Treatment of Parkinson's Disease with Occupational Therapy Based on the International Classification of Functioning, Disability and Health

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Abstract: It has always been stressed that "drugs, surgery and rehabilitation are the troika for the treatment of Parkinson's disease." Among them, throughout the rehabilitation treatment is of great significance to delay the progress of Parkinson's disease and improve the quality of life of patients. In particular, occupational therapy can provide an effective rehabilitation therapy for the patients with Parkinson's disease. Occupational therapists usually provide interventions to improve the quality of life of Parkinson's patients. This review will use ICF model to analyze the occupational therapy of Parkinson's disease patients and summarize the effectiveness of occupational therapy intervention.

1. Introduction

It is currently believed that Parkinson's Disease (PD) is a common, complex and multi-layered neurological disorder. It is a central neurodegenerative disease centered on the loss of early dopaminergic neurons in the dense part of the substantia nigra [1]. Its prevalence increases with age and it occurs more frequently among middle-aged. According to a survey in the Ninth Five-Year Plan, 1.7 million people suffer from PD in China, with a prevalence rate of 1.7% among people over 65 years of age. For those who have a family history of PD, the prevalence rate can be as high as 20% to 30%. With the aging of the population and worsening environmental pollution, 100,000 people in China could be added to the PD community annually. The Chinese Parkinson's Disease Treatment Guidelines (Third Edition) (2014) states that PD progressively worsens over time [2]. As a progressive disease, PD does not usually go into natural remission, and in some cases, it progresses rapidly, which places a heavy burden on the patients, their families, and society [3].

2. Occupational Therapy and the Icf Model

Occupational Therapy (OT) is an important part of treatment during rehabilitation. OT includes the therapeutic use of the functional daily activities of patients with the aim of enhancing their participation in and fulfilling their roles in their families, schools, workplaces and communities. In the field of neurorehabilitation, occupational therapists play an especially important role.

The International Classification of Functioning, Disability and Health (ICF), published by the World Health Organization (WHO) in 2001, formally states that health includes three major domains of the body which are: function and structure, activity, and participation. It also includes the environmental and personal factors that affect people's health. The ICF model provides a multidisciplinary framework and terminology for describing health and health-related issues, which is applicable both generally and internationally. Numerous studies have suggested that the ICF framework (Figure 1)can assist health care professionals (e.g. Doctors, Nurses, Occupational Therapists, etc.) in understanding the interaction between the status of a patient's health and the effects of individual factors (coping strategies, preferences, and attitudes) and environmental factors (physical, environmental, and social factors) on the patient's health. This assists the health care professionals to characterize and assess the overall recovery of patients with PD and to predict the extent of the problems encountered by PD patients in their daily lives. In summary, the aim of this

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paper is to use the ICF as the theoretical framework to review the barriers to PD patients undertaking activities and participating and recommend appropriate corresponding OT solutions, and discuss improvements to the application of the ICF model in practical research.

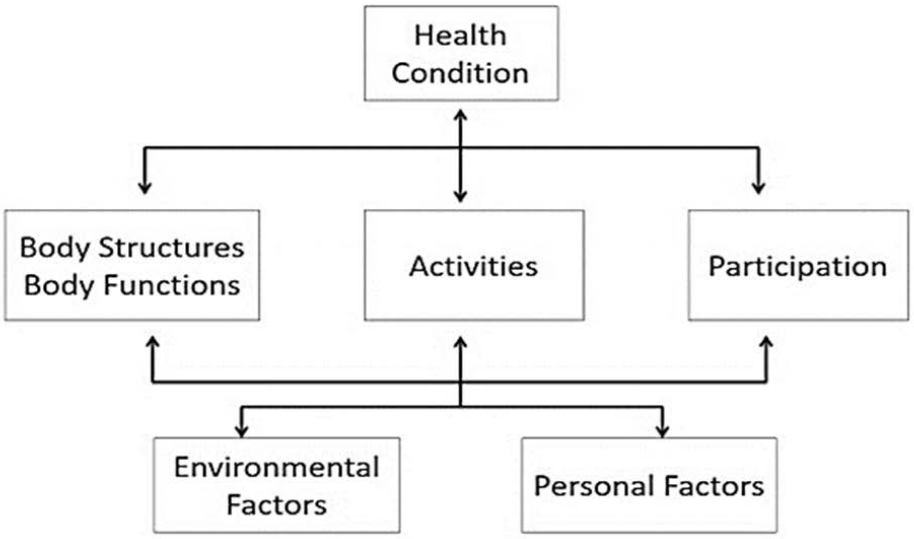

Fig.1 Icf Model [4]

3. Analysis of the Icf model's Application to Parkinson's Disease

The ICF was used to analyze the Pathogenetic characteristics of PD (Figure 2).

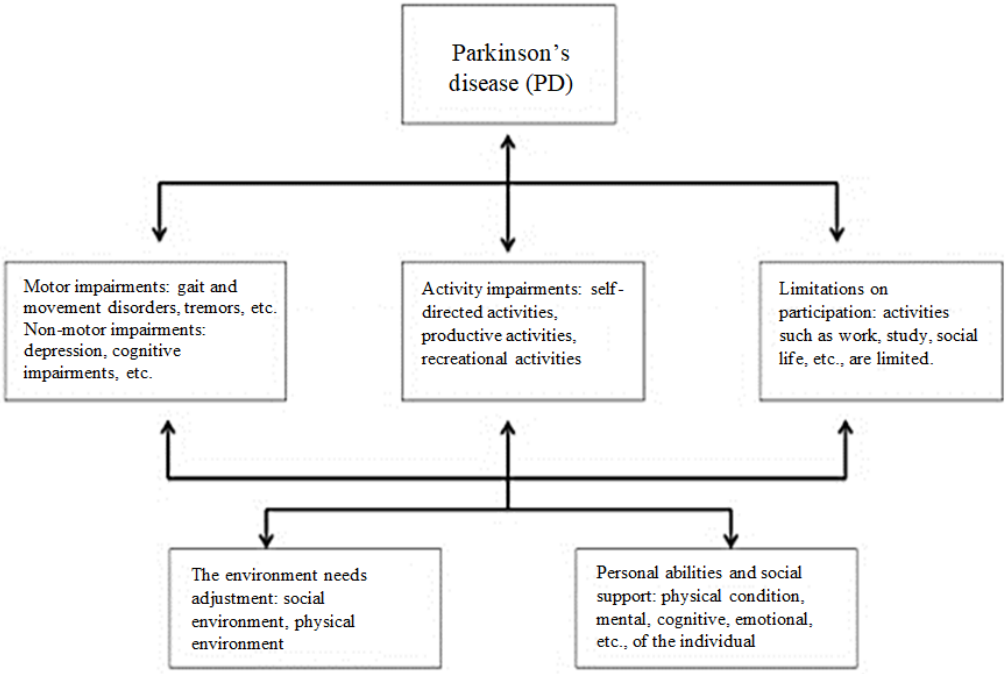

Fig.2 Icf Model of Parkinson's Disease

4. Clinical Assessment

Currently, the main scales used in clinical and scientific research on PD are the Unified Parkinson's Disease Rating Scale (UPDRS) [5], the Hoehn & Yahr (HY scale) scale, Weber's scale, Markham and Diamond scale, etc. [6]. The author of this paper has compiled a summary of the frequency with which most of the scales are used globally, as shown in Figure 3.

Frequency of use	Evaluation Indicator
1	Hoehn & Yahr scale

2	Unified Parkinson’s Disease Rating Scale (UPDRS)
3	Walking speed (slowest, fastest)
4	The length of a patient’s stride
5	Cadence (steps per minute)
6	Parkinson's disease questionnaire (PDQ-39)
7	Timed up & go (TUG)
8	Center of gravity shift distance
9	Leg support time
10	Berg balance scale
11	6-min walk test
12	10 m walk
13	Muscle strength
14	Response time
15	Time from sitting position to standing position
16	EuroQol-5D (an instrument for measuring quality of life)
17	Webster’s rating scale for Parkinsonian disabilities
18	Beck’s depression inventory (scale)
19	Spirometry

Figure.3 The Frequency with Which Different Systems (Scales) Were Used in Research to Evaluate the Effectiveness of Treatment and the Progression of Parkinson's Disease in Patients (1990-2000).

5. Occupational Therapy Regimen

5.1 Occupational Therapy for Body Functions and Structures:

Reduce stiffness: The use of pharmaceuticals can temporarily relax the skin and muscles and improve the range of motion of the joints. When using a pillow, position the limbs in the supine position and stretch the limbs. This can prevent hyperextension of the neck and facilitate the patient finding a comfortable neck posture and to keep the muscles relaxed. Breathing exercises encourage the patient to breathe in a flute-blowing style.

Exercising the range of motion of the joints: Passive movements with the bare hands, through joint mobility training and muscle stretching movements, are used to determine the cause of the limited range of motion of the joints and to prevent inhibition due to muscle tension. If active movements are taken and there is no increase in tension in the antagonistic muscles, the range of motion and frequency of the movements need to be increased to prevent a reduction in the range of motion. For example, to improve the functioning of the hands and gradually increase the range of the mobility of their joints, PD patients should regularly engage in occupational therapy exercises such as screwing, building puzzles, beading, knitting, etc.

Strengthening of the Muscles: The use of active movements in daily life are important for strengthening the muscles, for counteracting muscle tension and for effectively relieving hyper-tensioned muscles. The resistance to a movement and the posture must be considered by a person when moving. Rhythmic movements are more conducive to inducing spontaneous active movement.

Position and postural control - neck and trunk: Postural adjustment training is needed to counter the tendency that people with PD have of leaning forward. Leaning forward restricts the thoracic field of motion and can lead to respiratory dysfunction, and trunk flexion can lead to hypopharyngeal hypotonia. Slow stretching, twisting movements and pelvic tilt training are recommended to promote postural alignment. Therefore, it is recommended that PD patients use a high chair as it will be easier for them to stand up from it and that they adjust the rigidity of the seat cushion and/or make the seat inclined so that it further increases the ease with which they can stand up from it.

Limb function training: It is important to reduce flexor muscle tension during limb flexion in a stable seated position. Both upper limbs should be used simultaneously to improve the fine motor

function of the fingers. The exercise can be accompanied by music, and the use of repetitive and rhythmic movements stimulated by music improves the execution of the work activities.

5.2 Mobility Exercises

Activity and job analysis are tools that practitioners can use to achieve this understanding. Using activity analysis to arrange and conduct tasks is the primary therapeutic tool in occupational therapy. In activity analysis, the occupational therapist is required to first identify that aspects of the person that affects their ability to perform and participate in an activity. For example, in an action scenario in which a person with PD reaches for an object, the skills needed by the person include initiating the task, searching for and locating the desired object, selecting the correct object, using the object appropriately, bending and reaching for the object, manipulating the object, continuing the task, and knowing when to terminate the task. The required body structure includes all limbs and trunk, including bones, joints, muscles, tendons, eyes, and the central and peripheral nervous system. Physical functions include sustained attention, visual acuity, understanding spatial relationships, tactile reflexes, range of motions of the joints, muscle strength, and postural alignment and control. An intervention plan is developed in collaboration with the client based on the available evidence and best practices from an activity analysis [7,8].

5.3 Improving Social Participation

The goal of OT is to restore and maintain the greatest possible functional independence of patients so that they can return to society and participate maximally[9,10]. The non-motor symptoms of PD significantly affect the PD patient's engagement in life situations. Occupational therapists should focus on treating the psychological problems that accompany motor symptoms to improve the patient's ability to perform and participate in meaningful activities and roles at home and in the community. Approximately 40% to 55% of patients with PD have mood-emotional disorders such as depression and anxiety. Therapists should provide occupational therapy in conjunction with pharmacotherapy, such as psychotherapy. The emotional state of PD patients is greatly improved by family support and from being involved in society [11]. Depending on the needs of the client, the role of the occupational therapist extends to enabling caregivers to support and supervise the patient in their daily activities, taking into account their own well-being, uniting families, improving the patient's ability to perform activities of daily living, reducing anxiety and sequelae, and increasing the level of social participation.

5.4 Environment and Task Adjustments

In the social environment, universal, professional, and targeted safety education on reducing the risks of PD and reducing the occurrence of symptoms should be provided to patients with stable conditions and rehabilitation needs or as part of rehabilitation prevention and is an important part of OT social environmental adjustment. Occupational therapists conduct 20-30 min of educational sessions for patients and their families, which includes an introduction to the treatment plan and safety principles for the patient’s posture and activities. This information can also be made into a printed booklet to encourage patients returning home to review it under the care of their families [12]. There are also insurance systems, values, ethics, and interpersonal management that can influence the PD process.

In the physical environment, occupational therapy provides assessments of the home environment with preventing patients from falling as the primary goal. This includes assessing whether the furniture is arranged to provide adequate walking space, or whether carpets should be removed to avoid tripping accidents, and if necessary, whether handrails should be installed to assist in safety and to facilitate the patient getting up and moving around. For people with PD who still work, occupational therapy focuses on assessing the ergonomics of the workspace, postural adjustments and advice on assistive devices to avoid overexertion.

6. Shortcomings and Prospects

The ICF framework is used to explore the impairments in physical function and activity of patients caused by PD. ICF is used to construct a combination treatment plan based on the patient's living environment and lifestyle, and when necessary, to develop rehabilitation training programs and life coaching components based on their condition and medication status. The goal of which is to ultimately facilitates the patient's return to their family and society. This is a field that still needs to be researched, and this proposal provides new ideas for the use of OT in the treatment of patients with PD.

7. Conclusion

The rehabilitation of patients with PD is a long-term exploratory process. The clinical practice of using OT to treat PD needs to be summarized further to provide more therapeutic evidence of its benefits. The understanding of patients and their families of OT needs further improvement. This will all contribute to making OT more widely known and understood, and will provide a high level of rehabilitation treatment to a larger number of patients.

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