

Parkinson's Disease Current Awareness Bulletin

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Title: Parkinson's disease

Citation: The Lancet; Jun 2021; vol. 397 (no. 10291); p. 2284

Author(s): Bloem, Bastiaan R; Okun, Michael S; Klein, Christine

Summary: Parkinson's disease is a recognisable clinical syndrome with a range of causes and clinical presentations. Parkinson's disease represents a fast-growing neurodegenerative condition; the rising prevalence worldwide resembles the many characteristics typically observed during a pandemic, except for an infectious cause. In most populations, 3–5% of Parkinson's disease is explained by genetic causes linked to known Parkinson's disease genes, thus representing monogenic Parkinson's disease, whereas 90 genetic risk variants collectively explain 16–36% of the heritable risk of non-monogenic Parkinson's disease. Additional causal associations include having a relative with Parkinson's disease or tremor, constipation, and being a non-smoker, each at least doubling the risk of Parkinson's disease. The diagnosis is clinically based; ancillary testing is reserved for people with an atypical presentation. Current criteria define Parkinson's disease as the presence of bradykinesia combined with either rest tremor, rigidity, or both. However, the clinical presentation is multifaceted and includes many non-motor symptoms. Prognostic counselling is guided by awareness of disease subtypes. Clinically manifest Parkinson's disease is preceded by a potentially long prodromal period. Presently, establishment of prodromal symptoms has no clinical implications other than symptom suppression, although recognition of prodromal parkinsonism will probably have consequences when disease-modifying treatments become available. Treatment goals vary from person to person, emphasising the need for personalised management. There is no reason to postpone symptomatic treatment in people developing disability due to Parkinson's disease. Levodopa is the most common medication used as first-line therapy. Optimal management should start at diagnosis and requires a multidisciplinary team approach, including a growing repertoire of non-pharmacological interventions. At present, no therapy can slow down or arrest the progression of Parkinson's disease, but informed by new insights in genetic causes and mechanisms of neuronal death, several promising strategies are being tested for disease-modifying potential. With the perspective of people with Parkinson's disease as a so-called red thread throughout this Seminar, we will show how personalised management of Parkinson's disease can be optimised.

Title: Natural history of lung function over one year in patients with Parkinson's disease

Citation: Respiratory Medicine; Jun 2021; vol. 182

Author(s): David A Kaminsky, Donald G Grosset, Deena M Kegler-Ebo Salvador Cangiamilla, Michael Klingler, Ping Zhao, Charles Oh

Background: Little is known about decline in lung function in Parkinson's disease (PD). To assess these changes, we assessed the changes in lung function that occurred over 12 months in patients on standard PD therapy as part of the observational cohort of an open-label study of inhaled levodopa (CVT-301) in PD.

Methods: PD patients on stable oral PD therapy and no chronic respiratory disease had spirometry and diffusing capacity of the lungs for carbon monoxide (DL_{CO}) measured at 3, 6, 9, and 12 months.

Results: 106 patients (81.5%) in the observational cohort on no investigational therapy completed the study. Mean FEV₁ declined at 12 months from 2.88L at baseline with a mean change of -0.11L, greater than the -0.030-0.045L/year observed in healthy, non-smokers

aged 60-70 years. FVC declined from 3.77L (mean change -0.19L); FEV₁/FVC ratio remained relatively constant. DL_{CO} mean change was -0.48 mL/min/mmHg from a baseline of 24.24 mL/min/mmHg. This change in DL_{CO}, while not significant, was similar to that seen in non-smokers aged 60-70 years (DL_{CO} -0.42-0.63 mL/min/mmHg/year). Decreases in alveolar volume (VA) and inspiratory vital capacity (IVC) rather than the transfer coefficient (DL_{CO}/VA) were observed.

Conclusions: PD patients had greater declines in FEV₁, and FVC, but not in DL_{CO}, compared to healthy non-smokers of similar age. Declines in FEV₁ and FVC with little change in FEV₁/FVC, and decline in VA and IVC with little change in DL_{CO}/VA, suggest these changes were due to decreases in lung volume and are compatible with progressive PD-associated respiratory muscle weakness.

Trial registration: ClinicalTrials.gov (NCT02352363 Registered January 26, 2015 [<https://clinicaltrials.gov/ct2/show/NCT02352363>]) and EudraCT (2014-003799-22).

Keywords: Natural history; Parkinson's disease; Pulmonary function; Spirometry.

Title: Confronting the Complexities of "Co-Production" in Participatory Health Research: A Critical, Reflexive Approach to Power Dynamics in a Collaborative Project on Parkinson's Dance

Citation: Qualitative Health Research; Jun 2021; vol. 31 (no. 7); p. 1290

Author(s): Phillips, Louise; Frølund Lisbeth; Christensen-Strynø, Maria Bee

Abstract: The literature on participatory health research describes various ways of overcoming obstacles to the co-production of knowledge by redressing power imbalances. In this article, we propose an approach to understanding and analyzing co-production which conceptualizes power, not as an obstacle but as an intrinsic, productive force in bringing "co-production" into being. In the approach, "co-production" is understood and analyzed as a tensional, complex, unstable entity that emerges in power-imbued negotiations of meanings throughout the research process. Focusing on a participatory project on Parkinson's dance, our purpose is to illustrate how the approach can generate knowledge about the complexities of "co-production." We also demonstrate how the approach can provide a foundation for a relational ethics that confronts the complexities head-on. In conclusion, we discuss the insights gained into the possibilities and challenges of co-production and the value of the approach as a foundation for relational ethics.

Title: Moving towards Integrated and Personalized Care in Parkinson's Disease: A Framework Proposal for Training Parkinson Nurses.

Citation: Journal of personalized medicine; Jun 2021; vol. 11 (no. 7)

Author(s): van Munster, Marlena; Stümpel, Johanne; Thieken, Franziska; Pedrosa, David; Antonini, Angelo; Côté, Diane; Fabbri, Margherita; Ferreira, Joaquim J; Růžicka, Evžen; Grimes, David; Mestre, Tiago A

Abstract: Delivering healthcare to people living with Parkinson's disease (PD) may be challenging in face of differentiated care needs during a PD journey and a growing complexity. In this regard, integrative care models may foster flexible solutions on patients' care needs whereas Parkinson Nurses (PN) may be pivotal facilitators. However, at present hardly any training opportunities tailored to the care priorities of PD-patients are to be found for nurses. Following a conceptual approach, this article aims at setting a framework for

training PN by reviewing existing literature on care priorities for PD. As a result, six prerequisites were formulated concerning a framework for training PN. The proposed training framework consist of three modules covering topics of PD: (i) comprehensive care, (ii) self-management support and (iii) health coaching. A fourth module on telemedicine may be added if applicable. The framework streamlines important theoretical concepts of professional PD management and may enable the development of novel, personalized care approaches.

Title: The effects of transcranial direct current stimulation on gait in patients with Parkinson's disease: a systematic review.

Citation: Translational neurodegeneration; Jun 2021; vol. 10 (no. 1); p. 22

Author(s): Pol, Fateme; Salehinejad, Mohammad Ali; Baharlouei, Hamzeh; Nitsche, Michael A

Background: Gait problems are an important symptom in Parkinson's disease (PD), a progressive neurodegenerative disease. Transcranial direct current stimulation (tDCS) is a neuromodulatory intervention that can modulate cortical excitability of the gait-related regions. Despite an increasing number of gait-related tDCS studies in PD, the efficacy of this technique for improving gait has not been systematically investigated yet. Here, we aimed to systematically explore the effects of tDCS on gait in PD, based on available experimental studies.

Methods: Using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach, PubMed, Web of Science, Scopus, and PEDro databases were searched for randomized clinical trials assessing the effect of tDCS on gait in patients with PD.

Results: Eighteen studies were included in this systematic review. Overall, tDCS targeting the motor cortex and supplementary motor area bilaterally seems to be promising for gait rehabilitation in PD. Studies of tDCS targeting the dorsolateral prefrontal cortex or cerebellum showed more heterogeneous results. More studies are needed to systematically compare the efficacy of different tDCS protocols, including protocols applying tDCS alone and/or in combination with conventional gait rehabilitation treatment in PD.

Conclusions: tDCS is a promising intervention approach to improving gait in PD. Anodal tDCS over the motor areas has shown a positive effect on gait, but stimulation of other areas is less promising. However, the heterogeneities of methods and results have made it difficult to draw firm conclusions. Therefore, systematic explorations of tDCS protocols are required to optimize the efficacy.

Title: Chemical and Biological Molecules Involved in Differentiation, Maturation, and Survival of Dopaminergic Neurons in Health and Parkinson's Disease: Physiological Aspects and Clinical Implications.

Citation: Biomedicines; Jun 2021; vol. 9 (no. 7)

Author(s): Gaggi, Giulia; Di Credico, Andrea; Izzicupo, Pascal; Iannetti, Giovanni; Di Baldassarre, Angela; Ghinassi, Barbara

Abstract: Parkinson's disease (PD) is one of the most common neurodegenerative disease characterized by a specific and progressive loss of dopaminergic (DA) neurons and dopamine, causing motor dysfunctions and impaired movements. Unfortunately, available

therapies can partially treat the motor symptoms, but they have no effect on non-motor features. In addition, the therapeutic effect reduces gradually, and the prolonged use of drugs leads to a significant increase in the number of adverse events. For these reasons, an alternative approach that allows the replacement or the improved survival of DA neurons is very appealing for the treatment of PD patients and recently the first human clinical trials for DA neurons replacement have been set up. Here, we review the role of chemical and biological molecules that are involved in the development, survival and differentiation of DA neurons. In particular, we review the chemical small molecules used to differentiate different type of stem cells into DA neurons with high efficiency; the role of microRNAs and long non-coding RNAs both in DA neurons development/survival as far as in the pathogenesis of PD; and, finally, we dissect the potential role of exosomes carrying biological molecules as treatment of PD.

Title: Gastroparesis in Parkinson Disease: Pathophysiology, and Clinical Management.

Citation: Brain sciences; Jun 2021; vol. 11 (no. 7)

Author(s): Soliman, Heithem; Coffin, Benoit; Gourcerol, Guillaume

Abstract: Patients with Parkinson disease (PD) experience a range of non-motor symptoms, including gastrointestinal symptoms. These symptoms can be present in the prodromal phase of the disease. Recent advances in pathophysiology reveal that α -synuclein aggregates that form Lewy bodies and neurites, the hallmark of PD, are present in the enteric nervous system and may precede motor symptoms. Gastroparesis is one of the gastrointestinal involvements of PD and is characterized by delayed gastric emptying of solid food in the absence of mechanical obstruction. Gastroparesis has been reported in nearly 45% of PD. The cardinal symptoms include early satiety, postprandial fullness, nausea, and vomiting. The diagnosis requires an appropriate test to confirm delayed gastric emptying, such as gastric scintigraphy, or breath test. Gastroparesis can lead to malnutrition and impairment of quality of life. Moreover, it might interfere with the absorption of antiparkinsonian drugs. The treatment includes dietary modifications, and pharmacologic agents both to accelerate gastric emptying and relieve symptoms. Alternative treatments have been recently developed in the management of gastroparesis, and their use in patients with PD will be reported in this review.

Title: The Role of Neural Network for the Detection of Parkinson's Disease: A Scoping Review.

Citation: Healthcare (Basel, Switzerland); Jun 2021; vol. 9 (no. 6)

Author(s): Alzubaidi, Mahmood Saleh; Shah, Uzair; Dhia Zubaydi, Haider; Dolaat, Khalid; Abd-Alrazaq, Alaa A; Ahmed, Arfan; Househ, Mowafa

Background: Parkinson's Disease (PD) is a chronic neurodegenerative disorder that has been ranked second after Alzheimer's disease worldwide. Early diagnosis of PD is crucial to combat against PD to allow patients to deal with it properly. However, there is no medical test(s) available to diagnose PD conclusively. Therefore, computer-aided diagnosis (CAD) systems offered a better solution to make the necessary data-driven decisions and assist the physician. Numerous studies were conducted to propose CAD to diagnose PD in the early stages. No comprehensive reviews have been conducted to summarize the role of AI tools to combat PD.

Objective: The study aimed to explore and summarize the applications of neural networks to diagnose PD.

Methods: PRISMA Extension for Scoping Reviews (PRISMA-ScR) was followed to conduct this scoping review. To identify the relevant studies, both medical databases (e.g., PubMed) and technical databases (IEEE) were searched. Three reviewers carried out the study selection and extracted the data from the included studies independently. Then, the narrative approach was adopted to synthesis the extracted data.

Results: Out of 1061 studies, 91 studies satisfied the eligibility criteria in this review. About half of the included studies have implemented artificial neural networks to diagnose PD. Numerous studies included focused on the freezing of gait (FoG). Biomedical voice and signal datasets were the most commonly used data types to develop and validate these models. However, MRI- and CT-scan images were also utilized in the included studies.

Conclusion: Neural networks play an integral and substantial role in combating PD. Many possible applications of neural networks were identified in this review, however, most of them are limited up to research purposes.

Title: Combined and Sequential Treatment with Deep Brain Stimulation and Continuous Intraejunal Levodopa Infusion for Parkinson's Disease.

Citation: Journal of personalized medicine; Jun 2021; vol. 11 (no. 6)

Author(s): van Poppelen, Daniël; Tromp, Annelie N M; de Bie, Rob M A; Dijk, Joke M

Background: Deep brain stimulation (DBS) and continuous intraejunal levodopa infusion (CLI) are efficacious treatments of medication related motor response fluctuations in advanced Parkinson's disease (PD). Literature regarding the use of both advanced treatments within one patient is scarce.

Methods: We present a retrospective single center case series and a review of the literature. Patients with PD who were treated with both DBS and CLI in our tertiary referral center between 2005 and 2020 were identified and medical records were assessed. Additionally, literature on patients treated with both therapies was systematically searched for in Medline and Embase.

Results: Nineteen patients were included. Medication related motor response fluctuations were a major indication for the second therapy in all but one. Of nine patients initially treated with DBS, five reported improvement with CLI. Seven of ten patients initially treated with CLI experienced benefits from DBS. The systematic literature search resulted in fifteen previous publications comprising 66 patients. Of the 59 patients, for whom the effect of the second treatment was known, 57 improved.

Conclusions: PD patients, who have persisting medication related motor response fluctuations, despite DBS or CLI treatment, may benefit from an additional or alternative treatment with either CLI or DBS.

Title: Neurosonological Findings Related to Non-Motor Features of Parkinson's Disease: A Systematic Review.

Citation: Brain sciences; Jun 2021; vol. 11 (no. 6)

Author(s): Del Toro Pérez, Cristina; Amaya Pascasio, Laura; Arjona Padillo, Antonio; Olivares Romero, Jesús; Mejías Olmedo, María Victoria; Fernández Pérez, Javier; Payán Ortiz, Manuel; Martínez-Sánchez, Patricia

Abstract: Non-motor symptoms (NMS) in Parkinson's disease (PD), including neuropsychiatric or dysautonomic complaints, fatigue, or pain, are frequent and have a high impact on the patient's quality of life. They are often poorly recognized and inadequately treated. In the recent years, the growing awareness of NMS has favored the development of techniques that complement the clinician's diagnosis. This review provides an overview of the most important ultrasonographic findings related to the presence of various NMS. Literature research was conducted in PubMed, Scopus, and Web of Science from inception until January 2021, retrieving 23 prospective observational studies evaluating transcranial and cervical ultrasound in depression, dementia, dysautonomic symptoms, psychosis, and restless leg syndrome. Overall, the eligible articles showed good or fair quality according to the QUADAS-2 assessment. Brainstem raphe hypoechogenicity was related to the presence of depression in PD and also in depressed patients without PD, as well as to overactive bladder. Substantia nigra hyperechogenicity was frequent in patients with visual hallucinations, and larger intracranial ventricles correlated with dementia. Evaluation of the vagus nerve showed contradictory findings. The results of this systematic review demonstrated that transcranial ultrasound can be a useful complementary tool in the evaluation of NMS in PD.

Title: Imaging of Substantia Nigra in Parkinson's Disease: A Narrative Review.

Citation: Brain sciences; Jun 2021; vol. 11 (no. 6)

Author(s): Feraco, Paola; Gagliardo, Cesare; La Tona, Giuseppe; Bruno, Eleonora; D'angelo, Costanza; Marrale, Maurizio; Del Poggio, Anna; Malaguti, Maria Chiara; Geraci, Laura; Baschi, Roberta; Petralia, Benedetto; Midiri, Massimo; Monastero, Roberto

Abstract: Parkinson's disease (PD) is a progressive neurodegenerative disorder, characterized by motor and non-motor symptoms due to the degeneration of the pars compacta of the substantia nigra (SNc) with dopaminergic denervation of the striatum. Although the diagnosis of PD is principally based on a clinical assessment, great efforts have been expended over the past two decades to evaluate reliable biomarkers for PD. Among these biomarkers, magnetic resonance imaging (MRI)-based biomarkers may play a key role. Conventional MRI sequences are considered by many in the field to have low sensitivity, while advanced pulse sequences and ultra-high-field MRI techniques have brought many advantages, particularly regarding the study of brainstem and subcortical structures. Nowadays, nigrosome imaging, neuromelanine-sensitive sequences, iron-sensitive sequences, and advanced diffusion weighted imaging techniques afford new insights to the non-invasive study of the SNc. The use of these imaging methods, alone or in combination, may also help to discriminate PD patients from control patients, in addition to discriminating atypical parkinsonian syndromes (PS). A total of 92 articles were identified from an extensive review of the literature on PubMed in order to ascertain the-state-of-the-art of MRI techniques, as applied to the study of SNc in PD patients, as well as their potential future applications as imaging biomarkers of disease. Whilst none of these MRI-imaging biomarkers could be successfully validated for routine clinical practice, in achieving high levels of accuracy and reproducibility in the diagnosis of PD, a multimodal MRI-PD protocol may assist neuroradiologists and clinicians in the early and differential diagnosis of a wide spectrum of neurodegenerative disorders.

Title: Targeting of the Subthalamic Nucleus in Patients with Parkinson's Disease Undergoing Deep Brain Stimulation Surgery.

Citation: Neurology and therapy; Jun 2021; vol. 10 (no. 1); p. 61-73

Author(s): van den Munckhof, Pepijn; Bot, Maarten; Schuurman, P Richard

Abstract: Precise stereotactic targeting of the dorsolateral motor part of the subthalamic nucleus (STN) is paramount for maximizing clinical effectiveness and preventing side effects of deep brain stimulation (DBS) in patients with advanced Parkinson's disease. With recent developments in magnetic resonance imaging (MRI) techniques, direct targeting of the dorsolateral part of the STN is now feasible, together with visualization of the motor fibers in the nearby internal capsule. However, clinically relevant discrepancies were reported when comparing STN borders on MRI to electrophysiological STN borders during microelectrode recordings (MER). Also, one should take into account the possibility of a 3D inaccuracy of up to 2 mm of the applied stereotactic technique. Pneumocephalus and image fusion errors may further increase implantation inaccuracy. Even when implantation has been successful, suboptimal lead anchoring on the skull may cause lead migration during follow-up. Meticulous pre- and intraoperative imaging is therefore indispensable, and so is postoperative imaging when the effects of DBS deteriorate during follow-up. Thus far, most DBS centers employ MRI targeting, multichannel MER, and awake test stimulation in STN surgery, but randomized trials comparing surgery under local versus general anesthesia and additional studies comparing MER-STN borders to high-field MRI-STN may change this clinical practice. Further developments in imaging protocols and improvements in image fusion processes are needed to optimize placement of DBS leads in the dorsolateral motor part of the STN in Parkinson's disease.

Title: The Long-Term Impact of Levodopa/Carbidopa Intestinal Gel on 'Off'-time in Patients with Advanced Parkinson's Disease: A Systematic Review.

Citation: Advances in Therapy; Jun 2021; vol. 38 (no. 6); p. 2854-2890

Author(s): Antonini ; Odin, Per; Pahwa, Rajesh; Aldred, Jason; Alobaidi, Ali; Jalundhwala, Yash J.; Kukreja, Pavnit; Bergmann, Lars; Inguva, Sushmitha; Bao, Yanjun; Chaudhuri, K. Ray

Introduction: Levodopa/carbidopa intestinal gel (LCIG; carbidopa/levodopa enteral suspension) has been widely used and studied for the treatment of motor fluctuations in levodopa-responsive patients with advanced Parkinson's disease (PD) when other treatments have not given satisfactory results. Reduction in 'off'-time is a common primary endpoint in studies of LCIG, and it is important to assess the durability of this response. This systematic literature review was conducted to qualitatively summarise the data on the long-term effects of LCIG therapy on 'off'-time.

Methods: Studies were identified by searching PubMed, EMBASE and Ovid on 30 September 2019. Studies were included if they reported on patients with PD, had a sample size of ≥ 10 , LCIG was an active intervention and 'off'-time was reported for ≥ 12 months after initiation of LCIG treatment. Randomised clinical trials, retrospective and prospective observational studies, and other interventional studies were included for selection. Data were collected on: 'off'-time (at pre-specified time periods and the end of follow-up), study characteristics, Unified Parkinson's Disease Rating Scale (UPDRS) II, III and IV total scores, dyskinesia duration, quality of life scores, non-motor symptoms and safety outcomes.

Results: Twenty-seven studies were included in this review. The improvement in 'off'-time observed shortly after initiating LCIG was maintained and was statistically significant at the end of follow-up in 24 of 27 studies. 'Off'-time was reduced from baseline to end of follow-up by 38-84% and was accompanied by a clinically meaningful improvement in quality of life. Stratified analysis of 'off'-time demonstrated mean relative reductions of 47-82% at 3-6 months and up to 83% reduction at 3-5 years of follow-up. Most studies reported significant improvements in activities of daily living and motor complications. Most frequent adverse events were related to the procedure or the device.

Conclusion: In one of the largest qualitative syntheses of published LCIG studies, LCIG treatment was observed to provide a durable effect in reducing 'off'-time. Infographic: Video Abstract.

Title: Vibrotactile biofeedback devices in Parkinson's disease: a narrative review.

Citation: Medical & Biological Engineering & Computing; Jun 2021; vol. 59 (no. 6); p. 1185-1199

Author(s): Gonçalves ; Rodrigues, Ana Margarida; Santos, Cristina P.

Abstract: Parkinson's disease (PD) is often associated with a vast list of gait-associated disabilities, for which there is still a limited pharmacological/surgical treatment efficacy. Therefore, alternative approaches have emerged as vibrotactile biofeedback systems (VBS). This review aims to focus on the technologies supporting VBS and identify their effects on improving gait-associated disabilities by verifying how VBS were applied and validated with end-users. It is expected to furnish guidance to researchers looking to enhance the effectiveness of future vibrotactile cueing systems. The use of vibrotactile cues has proved to be relevant and attractive, as positive results have been obtained in patients' gait performance, suitability in any environment, and easy adherence. There seems to be a preference in developing VBS to mitigate freezing of gait, to improve balance, to overcome the risk of fall, and a prevalent use to apply miniaturized wearable actuators and sensors. Most studies implemented a biofeedback loop able to provide rescue strategies during or after the detection of a gait-associated disability. However, there is a need of more clinical evidence and inclusion of experimental sessions to evaluate if the biofeedback was effectively integrated into the patients' motor system.

Title: 'Striving for normality' when coping with Parkinson's disease in everyday life: A metasynthesis

Citation: International Journal of Nursing Studies; Jun 2021; vol. 118

Author(s): Haahr A.; Groos H.; Sorensen D.

Background: Parkinson's disease is a chronic, progressive neurodegenerative disease which affects more than ten million people worldwide. Living with Parkinson's disease has a high impact on everyday life, and may affect quality of life negatively. Individualized coping strategies are needed to deal with the disease on a daily basis and still enjoy a social life.

Objective(s): The aim of this study was to identify and describe strategies for coping adopted by individuals living with Parkinson's disease in their daily lives.

Design(s): The study is designed as a meta-ethnographic metasynthesis and follows Sandelowski and Barroso's guidelines for synthesizing qualitative research.

Datasources: Based on an exhaustive literature search in the following databases: CINAHL, MEDLINE, PsychINFO, Scopus and Swemed, as well as Mednar, parkinson.org, Google Scholar and OpenGrey, with no limit on the search date, 14 articles were included. Review methods: The data were analyzed through a taxonomic and inductive analysis focusing on coping with Parkinson's disease in daily life.

Result(s): The findings revealed that the overarching motivation for patients to cope with Parkinson's disease was maintaining normality and preserving the self. The coping strategies used were: Staying independent, Focusing on the present and Avoiding challenging situations.

Conclusion(s): Coping with Parkinson's disease is an ongoing and complex process of balancing the strategies used, while holding on to the 'self' that pre-dated Parkinson's disease, and at the same time adjusting one's identity to embrace living with a chronic condition. In this process, optimism and positive thinking would seem to be very fruitful. Further, the synthesis revealed that relatives often act as informal caregivers and hence as an important support in daily life. Healthcare professionals must know about coping strategies in order better to support the patients. Copyright © 2021 Elsevier Ltd

Title: Effectiveness of endurance exercises and high-speed cycling on bradykinesia in Parkinson's disease: A systematic review

Citation: Fisioterapia; 2021

Author(s): Molina Palomino F.M.; Lopez Lopez L.; Rodriguez Torres J.; Granados Santiago M.; Ortiz Rubio A.; Cabrera Martos I.; Valenza M.C.

Background and Objective: Endurance and high-intensity stationary cycling exercises have been used in recent years to treat bradykinesia in Parkinson's disease (PD). The aim is to determine the effectiveness of endurance and high-intensity stationary cycling in reducing bradykinesia in people with PD.

Subjects and Methods: A search was conducted up to 2020 in the PubMed, Web of Science, Medline, Cochrane Library, Google Scholar and ScienceDirect databases. The PEDro scale was used to assess the methodological quality and internal validity of the studies.

Result(s): 10 studies were included in our review. Five studies carried out high intensity stationary cycling workouts with a duration of 1 to 5 weeks, 4 of them showed improved bradykinesia, 3 of them significantly. Four studies carried out endurance exercises (from 9 weeks to 24 months) all cases of bradykinesia improved, 3 significantly. One study looked at endurance exercises and stationary cycling showing, an improvement in bradykinesia after 12 weeks of treatment.

Conclusion(s): Although both treatments are beneficial for improving bradykinesia in PD of mild-moderate severity, in a minimum period of one week, treatment with high-speed stationary cycling shows significant improvements, while endurance exercises do so from 9 weeks onwards. Further studies with better evidence are needed.

Sources Used: The following databases are searched on a regular basis in the development of this bulletin: EMCARE, British Nursing Index, CINAHL, Medline.

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