

Analysis of Research Status and Hot Spots in Sports and Parkinson's Disease (PD)

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ABSTRACT. This study uses Cite Space 5.5.R2 as the main analysis tool, and studies related literature in the field of exercise and Parkinson's disease (PD) as the research object. Through descriptive statistics and data mining, it analyzes sports and Parkinson's. Objective analysis of relevant literature characteristics, hot topics and dynamic trends in the field of disease (PD). The results show that high-yielding countries, institutions, and authors in the field of sports and Parkinson's disease are mainly concentrated in the United States. Research hotspots in the field mainly focus on sports, Parkinson's disease, quality of life, gait, rehabilitation, balance, physical activity, etc. The research group is mainly elderly, adults (male), rats, and mice. In terms of research content and methods, early scholars mainly studied drugs and clinical treatment of Parkinson's disease, and later scholars studied the benefits of exercise therapy for patients with Parkinson's disease, and combined with drugs and clinical experience to provide theoretical basis for Parkinson's disease prevention and rehabilitation.

KEYWORDS: exercise; Parkinson's disease; Cite Space

1. Introduction

parkinson's disease (pd) is a common neurodegenerative disease in the middle-aged and the elderly. clinically, it is mainly characterized by tremor, myotonia, motor retardation, abnormal posture gait as the main motor symptoms and sleep disorders, hyperhidrosis, constipation, decreased smell and anxiety and depression as the clinical manifestations of non-motor symptoms. The data show that the prevalence of Parkinson's disease (PD) in China is 16.7/100,000 to 440.3/100,000, and the prevalence rate of the elderly population above 65 is 1.7%; the annual incidence rate is 1.5/100,000 to 8.7/100,000, showing an increasing trend year by year. It is estimated that by 2040, the number of patients with Parkinson's disease (PD) worldwide will exceed 14 million, twice as many as it is now [1].

Parkinson's disease (PD), in addition to the treatment of drugs, surgery, and the like, is of great importance for improving the patient's dyskinesia and improving the quality of life. The evidence-based medicine committee of the International

Association of Dyskinesia in 2011 recommended exercise therapy as an adjunct to levodopa.

Exercise therapy can improve the multiple functions of PD in patients with Parkinson's disease (PD) and is closely related to Parkinson's disease (PD). The research on the field of sport and parkinson's disease (PD) has emerged in the world. Therefore, in order to make clear the current situation, hot point and trend of this research field, this paper, through the visualization of software Cite Space, The paper analyses and analyses the whole records of the relevant literature in the field of the Web of Parkinson's disease, and makes a comprehensive use of the methods of the co-occurrence of the literature, the co-occurrence of the author and the organization, the co-occurrence of the keyword, and the research status in the field of the movement and the Parkinson's disease. And the dynamic change trend of the hot spot is analyzed.

2. data source

The data of this study come from Web of science core collection database, and the retrieval time is October 8, 2019. By using "Agitans paralysis" or "Paralysis agitans" or "Parkinson's disease" or "PD" or "Parkinsonism" in the Web of science core collection database as the subject word, the time span is 2001-2019, and the retrieval results are refined with "exercise" or "sport". The selected literature type is ARTICLE. A total of 1610 literatures were searched, and all the references recorded and quoted were downloaded and saved as plain text.

3. Research Status

3.1 Analysis of publication situation

The publication of the literature can intuitively reflect the dynamic relationship between the time and quantity of literature in a certain research area, and it can also explain the theoretical level and development speed of the field in this period. Comprehensive statistics of the literature on sports and Parkinson's disease are shown in Figure 1.

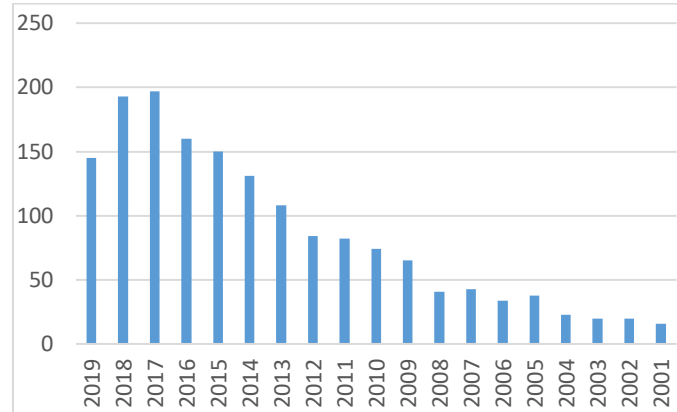


Figure 1 Annual publications in the field of sports and Parkinson's disease

As can be seen from fig. 1, the number of literatures in the field of exercise and Parkinson's disease shows a relatively stable upward trend with the year. It can be seen that the attention in this field is gradually increasing, which may be related to the aging of the world population, the improvement of economic level and the development of science and technology. Parkinson's disease is one of the most common neurodegenerative diseases in the elderly. With the aggravation of population aging in the world, the incidence, prevalence and mortality of Parkinson's disease are also gradually increasing. People pay more and more attention to the prevention and treatment of Parkinson's disease, with the development of economic level and science and technology, to provide sufficient conditions for researchers.

3.2 Country and institutional distribution

Statistics are made on the number of countries and institutions in the field of exercise and Parkinson's disease, and the results are shown in Table 1.

Table 1 Number of papers issued by countries / regions and institutions in the field of sports and Parkinson's disease

country	Number of posts	institution	Number of posts
USA	590	Washington Univ	24
ITALY	135	Boston Univ	24
ENGLAND	115	Univ SAO PAUIO	24
BRAZIL	109	Univ Florida	23
GERMANY	105	Northwestern Univ	21
CANADA	87	Radboud Univ	19

AUSTRALIA	78	Nijmegen Univ Sydeny	19
PEOPLES R CHINA	74	Karolinska Institute	18
JAPAN	63	Moriggia-Pelascini HOSP	18
SPAIN	63	Oregon HITH & Sci Univ	17

As can be seen in Table 1, in the 1610 documents, the United States, Italy, England, Brazil, Germany and other countries have strong scientific research strength in the field of sports and Parkinson's disease. This may be related to the level of local economic development, national health, medical institutions and medical resources.

According to the distribution of institutions, there is only one hospital in the top 10, and the rest are colleges and universities, of which the University of Washington ranks first among the institutions with 24 posts, followed by Boston University and the University of SAO PAULO. In contrast, the scientific research ability of colleges and universities is much higher than that of social institutions, and the scientific research ability of foreign colleges and universities is much higher than that of domestic institutions.

3.3 Analysis of authors

Draw the knowledge graph of high output authors in the field of exercise and Parkinson's disease. As can be seen from figure 2, the top 10 authors of high output are: GIUSEPPE FRAZZITTA (22), ROBERTO MAESTRI (20), GAMMON M EARHART (16), ERIKA FRANZEN (13), MEG E MORRIS (11), ALICE NIEUWBOER (10), ANGELA L RIDGEL (10), DAVIDE FERRAZZOLI (10), DANIEL M CORCOS (9), BASTIAAN R BLOEM (9). It can be seen from the map that the author cooperates in the form of small groups, the cooperation between small groups is not close, and some of the authors are embodied in the form of dot or two points and one line of cooperation.



Figure 2 Map of high output authors in the field of exercise and Parkinson's disease

4. Research Dynamic Analysis

4.1 Analysis of research hotspots

In Cite Space software, high frequency keywords can reflect a hot research topic in a field. Therefore, this paper uses Cite Space tool to analyze the key words of the searched literature. From Table 2, it can be seen that the research hotspots in the field of exercise and bone mineral density mainly focus on exercise, Parkinson's disease, quality of life, gait, rehabilitation, balance, physical activity and so on, the subjects of the study are the elderly, adults (male), rats, mice and so on, and the research subjects are mainly in the field of exercise, Parkinson's disease, quality of life, gait, rehabilitation, balance, physical activity and so on. Most of the studies used Meta analysis to quantitatively and qualitatively analyze the relationship between exercise and Parkinson's disease, so as to provide theoretical basis for the prevention and rehabilitation of Parkinson's disease. (RCT), was used to evaluate the effectiveness of exercise intervention in patients with Parkinson's disease (physiological, psychological or social function or quality of life), and to verify whether aerobic exercise, Taiji, high intensity exercise and low intensity exercise could improve gait, balance ability, stability, sensitivity, posture control and action execution in patients with Parkinson's disease. the results showed that aerobic exercise, Taiji exercise, high intensity exercise and low intensity exercise could improve gait, balance ability, stability ability, sensitivity ability, posture control and action execution ability in patients with Parkinson's disease.

Table 2 High frequency and high centrality keywords in the field of exercise and Parkinson's disease

serial number	High frequency keyword	frequency	Highly centric keywords	Centrality
1	exercise	695	Alzheimers disease	0.13
2	Parkinsons disease	651	Aerobic exercise	0.11
3	people	341	Postural instadility	0.11
4	Quality of lift	265	reliability	0.10
5	gait	263	dopamine	0.10
6	rehabilitation	252	Oxidative streaa	0.10
7	Balance	245	management	0.10
8	Randomized controlled trial	202	therapy	0.09
9	Parkinson disease	182	scale	0.09
10	Physical activity	173	rehabilitation	0.08

4.2 Frontier analysis of research

The high citation literature is a research achievement with high reliability and validity in a certain research field, and it is also the basic literature in this field. the cited literature of the first 10 times of the cited frequency is shown in table 3.

The main subjects of exercise and Parkinson's disease can be divided into the elderly, the adult (mainly male), and the model of Parkinson's disease (rats, mice).

The main content of the study is the effect of exercise on patients with Parkinson's disease. it is found that exercise is beneficial to the physical function, health-related quality of life, strength, balance and gait speed of patients with Parkinson's disease[2]. Targeted Taijiquan training can reduce the balance disorder in patients with moderate Parkinson's disease, improve functional ability and reduce falls[3]. The combination of goal-based training and aerobic activity has the potential to improve the cognitive and automatic components of exercise control in individuals with mild to moderate diseases by experiencing dependent neuroplasticity[4]. Exercise and exercise training can improve the performance of balance-related activities in patients with Parkinson's disease [5]. The dose-dependent benefits of exercise. High intensity exercise can normalize the excitability of cortical exercise in the early stage of PD[6]. Exercise can lead to the neuroplasticity of dopamine signal and help to improve the specific task (posture control) function of early PD[7]. Ve and FE intervention can improve the aerobic fitness of PD patients. However, only the finite element method can significantly improve the motor function and bilateral dexterity. Biomechanical data show that FE leads to the change of motion control strategy from feedback to greater dependence on feedforward process, which indicates that FE may be changing the central motion control process[8]. In patients with Parkinson's disease, progressive and intensive treadmill training programs can minimize gait injury, reduce the risk of falls, and improve the quality of life of these patients[9]. Family prompt training has a certain

impact on gait, movement and balance. The decline of intervention effect emphasizes the necessity of permanent prompt device and follow-up treatment. It is suggested that training is an effective auxiliary method for the treatment of gait disorder in Parkinson's disease[10].

Table 3. High co-cited literature in the field of sports and Parkinson's disease

serial number	Author, article title, publication time, source journal	cited frequency
1	GOODWIN VA, The effectiveness of exercise interventions for people with Parkinson's disease: A systematic review and meta-analysis, 2008, MOVEMENT DISORD, 23,631	128
2	PETZINGER GM, Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease, 2013, LANCET NEUROL,12,716	96
3	LI FZ, Tai Chi and Postural Stability in Patients with Parkinson's Disease, 2012, NEW ENGL J MED, 366,511	77
4	ALLEN NE, Balance and Falls in Parkinson's Disease: A Meta-analysis of the Effect of Exercise and Motor Training, 2011, MOVEMENT DISORD, 26,1605	68
5	FISHER BE, The effect of exercise training in improving motor performance and corticomotor excitability in people with early Parkinson's disease, 2008, ARCH PHYS MED REHAB, 89,1221	64
6	AHLSSKOG JE, Does vigorous exercise have a neuroprotective effect in Parkinson disease?, 2011, NEUROLOGY,77,288	63
7	RIDGEL AL, Forced, Not Voluntary, Exercise Improves Motor Function in Parkinson's Disease Patients, 2009, NEUROREHAB NEURAL RE,23,600	63
8	HERMAN T, Six weeks of intensive treadmill training improves gait and quality of life in patients with Parkinson's disease: A pilot study,2007, ARCH PHYS MED REHAB, 88, 1154	57
9	NIEUWBOER A, Cueing training in the home improves gait-related mobility in Parkinson's disease: the RESCUE trial, 2007, J NEUROL NEUROSUR PS, 78, 134	57
10	SHULMAN LM, eadmill exercise elevates striatal dopamine D2 receptor binding potential in patients with early Parkinson's disease, 2013, JAMA NEUROL,24,509	52

4.3 Trend analysis of research

The "a set of pop-up dynamic concepts and potential research issues" can represent a hot spot in a certain field. Through the analysis of the literature, the development path of the present subject word is observed to reveal the development of the research in the field of the movement and the Parkinson's disease and the main research tendency in each year.

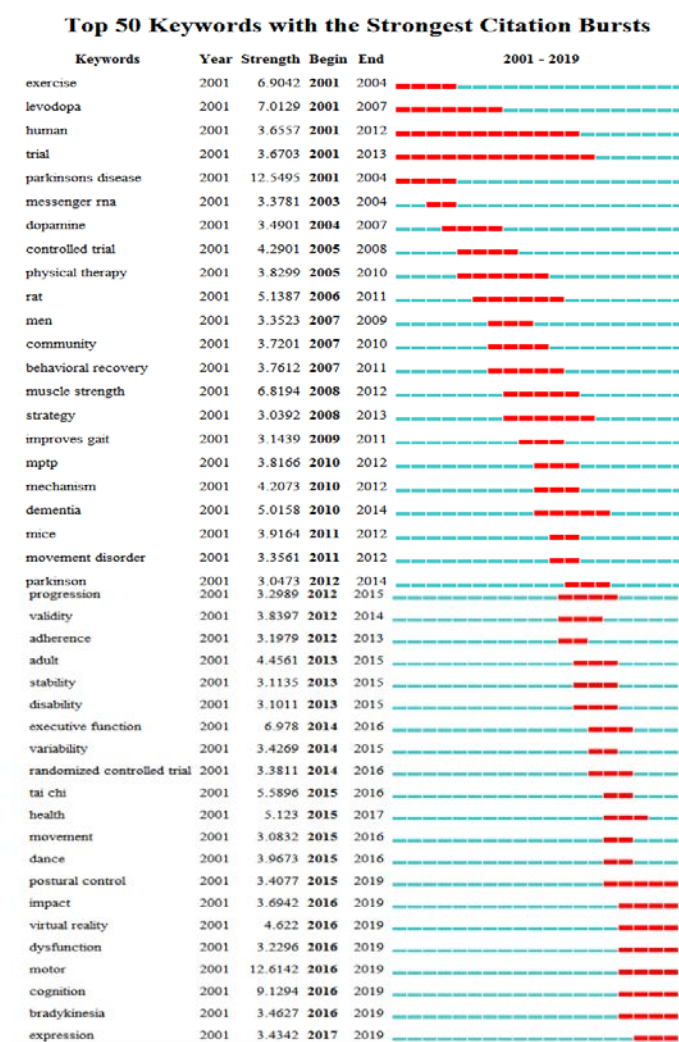


Figure 3 Study of sports and Parkinson's disease in 2001-2019

According to figure 3, the hot research areas of exercise and Parkinson's disease can be divided into four periods: 2001-2004, 2005-2009, 2010-2015, 2016-2019.

From 2001 to 2004, the subjects were human beings, and there was no obvious gender and age tendency. From 2005 to 2009, the subjects changed from gender-indistinguishable to male-focused. From 2010 to 2015, the researchers changed from no obvious age division to adults in the selection of subjects, and began to carry out cell and animal experiments in this field. It can be seen that the research object is gradually expanding, which indicates that the population with Parkinson's disease is expanding, and the subjects begin to appear cells and animals. The researchers try to study this field from macro and micro aspects.

In the study, a randomized controlled trial (RCT) was used to assess the effectiveness of exercise intervention on the outcomes of patients with Parkinson's disease (physiological, psychological or social function or quality of life). Secondly, a meta-analysis was used to carry out quantitative and qualitative analysis on the relationship between the motion and the parkinson's disease and to provide a theoretical basis for the prevention and rehabilitation of Parkinson's disease.

In the light of the research, the scholars of 2001-2004 focus on the internal mechanism of Parkinson's disease, and find out the methods of drug treatment. In 2005-2009, the study mainly studied the improvement of the symptoms of Parkinson's disease, and the improvement of gait by physical therapy and muscle strength training. In addition to the study of the mechanism and condition of Parkinson's disease in 2010-2015, in addition to the study of the mechanism and condition of Parkinson's disease, the main research on the effectiveness and compliance of the exercise intervention on the treatment of patients with Parkinson's disease, the use of randomized controlled trials, the verification of the Taiji, the dance to the posture control of the patients with Parkinson's disease, the balance disorder In 2016-2019, the scholars joined the study of the psychological cognition of the patients with Parkinson's disease.

5. Conclusion

Sports and Parkinson's disease research in high-output countries, institutions, the author is mainly concentrated in the United States. The research hotspots in the field mainly focus on exercise, Parkinson's disease, quality of life, gait, rehabilitation, balance, physical activity and so on. The main research groups are elderly, adult (male), rat and mouse. In terms of research contents and methods, early scholars mainly studied Parkinson's disease drugs and clinical treatment, later scholars studied the benefits of exercise therapy for patients with Parkinson's disease, combined with drugs and clinical experience to put forward a theoretical basis for the prevention and rehabilitation of Parkinson's disease.

References

- [1] Dorsey ER, Bloem BR (2018). The Parkinson pandemic—a call to action. *JAMA Neurol*, vol 75, no 1, pp. 9-10.
- [2] GOODWIN VA, RICHARDS SH, et al. (2008) The effectiveness of exercise interventions for people with Parkinson's disease: A systematic review and meta-analysis. *MOVEMENT DISORD*, vol 23, pp. 631-640.
- [3] LI FZ, HARMER P, et al. (2012) Tai Chi and Postural Stability in Patients with Parkinson's Disease. *NEW ENGL J MED*, vol 366, pp. 511-519.
- [4] PETZINGER GM, FISHER BE, et al. (2015) Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease. *LANCET NEUROL*, vol 12, pp. 716-726.
- [5] ALLEN NE, SHERRINGTON C, et al (2011). Balance and Falls in Parkinson's Disease: A Meta-analysis of the Effect of Exercise and Motor Training , *MOVEMENT DISORD*, vol 26, pp 1605-1615.
- [6] FISHER BE, WU, et al (2008). The effect of exercise training in improving motor performance and corticomotor excitability in people with early Parkinson's disease. *ARCH PHYS MED REHAB*, vol 89, pp. 1221-1229.
- [7] SHULMAN LM, LI QZ, et al (2013). Treadmill exercise elevates striatal dopamine D2 receptor binding potential in patients with early Parkinson's disease. *JAMA NEUROL*, vol 24, pp 509-514.
- [8] RIDGEL AL, VITEK JL, et al (2009). Forced, Not Voluntary, Exercise Improves Motor Function in Parkinson's Disease Patients. *NEUROREHAB NEURAL RE*, vol 23, pp 600-608.
- [9] HERMAN T, GILADI N, et al (2007). Six weeks of intensive treadmill training improves gait and quality of life in patients with Parkinson's disease: A pilot study. *ARCH PHYS MED REHAB*, vol 88, pp 1154-1158.
- [10] NIEUWBOER A, KWAKKEL G, et al (2007). Cueing training in the home improves gait-related mobility in Parkinson's disease: the RESCUE trial. *J NEUROL NEUROSUR PS*, vol 78, pp 134-140.