Physical function deterioration Mood swings and psychological shifts Impaired cognition Fatigue
Social participation has been restricted	Limited opportunity to interact with others Isolation on a social level Public humiliations Speech issues
Identity and dignity loss	Changes in family connections. A sense of identity loss. A sensation of being devoid of self-worth
Using both practical and psychological strategies	To anticipate and plan. Several compensating techniques were used. Trying to keep an optimistic mindset. Using negative comparisons. Accepting medical assistance.

Pathologically, Parkinson's disease is defined as the loss or degeneration of dopaminergic (dopamine-producing) neurons in the substantia nigra, as well as the development of Lewy Bodies (a pathologic hallmark) in dopaminergic neurons. Pathologic alterations can occur two decades or more before visible symptoms appear. The selective loss of dopamine- producing neurons causes significant impairment in motor function. Lewy Bodies, or aberrant intracellular aggregates, contain proteins such as alpha synuclein and ubiquitin, which affect neuron function [5].

B. **Common Clinical Symptoms**

Tremor at rest, rigidity, akinesia (or bradykinesia), and postural instability are the four cardinal signs of Parkinson's disease (PD). Additionally, contracted posture and freezing (motor blocks) have been identified as characteristic features of Parkinsonism, with Parkinson's disease being the most frequent kind.

1. **Bradykinesia:** Bradykinesia is the most common clinical sign of Parkinson's disease, while it can also be observed in other illnesses such as depression. Bradykinesia is a symptom of basal ganglia disorders and includes issues with movement planning, initiating, and execution, as well as performing sequential and simultaneous tasks [7]. This may include difficulty with fine motor control tasks (such as buttoning or using utensils). Other symptoms of bradykinesia include loss of spontaneous movements and gestures, drooling due to difficulty swallowing, and tremors [8].

2. **Tremor:** The most frequent and easily recognized sign of Parkinson's disease is rest tremor. Tremors are usually unilateral, occur at a frequency of 4 to 6 Hz, and are most noticeable in the distal region of an extremity. Supination-pronation ("pillrolling") tremors that spread from one hand to the other are referred to as hand tremors. Rest tremor typically diminishes with movement and during sleep. Some patients also describe" internal" shaking that isn't accompanied by a visible tremor [9]. Parkinson's associated postural tremor ("re-emergent tremor") differs from essential tremor in that it often appears after the patient assumes an outstretched horizontal stance [10].

3. **Rigidity:** Rigidity is defined by increased resistance, which is generally accompanied by the" cogwheel" phenomena and is present throughout the range of passive movement of a limb (flexion, extension, or rotation about a joint). It can happen proximally (neck, shoulders, hips) or distally (wrists, ankles). Reinforcing maneuvers, such as the Froment's maneuver, usually increase rigidity and are especially beneficial in detecting mild cases of rigidity [11]. Rigidity is connected with discomfort, and an uncomfortable shoulder is one of the most prevalent early indications of Parkinson's disease, however, it is sometimes misinterpreted as arthritis, bursitis, or rotator cuff injury [12].

4. **Postural Deformities:** Furthermore, axial rigidity of the neck and trunk might develop, resulting in abnormal axial postures (e.g., Antero Collis, scoliosis). Rigidity is frequently connected with postural abnormalities that result in flexed neck and trunk posture, as well as flexed elbows and knees. Flexed posture, on the other hand, is more common later in the disease. Some patients might develop striatal limb abnormalities (e.g., striatal hand, striatal toe). The striatal hand is defined by ulnar deviation of the hands, flexion of the metacarpophalangeal joints, and extension and flexion of the proximal and distal interphalangeal joints; the striatal foot is defined by the extension or flexion [13,14]. The Pisa syndrome is another truncal abnormality that causes a tilting of the trunk, notably when sitting or standing [15].

Role of a Physical Therapist

Physical therapists are qualified professionals who have been trained to use personalized strategies to assist patients in regaining mobility.

Parkinson's disease is a nervous system ailment that affects over one million people in the United States. This condition affects the area of the brain that regulates movement. Tremors, muscle rigidity, and trouble with coordination, balance, and walking are the most common symptoms. Although there is no cure for Parkinson's disease, several therapies can help individuals manage their symptoms and maintain their quality of life. Physical therapy is one type of treatment that has been shown to help people with Parkinson's disease increase their mobility, strengthen their muscles, improve their coordination and balance, and, eventually, stay independent.

Physical therapy is an important component of Parkinson's disease treatment. Its goal is to enable people with Parkinson's disease to be active and independent for as long as feasible.

A. Common Physical Therapy Goals
A physical therapist will design a personalized, research- based workout program for you. They will first assess your current abilities and the areas in which you want to improve. The therapist will next create an exercise program to ad- dress those issues. Physical therapy typically consists of little achievements that lead to a larger objective. Although your physical therapist will design an exercise program tailored to your specific needs, common aims for Parkinson's disease sufferers include:

Learning About Exercises: Physical therapists teach patients about different types of exercises to empower them and help them manage their ailments on their own. They use physical activity to teach patients how to notice and respond to new symptoms. Patients are also taught how to exercise properly by physical therapists.

Improving movement: Parkinson's disease is characterized by changes in walking, balance, and posture. Your physical therapist will evaluate your mobility and posture and devise solutions to help you move more effectively and stay active.

Addressing fall risk: People with Parkinson's disease are at a greater risk of falling due to motor symptoms. Falls can cause injuries and increase a person's fear of falling, limiting a person's ability to maintain independence. Your physical therapist will assess your fall risk and provide activities to assist in preventing falls.

Pain management: Your physical therapist will assess any muscle or joint pain that is interfering with your everyday activities. They will develop fitness goals to assist you in completing daily duties with less pain.

Gait and Balance Improvement
Parkinson's disease (PD) causes serious disability due to gait issues [17]. They have been connected to an increased risk of falling and a lower quality of life. There are currently no specific treatments available for these symptoms, which worsen with illness severity despite adequate therapy [17,18]. Dopamine replacement therapies (DART) are the mainstay of treatment and provide temporary benefits to certain gait characteristics, such as gait velocity, but may worsen others, such as gait variability [19]. Other systems regulating the brain control of walking in Parkinson's disease have been hypothesized due to the limited response to dopaminergic medications [20]. Furthermore, cognitive problems have been linked to early gait difficulties in patients [21].

Recent research has shown that gait impairment is present in the prodromal stages of Parkinson's disease, sparking interest in the possibility of gait features as biomarkers for early disease detection and surveillance [21]. Despite this, brain mechanisms underpinning various gait characteristics remain obscure, necessitating the development of reliable neuroimaging biomarkers for distinct gait impairments in this condition [18,24].

Physiotherapy is primarily an exercise-based intervention in Parkinson's disease management, addressing five major areas: physical fitness, transfers, manual tasks, balance, and gait [23].

A. Balance and Multi Component Exercise
Definition Balance exercise training is a set of activities meant to improve lower-body strength and decrease the likelihood of falling [28]. Multi-component exercise training (also known as neuromotor or multi-modal training) combines the above-described types of exercise with the development of various motor abilities such as balance, coordination, gait, and agility, as well as proprioceptive training [25,29].

Balance and multi-component exercise are rarely addressed simply as exercise programs in Parkinson's disease; rather, they are part of a physiotherapy therapeutic intervention. Ac- cording to the existing research, balancing training improves the mobility and postural stability of Parkinson's disease patients [26].

Aquatic Therapy: Rodriguez et al. conducted a pilot study to assess the effects of an aquatic-based physical exercise program on gait metrics in Parkinson's disease patients [27]. Nine patients with idiopathic Parkinson's disease (stages IIII on the Hoehn and Yahr scale) participated in a five-month aquatic physical activity program with one session per week. Significant improvement in walking speed, stride length, and the relationship between single and double support time at the end of the training (p 0.05). Although improvements were recorded in all measured ranges of motion, they were not statistically significant.

Treadmill Training: Earhart and Williams conducted a literature evaluation on the research topic "Can treadmill training improve the gait of individuals with Parkin- son's?" The researchers examined eight randomized control studies and eight randomized controlled crossover trials [28]. They concluded that treadmill exercise is safe and appropriate for certain people with mild to moderate Parkinson's dis- ease based on the findings of this systematic study. These individuals must be cognitively and physically capable of using the treadmill, understand and apply the appropriate safety procedures, and be adequately supervised as needed. Treadmill training is believed to enhance gait speed, stride length, and walking distance. Treadmill training does not appear to alter cadence, although this is not a bad finding.

Maintaining cadence after treadmill training, combined with increased stride length, results in quicker gait speed, which is a favorable outcome. There is no evidence to support or contradict the effects of treadmill training on other components of gait, such as dual-task walking and diminished coordination, in the review. Furthermore, because arm swing is limited during treadmill training by the use of handrails, treadmill training may not address diminished arm swing, which is prevalent in patients with Parkinson's. Furthermore, treadmill training's generalizability may be limited because the research examined excluded participants with a history of cognitive, psychological, cardiovascular, or orthopedic disorders.

1) Tai Chi: Oriental martial arts, such as tai chi, have been utilized successfully in the treatment of Parkinson's disease patients. Tai chi combines deep breathing and slow motions, and studies have found that it improves balance and functional mobility, lowering the amount of falls, but has no effect on gait velocity, step length, or gait endurance [40]. A comprehensive review and metanalysis found that tai chi combined with medicine improved motor function and balance more than medication alone or another therapy combined with medication. These increases were most likely the result of the creation of new motor programs, which allow for faster reflexes in response to postural challenges, encouraging improved behavioral recovery via new synaptic connections [41]. Before employing this approach on patients, it is vital to learn and practice it.

2) Cueing Strategies: External cues can be both audible and visual in nature. Attentional techniques involve consciously focusing on a certain component of gait. The faulty basal ganglia are bypassed by using cueing and attentional methods. They no longer have to control the movement automatically because it has now become a cognitive effort. A systematic evaluation of the evidence for physical therapies for Freezing of gait (FOG) and gait deficits in Parkinson's disease (PD) patients supports Visual Cueing, Auditory Cueing, and treadmill training as effective interventions for FOG and gait abnormalities.

3) Assistive Devices: Lo et al. conducted a pilot study to investigate the effect of continuous physical cueing using robot-assisted sensorimotor gait training on minimizing freezing of gait (FOG) episodes and improving gait [30]. Four people with Parkinson's disease and FOG symptoms were given ten 30-minute sessions of robot-assisted gait training (Lokomat) to help them with repetitive, rhythmic, and alternating bilateral lower extremity movements. Following training, all individuals demonstrated a reduction in freezing, as measured by self-report and clinician-rated scoring. Gait velocity, stride length, rhythmicity, and coordination were also improved.

According to the literature review [31], robot-assisted gait technology provides greater success in resolving gait freezing in Parkinson's patients.

Strength and Flexibility Enhancement

Endurance Training

Endurance exercise training (EET) is a type of exercise in which the body's big muscles move rhythmically for extended periods of time [32].

EET has been linked to a number of health advantages. The cardiovascular effects have received the most attention, including: (1) a lower heart rate at rest and at any submaximal exercise workload; (2) lower blood pressure rises during submaximal exercise; (3) improvements in the oxygen delivery and extraction capacities of trained muscle groups; and (4) reductions in atherogenic risk factors and large elastic artery stiffness, improved endothelial and baroreflex function, and increased vagal tone [31]. In Parkinson's disease, EET appears to improve physical fitness, balance, gait speed, motor function, quality of life, and fall rate, with benefits lasting for 2 to 6 months after the exercise program is discontinued. Evidence suggests that the amount of exercise required to achieve benefits in cardio respiratory fitness and cardio metabolic health is greater than the amount of activity required to maintain such benefits. While numerous physiological changes occur as quickly as 1 or 2 weeks after stopping exercise training, maintaining a lower level of exercise has only a minor effect on VO2 max over several months [23].

Resistance Exercise

Resistance exercise training (RET) is a term used to describe activities in which muscles work or hold against an applied force or weight in order to increase muscular fitness (i.e., functional parameters of strength, endurance, and power) [23]. Changes are measured using a variety of approaches, with 1-RM (repetition maximum-effort) or 3-RM performance compared to isometric or isokinetic tests being the most prevalent in older persons. Power development (i.e., the force or torque of a muscle contraction multiplied by its velocity as evaluated by isokinetic, isotonic, stair climbing, and vertical jumping protocols) should be prioritized for subjects at high risk of falling. Power appears to be more strongly correlated with functional performance and to deteriorate more rapidly with age than strength. RET disruption causes a rapid loss of muscle strength and power gains. To be effective, at least one session per week of moderate- to hard-intensity resistance training should be maintained [23,25]. RET appears to improve muscle strength, balance, functional mobility, and quality of life in Parkinson's disease patients, with effects lasting over 12 weeks. However, the study's findings are inconsistent and should be regarded with caution [31,32].

Flexibility Exercises

Definition The term "flexibility exercise training" (FET) refers to activities that attempt to maintain or increase range of motion (ROM) [22]. FET can be performed utilizing a variety of techniques, including ballistic, static, and dynamic stretching, as well as proprioceptive neuromuscular facilitation (PNF). PNF may provide significantly greater increases in joint flexibility than other approaches, but it requires the aid of a second person. It is advisable to stretch for 10 to 30 seconds at the point of tightness or slight discomfort. Stretching for longer periods (30-60 seconds) may result in significant improvements in ROM in older people [23].

It is good to repeat each flexibility exercise two to four times. It is recommended to perform a sequence of exercises that target the primary muscle-tendon units of the shoulder girdle, chest, neck, trunk, lower back, hips, posterior and anterior legs, and ankles. The joint range of motion gradually improves after around 3 to 4 weeks of frequent stretching at least two to three times per week. Daily flexibility exercises result in greater gains in joint range of motion. To optimize FET, this should be done when the muscle temperature is elevated by light to moderate cardio respiratory or muscular endurance exercise, or passively by external techniques such as moist heat packs or hot baths. Stretching exercise causes ROM improvements to return between 4 to 8 weeks [25].

Speech and Swallowing Rehabilitation

Dysarthria and dysphagia are both common in idiopathic Parkinson's disease (PD), with dysarthria often appearing before dysphagia [33]. Approximately 90Parkinson's disease will acquire dysarthria at some point in their lives, however they may be unaware of any difficulties with oral communication [38,39]. Voice abnormalities are usually the initial sign of dysarthria, followed by articulation and fluency issues. As with dysarthria, people with Parkinson's disease may be unaware of swallowing issues, even if they are experiencing weight loss, dehydration, or pneumonia. There is also no clear evidence of a link between the degree of dysphagia in Parkinson's disease and the overall severity of the disease [43].

Treatment of Dysarthria

In the current review, dysarthria treatment procedures are broadly classified as either speaker-oriented strategies or communication-oriented strategies. Low-tech augmentative and alternative communication (AAC) strategies are also briefly discussed.

Speaker-Oriented Treatments: Speaker-oriented treatments for moderate dysarthria caused by Parkinson's disease are often compensatory, requiring persons to learn to employ various behavioral measures to improve intelligibility [41]. As a result, candidates for treatment must be sufficiently driven to acquire new ways of speaking and be willing to practice outside of the clinic setting. The need to practice new ways of speech outside of the formal clinic context is especially essential for people with Parkinson's disease, as poor generalization from the clinic to more realistic, conversational situations has long been a problem in this population. This transfer of treatment issue could indicate a cognitive disadvantage in learning new procedures, as well as a larger reliance on the current context while learning new motor activities [45].

Prosodically based therapy techniques have the most potential for resolving both subpharyngeal and phonatory deficiencies in Parkinson's disease while also improving intelligibility and speech naturalness. Furthermore, focusing on utterance or phrase-level quality via prosodic modification, rather than segmental quality (i.e., articulatory precision of vowels and consonants), will have the greatest impact on a listener's ability to apply perceptual strategies to connected speech.60 Speaking loudly has the ability to improve intelligibility due to improved speech audibility as well as segmental and suprasegmental changes in speech output. Increasing vocal loudness, for ex- ample, expands F0 range and enhances phonatory consistency [46,47].

Communication-Oriented Strategies: Communication-oriented treatment options are based on the idea that factors other than the acoustic signal produced by a talker contribute to mutual comprehension between a speaker and a listener. Communication-oriented methods are frequently thought of as complementary to the previously discussed speaker-oriented tactics, but they can also be utilized as a" stand-alone" approach to treatment. Several tactics may be utilized together, or they may be used separately [37].

Low-Tech AAC: Low-tech Individuals with severe dysarthria caused by Parkinson's disease who can only use speech to partially meet their communication needs or for whom speech is no longer useful may benefit from AAC. Alphabet supplementation, in which a speaker points to the first letter of each word on an alphabet board as it is delivered, not only benefits from a slower-than-normal rate but also gives orthographic indications to the communication partner. According to research, these forms of letter signals promote intelligibility by 25% on average [38]. An alphabet board can also be used to spell out entire words as part of a communication repair. Portable typing devices, as well as paper-based communication books and boards, are further examples of low-tech AAC that may be useful for those with severe dysarthria [38]. These low-tech solutions often require users to point to a picture or letter to choose it. Large graphics or symbols may be required for people who have poor upper extremity control.

Management of Dysphagia

Because lack of awareness of swallowing difficulty and silent aspiration are common in Parkinson's disease, it is crucial to monitor weight and provide counselling on signs and symptoms of swallowing trouble even in persons who report no swallowing difficulties [41]. Regular evaluation of patients with developed swallowing difficulty should help to anticipate problems and start treatments to limit the possibility of malnutrition, dehydration, and pulmonary complications.

Swallowing and Medication: As previously stated, levodopa medication has the most predictable effects on limb symptoms in Parkinson's disease. Nonetheless, medicine may improve certain elements of eating and swallowing [42]. It is therefore recommended that patients time their meals and medications so that they receive the most pharmaceutical effect during meals, so improving upper extremity control and maybe oral and pharyngeal function. Similarly, when medicine is adjusted, some people may notice an improvement in swallowing [34]. Thus, in patients who have switched medications, the doctor may choose to wait several weeks before starting swallow treatment, particularly active range of motion exercises, to see if the medicine improves the patient's swallow. As a side effect of PD medication, some patients have xerostomia. Taking frequent sips of water, throat lozenges or lemon drops, as well as synthetic saliva, may be beneficial depending on the presence of other swallowing and eating issues.

Feeding Modifications and Drooling: Adaptive utensils can help promote and extend independent eating. Later-stage Parkinson's disease may be accompanied by dementia, which complicates eating and swallowing treatment since patients may be unable to follow guidelines for some compensatory techniques. Patients may also be unable to feed themselves, necessitating the assistance of a qualified feeder. Feeders should be taught to monitor the safety of each swallow, as well as the speed and duration of the meal. Because people with Parkinson's disease may take longer to swallow, a longer mealtime should be permitted. Similarly, swallowing too much food swiftly can increase the risk of aspiration due to food collection in the pharynx in patients with decreased pharyn-geal wall contraction and posterior tongue base retraction or who exhibit impulsive feeding behaviour. Smaller, slower bites should be encouraged. By providing nutritional support, enteral feeding via a percutaneous endoscopic gastrostomy (PEG) may improve quality of life [34].

Motor Skill Retraining

Parkinson's disease is a neurodegenerative disorder that affects the central nervous system, resulting in motor impairments such as tremor, rigidity, and bradykinesia. Physical therapy plays a crucial role in the management of Parkinson's disease, particularly in neuromuscular re-education.

Neuromuscular re-education (NRE) is a type of physical therapy that aims to improve movement patterns and coordination by retraining the nervous system to control the muscles. In Parkinson's disease, NRE focuses on retraining the brain and muscles to overcome the motor impairments caused by the disease.

Regaining fine motor skills and coordination can be a challenge for Parkinson's disease (PD) patients, but there are a number of strategies that can help. These strategies can help to improve the patient's ability to perform everyday tasks such as dressing, eating, and writing.

Specific Exercises for Fine Motor Improvement

Hand Strengthening Exercises: These exercises help to improve muscle strength and grip, which is essential for fine motor tasks such as grasping objects, writing, and manipulating tools.

Hand Dexterity Exercises: These exercises focus on im- proving the range of motion and flexibility of the hands and fingers. Activities like finger stretches, putty manipulation, and using small objects can enhance hand dexterity.

Bilateral Coordination Exercises: These exercises involve coordinating movements between both hands simultaneously, which is crucial for tasks like buttoning clothes, tying shoelaces, and using utensils.

Task-Specific Training: PTs can incorporate specific tasks that are important to the patient's daily life into the treatment plan. For example, practicing buttoning shirts, opening jars, or writing can help patients regain the ability to perform these tasks independently.

Balance Training: PD patients often have balance impairments, which can increase the risk of falls. PTs can provide balance training exercises to improve stability and reduce the risk of falls.

Gait Training: PTs can assess and improve the patient's gait, which is the pattern of walking. They can provide exercises and strategies to improve walking speed, balance, and coordination during walking.

Assistive Devices Training: PTs can introduce and train patients on using assistive devices that can help them perform daily tasks independently. This may include devices like weighted utensils, adaptive pens, or dressing aids.

Home Modifications: PTs can assess the patient's home environment and suggest modifications to make it safer and more accessible. This may include installing grab bars, re- moving clutter, and ensuring adequate lighting.

Quality of Life Enhancement

Patients with Parkinson's disease experience both motor and non-motor symptoms, and treating these symptoms may enhance their quality of life (QOL). Receiving care from a multidisciplinary team also contributes to better QOL [59,60]. Patients with Parkinson's disease have neuropsychiatric symptoms and minor cognitive impairment, which have an impact on their quality of life [56,57]. The disease's progression may have an impact on the psychosocial domain and effective coping skills, necessitating a psychosocial adjustment for patients and caregivers. The degree of adjustment is determined by QOL, which can aid caregivers of patients with Parkinson's disease [46].

The Parkinson's impact scale is made up of ten items: Self (Positive), Self (Negative), Family Relationships, Community Relationships, Work, Travel, Leisure, Safety, Financial Security, and Sexuality [42,43]. The symptoms were assessed by the individuals themselves. Furthermore, participants were permitted to complete the survey in both their best and worst states.

Motivation, empowerment, and emotional support are crucial elements in the therapy process for Parkinson's disease (PD) patients. These factors play a significant role in enhancing the effectiveness of treatment, promoting positive patient outcomes, and improving overall quality of life.

Therapists can encourage motivation by establishing realistic goals, tailoring treatment to individual needs, providing positive reinforcement, and addressing underlying barriers.

Empowerment can be encouraged by educating patients about PD, encouraging self-management strategies, promoting collaborative decision-making, and supporting self-advocacy.

Therapists can provide emotional support by active listening, normalizing emotional reactions, providing emotional education, and connecting patients with support groups.

Conclusion

Physical therapy plays a vital role in enhancing the quality of life for individuals living with Parkinson's disease. Through specialized interventions that address gait, balance, strength, speech, and motor skills, physical therapists contribute significantly to symptom management and functional improvement. Moreover, their support in falls prevention and safety measures, coupled with emotional and psychological support, makes physical therapy an indispensable part of comprehensive care for PD patients. As we continue to advance our understanding of Parkinson's disease, physical therapy remains a cornerstone in promoting independence and improving the overall well-being of those affected by this condition [48].

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