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Feldenkrais Method-based Exercise Improves Quality of Life in Individuals With Parkinson's Disease: A Controlled, Randomized Clinical Trial

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ABSTRACT

Context • Longevity results in changes to patterns of health, with an increased prevalence of chronic diseases. Parkinson's disease (PD) is described as a progressive neurodegenerative disease related to age that influences quality of life (QoL) and leads to depression.

Objective • The study intended to assess changes in QoL and depression in older adults with PD through use of Feldenkrais method-based exercise.

Design: The study was a controlled, blinded, and randomized clinical trial.

Setting: The study occurred at the University Hospital of the Federal University of Sergipe in Aracaju, Sergipe, Brazil.

Participants • Participants were 30 patients, aged between 50 and 70 y, with idiopathic PD, who signed an informed consent form and were randomly assigned to 2 groups: treatment and control.

Intervention • The treatment group underwent 50 sessions of an exercise program based on the Feldenkrais

method. The control group received educational lectures during this period. The treatment group's 50 sessions, given 2 ×/wk on alternate days and lasting 60 min, were conducted in an appropriate room at the hospital.

Outcome Measures • Two surveys, the Parkinson's Disease Quality of Life (PDQL) questionnaire and the Beck Depression Inventory (BDI), were administered before and after the sessions for both groups.

Results • After the exercises based on the Feldenkrais method, the treated group showed improvement in QoL scores ($P = .004$) as well as a reduction in the level of depression ($P = .05$) compared with the control group.

Conclusion • The findings in the current study indicate that it is likely that the practice of a program based on the Feldenkrais method can contribute greatly to the QoL of patients with PD, suggesting the importance of interventions that promote wellness for this population. (*Altern Ther Health Med.* 2015;21(1):8-14.)

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In today's world, the aging of the population presents a major challenge for organizations creating health policies, because longevity predisposes the emergence of health problems as well as the prevalence of chronic diseases. And in situations for which a cure is not possible, the goal of policies should relate to the supply and maintenance of quality of life (QoL).[1,2] Parkinson's disease (PD) is a complex, age-related, progressive neurodegenerative disorder, the second most common after Alzheimer's disease. Motor dysfunctions in PD increase dependency, inactivity, and social isolation, all factors that greatly affect the QoL of individuals with the disease.[2,3]

Intervention in PD is traditionally focused on pharmacological and surgical therapies, but auxiliary therapies can act in support of and assist in the effective realization of the gains from these interventions.[4] In this article, the research team highlights the importance of physiotherapy, the purpose of which is to maximize functional ability and minimize secondary complications due to surgical and pharmacological

treatments. However, even with optimal medical management, patients experience a deterioration of body function, daily activities, participation, and decline in mobility. Physiotherapy acts to promote QoL through strategies for independence that use movement rehabilitation focusing on corporal education for the whole person.[3]

The focus of physical therapy for PD patients has always been based on motor delay. However, in recent years, interventions that deliver a major impact for QoL have been emphasized. These interventions consider not only the physical disorders of PD but also various nonmotor symptoms, including depression and cognitive deficit. These features interfere exponentially with the lifestyle of this population as the disease progresses.[5]

Depression is the most common mental disorder that affects PD patients, with its prevalence being 40% of the cases. In some cases, depression can have a greater impact than physical disability on QoL, as reported by patients and their caregivers. Although depression is a common symptom in PD, it is often neglected and untreated in clinical practice.[6,7]

Depression is classified as a nonmotor symptom in PD, and it is usually neglected because attention is focused on the motor manifestations that are treated with dopaminergic drugs. However, in the provision of benefits that improve the well-being of PD patients, complementary techniques are often necessary but are underexplored.[4] The intervention in the current study aimed to teach the treatment group awareness of their bodies through movement using strategies that activate the somatosensory aspect. These strategies predispose the regulation of emotion and attention, which are key elements of the best way in which to use the body in the various situations to which PD patients may be exposed.

Body consciousness, defined as the sense of the physiological condition of the body, plays a fundamental role in mediating results in self-rated surveys of health and wellness, relating closely to measurements of fear, depression, and pain.[8] Further, the precise cause of depression in PD is unclear; biological and psychosocial aspects are implicated in the onset and perpetuation of the disease. Biological aspects are related to degeneration of dopaminergic neurons that will lead the motor symptoms of PD; psychosocial aspects involve nonmotor symptoms such as depression, fear, and pain, which influence the interpersonal relationships. Therefore, therapies that focus on the emotional and functional aspects, as well as exercises combined with assistance in learning to perform the daily tasks of living, can be beneficial, independent of the etiology.[6,7]

In contrast, the fact that PD patients are usually referred to physical therapy when motor function is severely compromised or when a sudden change in the condition of the disease occurs creates a situation that impedes physical therapy. It is not common for rehabilitation to occur in the early stages of the disease, especially when the decline of the disease is barely noticeable.[2]

Emotional states are closely correlated to lower self-reported scores of QoL on the the Parkinson's Disease Quality of Life (PDQL) questionnaire. Being major determinants of QoL, significant depressive disorders are present in approximately 40% of patients with PD.[9]

The central intent of the current study was to evaluate the benefits of an intervention that aimed to improve QoL and the pursuit of physical, mental, and social well-being. For this goal, a need existed for methods that can foster health in individuals with PD using a holistic approach. The research team chose the Feldenkrais method, because the focus of this treatment is awareness of the body through movement. For several decades, Moshe Feldenkrais (1904-1984) developed investigations that would allow him to understand human motion from a dynamic-systems perspective (ie, to see the spatial and kinesthetic properties of body segments) based on the elucidation of martial arts that contribute to body awareness and movement organization.[10,11]

The Feldenkrais method is an approach that seeks to balance the systems in a dynamic and multidimensional way. All parts of the body are involved in body movements, including tactile, proprioceptive, visual, and vestibular systems.[10]

An underlying principle of the Feldenkrais method is that the processes of thinking, feeling, and doing are all interrelated to components of human functioning. To resolve any component, medical practitioners have to address all of them. This concept of unity of mind and body distinguishes the Feldenkrais method from more traditional approaches to improving movement.[11]

Few studies exist that demonstrate how good physical-therapy practice is for treatment of PD.[12] Therefore, the current study has suggested an exercise program based on the Feldenkrais method, which focuses on a set of movements that favor motor action that is more functional, more harmonious, and easier to perform.

The natural trajectory of disability in PD affects daily-living activities and interferes in mobility and QoL.[13] Thus, offering exercises that motivate action and generate self-confidence and self-control in PD patient is very important to the instigation of emotional states that trigger the intentional movements nicely. The Feldenkrais method favors the intentional movement in an easy and pleasurable way, and then it triggers emotional aspects related to the ability to perform daily activities easily.

Given the above information in view of the motor and nonmotor alterations in PD patients, especially those related to QoL, and of the evidence presented by Tomlinson et al[3] that physical therapy can assist in minimizing such changes, the study investigated the effect of the exercises based on the Feldenkrais method on QoL and depression in the PD population.

Methods
Participants

Thirty participants, male and female aged between 50 and 70 years, were recruited from patients of the Clinic of Neurology at the University Hospital of the Federal University of Sergipe. Patients were included in this controlled, blinded,

Figure 1. Timeline for Experiment Design
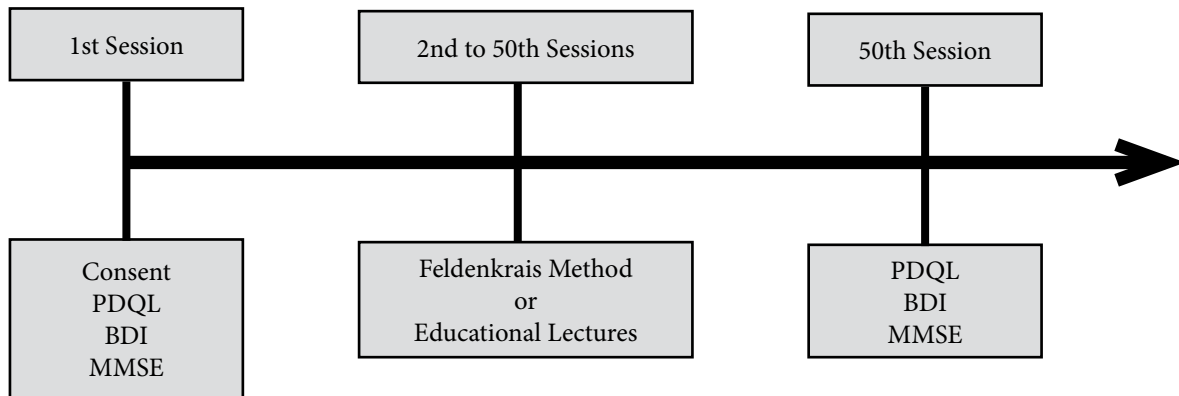
Abbreviations: PDQL, Parkinson's Disease Quality of Life questionnaire; BDI, Beck Depression Inventory; MMSE, Mini Mental State Examination.

and randomized clinical trial if they (1) had a clinical diagnosis of idiopathic PD, at Hoehn and Yahr stage II or III[14] (ie, met the Unified Parkinson's Disease Rating Scale [UPDRS-Session III] criteria for PD); (2) had been diagnosed with the disease less than 1 year prior to the study; (3) had received conventional anti-Parkinson's Disease therapy, excluding amantadine, clozapine, deep-brain stimulation, and thalamotomy or pallidotomy; (4) had been treated with levodopa; (5) had motor fluctuations; (6) were able to remain standing for at least 10 minutes; (7) were able to walk independently with or without assistive devices; and (8) were stable with respect to anti-Parkinson's disease treatment.[15]

Patients were excluded if they (1) had scores lower than 24 on the Mini Mental State Examination (MMSE),[16] as tested during the medical examination; (2) had systemic conditions such as cardiovascular disease that interfered with participation in the study; (3) had a musculoskeletal, cardiopulmonary, or neuromuscular disorder, recent or unresolved, that could affect their ability to walk or their mobility; (4) had musculoskeletal damage or excessive pain in any joint that limited their participation in the proposed exercise program based on the Feldenkrais method; (5) had a psychiatric condition, cognitive decline, or dementia that would influence the communication process; and (6) were not receiving physical therapy during the training period.

Participants were enrolled in 1 of 2 study groups using a random sequence determined by computer. Randomization occurred in the order in which patients entered the study. Throughout the process of inclusion in the study, a blocked distribution was performed to generate a sequence of allocation to ensure proportionality in the number of participants in each group. After each block, the number of participants in the study was equivalent to the proportion of 1:1.

Sample size calculation was made with preliminary data from the PDQL questionnaire to compare the Feldenkrais method against the control intervention. The research team calculated the required number to be 14 participants per group based on an expected PDQL difference of 20 points, a standard deviation of 20, a significance level of .05, and a power analysis of 85%.

Intervention

After signing a consent form, participants were randomly divided into 2 groups: treatment and control. The treated group received 50 sessions of a physical therapy program based on the Feldenkrais method. The sessions were held twice per week on alternate days for 60 minutes. The control group received 1 week of educational lectures immediately after a baseline assessment and had their outcome reassessed at the same period as the Feldenkrais-treated group did.

Sessions based on the Feldenkrais method consisted primarily of awareness through movement. The lessons emphasized chosen ways of breathing, rolling over, sitting, standing, squatting, and walking easily and efficiently. The sessions were divided into 4 sections: (1) breathing exercises and body warming, (2) flexibility exercises and position changes, (3) balance and strengthening exercises, and (4) relaxation.

The lectures presented for the control group consisted of instruction in guidelines to prevent falls, the use of medications, and the management of the activities of daily living. For all participants, all medications related to PD were kept constant in the course of the study.

Outcome Measures

Both groups underwent assessment at baseline and after the interventions, using the PDQL, Beck Depression Inventory (BDI), and MMSE. Assessments, reassessments, and procedures were performed in an appropriate room at the University Hospital of the Federal University of Sergipe in Aracaju, Sergipe, Brazil (Figure 1).

PDQL Questionnaire. The survey's 37 items assess QoL in PD patients. Scores range from 1 to 5, from a major to a

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Figure 2. Flow Chart of Patients for the Trial
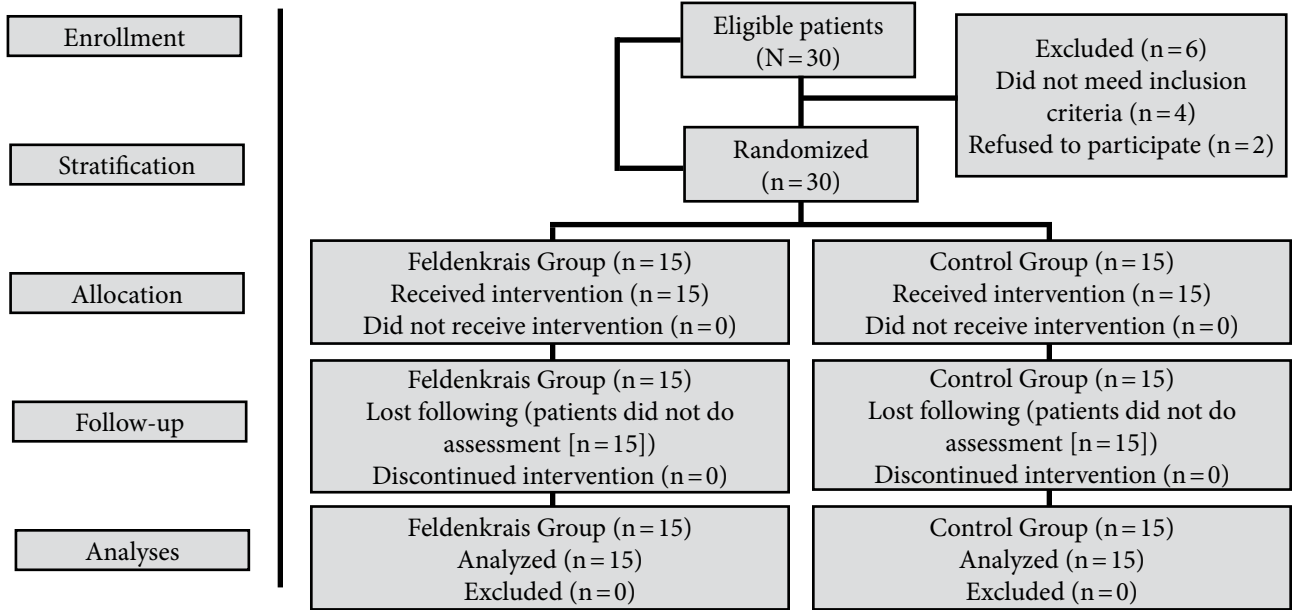
minor frequency of PD symptoms—motor, systemic, social, and emotional—as well as a global score.[17-20]

Beck Depression Inventory. This inventory is widely used for measuring the severity of depression. It consists of 21 multiple-choice questions for self-report (scores: 0-3) according to the severity of depressive symptoms. The questionnaire is intended for individuals who are aged 13 years or older and consists of items related to (1) symptoms of depression, such as hopelessness and irritability; (2) perceptions, such as feelings of guilt or punishment; and (3) physical symptoms, such as fatigue, weight loss, and lack of interest in sex. A score lower than 13 is considered to reflect depression.[21-23]

Mini Mental State Examination. This measure assesses cognitive mental status. The MMSE is composed of 11 questions and requires 5 to 10 minutes to be administered. It is divided in 2 parts, with questions that evaluate (1) vocal responses and orientation, memory, and attention; and (2) the ability to name items, follow verbal and written commands, write any sentence spontaneously, and copy a polygon figure. The maximum score is 30. A score between 0 and 9 identifies dementia; 9 and 19, depression with cognitive impairment; 19 and 24, uncomplicated affective disorder and depression; and 25 and 30, normality.[16,24,25]

Statistical Analysis

Statistica version 8.0 (Informer Technologies Inc, Shingle Springs, CA, USA) was used for analysis of pre- and posttreatment changes as well as differences between groups. The Shapiro-Wilk test was used to evaluate data normality of variable within each group at each assessment interval. For variables with normal distribution, a t test was used for dependent and independent samples. The Spearman test was applied for correlation between depression and cognitive state. An α level of .05 was used in all analyzes.

Table 1. Demographic Data and Results of Measures at Baseline for Both Groups[a]

| Demographic Characteristics	Feldenkrais	Control	P
Age (y)	60.70 ± 2.55	61 ± 2.70	.91
Weight (kg)	64.60 ± 2.61	63.81 ± 2.64	.81
Height (cm)	158.24 ± 0.17	159.81 ± 0.19	.63
BMI	25.69 ± 0.81	25.06 ± 1.10	.63
UPDRS (III)	17.44 ± 2.16	17.12 ± 1.20	.91
MMSE	24.83 ± 0.69	25.06 ± 0.52	.88
BDI	13.55 ± 1.88	13.62 ± 1.37	.79

Abbreviations: BMI, body mass index (kg/m²); UPDRS(III), Unified Parkinson's Disease Rate Scale (UPDRS-II session); MMSE, Mini Mental State Examination; BDI, Beck Depression Inventory.

[a]Shows Mean ± SEM and P values. Study used t test for independent samples. No significant difference existed between groups at baseline.

Results

Thirty-six patients were eligible for the study; however, 4 patients did not fit the inclusion criteria, of which (1) 2 received a rating of higher than 3 on the Hohen and Yahar scale, (2) 1 had cognitive impairment based on the MMSE, and (3) 1 had associated cardiopathy (Figure 2). Two patients refused to participate. The 30 remaining patients were randomly divided into 2 groups: the Feldenkrais treatment group (n = 15), with a mean age of 61.41 ± 8.92 years, and the control group (n = 15), with a mean age of 62.55 ± 6.29 years (Table 1). No significant differences existed between the groups at baseline.

Figure 3. Quality of life and level of depression in Parkinsonian patients in Feldenkrais and control groups.
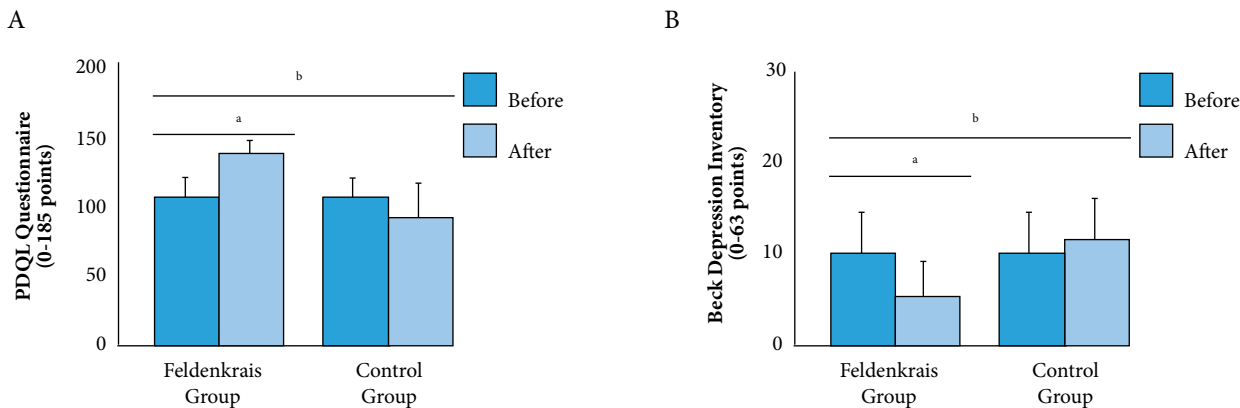
Abbreviation: PDQL, Partinson's disease quality of life.

[a] Compared with before treatment.
[b] Compared with control group, after treatment.

After the 50 sessions, the group that received exercises based on the Feldenkrais method presented a total score for QoL that was significantly higher, compared with both the baseline, $P = .004$, and the control group, $P = .002$ (Figure 3A). In the Feldenkrais group, the rate of depression after treatment was significantly lower, compared with both the baseline, $P = .0005$, and the control group, $P = .05$ (Figure 3B).

The mental state score significantly increased in the Feldenkrais group, from 24.83 ± 0.69 to 26.93 ± 0.32, $P = .0007$, and decreased in controls, from 25.18 ± 0.67 to 24 ± 0.39, $P = .04$. A significant positive correlation existed between depression and cognitive state in the Feldenkrais group after treatment, $r = 0.859$, $P = .006$ (Table 2).

Table 2. Correlation Between Mental State and Depression in Both Groups Before and After Treatment[a]

Mental State × Depression	Before		After	
	r	P	r	P
Feldenkrais	0.114	.200	0.859	.006
Control	0.216	.005	0.023	.044

[a] Spearman test.

Discussion

After the sessions of exercises based on the Feldenkrais method, the treatment group showed better results than the control group regarding QoL. Moreover, the rate of depression decreased, and the mental state score increased. The current study's findings suggest that the practice of exercises based on the Feldenkrais method could contribute greatly to QoL in PD, which indicates the importance of interventions that work with awareness through movement to the promotion of wellness for this population.

The idea of focusing the treatment of PD only on motor disorders should be reconsidered. The nature of the disease should not be seen in a narrow sense, considering only motor issues, as argued by Modugno et al.[4]

When a person has physical disabilities, the reaction to emergency situations is deficient, because one does not know all the possibilities that one's body is able to perform. The Feldenkrais method encourages patients to transpose their perception of these limits and deal with stressful situations imposed by causality of daily activities. Frequently, mobility and agility in emergencies allow medical practitioners to infer emotional state through the attitudes of the individual, even those with PD. This connection is particularly relevant when faced with daily activities associated with mental state, such as when a car appears unexpectedly while crossing a street or when the street is observed to be wet and uneven, which require making decisions that prevent sudden changes in body movement or pathways. In the current study's findings, the treatment and control groups, after 50 sessions, showed values lower than 24 on the MMSE. According to Fereshtehnejad et al,[16] Folstein et al,[24] and Yamanishi et al,[25] MMSE values lower than 24 characterize the early stages of dementia.

Correlation between depression and cognitive state in both groups showed that the Feldenkrais method affected change in the treatment group, improving mental state and reducing depression. The findings by Martinez-Martin et al[26] showed that nonmotor symptoms, on the whole, have a greater impact on QoL than motor symptoms, and in addition, progression of nonmotor symptoms contributes to the decline of QoL in PD patients.

Mental states interfere greatly in the depressive stages of the population with PD. In the current study, the practice of the Feldenkrais method provided an innate strategy of motivation (ie, improvement in QoL) for the treatment

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group to perform the exercises based on Feldenkrais method. They learned that persistence (ie, constant practice) minimized motor limitations and, consequently, improved emotional state.

When the Feldenkrais exercises are combined with pharmacological therapy, treatment is more effective than that which is focused on only pharmacological therapy.[23] The social function scale in the PDQL covers activities such as hobbies, reading, use of transportation, and leisure. These activities are linked to motor skills.[27] Exercises based on the Feldenkrais method had an elemental impact on social function in the treated group.

Some participants in the current study underlined the changes that occurred in their bodies and the benefits that the practice of the Feldenkrais method brought to their daily activities. They reported ease and agility, plus strength, which helped them perform tasks, such as getting on a bus. These perceptions reduced their anguish about leaving home unaccompanied, demonstrating that they felt safer and more independent.

The benefits provided by exercises based on the Feldenkrais method were relevant because they were developed in a context that promoted well-being in PD patients, despite the fact that the exercises did not focus on tasks that mimicked daily activities, such as the action of climbing on a bus. Awareness through the movement predisposed participants to perform daily tasks satisfactorily. Participants' reporting of this result relates to issues that went beyond the motor disorders involved in PD. Self-esteem can help participants complete tasks that were previously impossible, generating a positive impact on the QoL of PD patients. The motivation imposed by a therapist also is a contributing factor to obtaining gains related to motor impairment and must be included in the set of elements that promote physical and social well-being in patients with motor disorders.[28]

To retain the improvements, activities learned during the sessions of the Feldenkrais method needed to be continued at home. Problematically, however, a study by Dereli and Yaliman[5] showed that an exercise program with a physiotherapist's supervision proved to be more effective in promoting daily living activities requiring motor, mental, and emotional functions and, therefore, QoL in patients with PD compared with patients who underwent a self-supervised program in their homes. These findings substantiate the importance of physiotherapy in the care of patients with PD, given the fact that cognitive impairment also affects the ability of a patient to reach a therapeutic goal. Regardless of whether the intervention is being practiced at a clinic or at home, physical therapy should accompany other treatment provided to a patient with PD to halt the progression of the disease.[29] Moreover, the discontinuance of treatment may reverse any obtained improvements and impede future interventions, affecting a patient's prognosis.

Benefits for physical therapy were found in some studies of short duration, fewer than 3 months, but significant results related only to motor function and not to mental state and QoL.[3,12,18,] Perhaps people with PD require longer intervention to influence nonmotor symptoms through the creation of a new more dynamic lifestyle based on regular physical exercises. In this case, the Feldenkrais method offers an efficacious exercise strategy for PD patients.

Modugno et al[4] interpreted their study's results as satisfactory compared with other studies with short duration because of the extended length of the intervention that they developed. In the other words, long-term interventions are most effective in patients with chronic neurological disease. Further, the intervention affects motor and nonmotor symptoms in PD.[4]

Thus, interventions that promote ongoing, enjoyable, and motivating sessions should be used for PD patients. To improve the effectiveness of an intervention, it should involve tasks that cover several dimensions. It should focus not only on the motor system to achieve positive results but also on actions covering the sensorial and cognitive systems and on those involving dynamic interaction with the environment.

Study Limitations

The current study did not cover participants' progress for a sufficiently long period. Therefore, the research team suggests a need for a new study in which it can follow a patient's nonmotor symptoms for a period of 6 months. Chronic progressive diseases and old age require more intervention time to obtain results from applied therapies. Even so, changes were observed in the first weeks of the current study, through the narrative of participants in the treated group.

Also, the current study did not compare the Feldenkrais method with other therapies. The inclusion of a third group using another training protocol would be important in a future study to confirm whether the findings of the current study were due to the intervention (ie, exercises using the Feldenkrais method that influenced the participants awareness of their bodies through movement) or whether the results were due to other causes.

Moreover, it is necessary to emphasize that recruiting patients with neurological diseases, especially those affecting the central nervous system, is a hard task. For a study such as the research team proposes, participants must be involved in a prolonged clinical trial and must participate in a large number of consecutive sessions of exercises twice per week.

CONCLUSIONS

In summary, exercises based on the Feldenkrais method improved QoL and reduced self-reported depression in PD patients, resulting in an improvement in mental state in the currently studied population.

Intervention is required in the early stages of PD to improve and maintain QoL. As in the current study, an individual's needs and preferences should form the guidelines for treatment, because they are of fundamental importance to the development and success of a proposed therapy.

Future studies are essential to signal gaps in knowledge and resolve the mysteries that comprise the complex neurodegenerative disorder that is PD. Primarily, researchers must identify pathways to improve the emotional states that determine the physical and social well-being of patients fated to live with this neurodegenerative disorder.

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