

Parkinson's Disease Current Awareness Bulletin August 2021

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Title: A Meta-Analysis of the Effect of Subthalamic Nucleus-Deep Brain Stimulation in Parkinson's Disease-Related Pain

Citation: Frontiers in Human Neuroscience; Jul 2021; vol. 15 **Author(s):** Diao Y.; Bai Y.; Hu T.; Yin Z.; Liu H.; Meng F.; Yang A.; Zhang J.

Abstract: Pain from Parkinson's disease (PD) is a non-motor symptom affecting the quality of life and has prevalence of 20-80%. However, it is unclear whether subthalamic nucleus deep brain stimulation (STN-DBS), a well-established treatment for PD, is effective forPDrelated pain. Thus, the objective of this meta-analysis was to investigate the efficacy of STN-DBS on PD-related pain and explore how its duration affects the efficacy of STN-DBS. A systematic search was performed using PubMed, Embase, and the Cochrane Library. Nine studies included numerical rating scale (NRS), visual analog scale (VAS), or non-motor symptom scale (NMSS) scores at baseline and at the last follow-up visit and therefore met the inclusion criteria of the authors. These studies exhibited moderate- to high-guality evidence. Two reviewers conducted assessments for study eligibility, risk of bias, data extraction, and quality of evidence rating. Random effect meta-analysis revealed a significant change in PD-related pain as assessed by NMSS, NRS, and VAS (P < 0.01). Analysis of the short and long follow-up subgroups indicated delayed improvement in PDrelated pain. These findings (a) show the efficacy of STN-DBS on PD-related pain and provide higher-level evidence, and (b) implicate delayed improvement in PD-related pain, which may help programming doctors with supplement selecting target and programming. Systematic Review Registration: This study is registered in Open Science Framework (DOI: 10.17605/OSF.IO/DNM6K).© Copyright © 2021 Diao, Bai, Hu, Yin, Liu, Meng, Yang and Zhang.

Title: Action Imagery and Observation in Neurorehabilitation for Parkinson's Disease (ACTION-PD): Development of a User-Informed Home Training Intervention to Improve Functional Hand Movements.

Citation: Parkinson's Disease (20420080); Jul 2021 ; p. 1-14

Author(s): Bek ; Holmes, Paul S.; Craig, Chesney E.; Franklin, Zoë C.; Sullivan, Matthew; Webb, Jordan; Crawford, Trevor J.; Vogt, Stefan; Gowen, Emma; Poliakoff, Ellen

Background: Parkinson's disease (PD) causes difficulties with hand movements, which few studies have addressed therapeutically. Training with action observation (AO) and motor imagery (MI) improves performance in healthy individuals, particularly when the techniques are applied simultaneously (AO + MI). Both AO and MI have shown promising effects in people with PD, but previous studies have only used these separately. Objective. This article describes the development and pilot testing of an intervention combining AO + MI and physical practice to improve functional manual actions in people with PD.

Methods: The home-based intervention, delivered using a tablet computer app, was iteratively designed by an interdisciplinary team, including people with PD, and further developed through focus groups and initial field testing. Preliminary data on feasibility were obtained via a six-week pilot randomised controlled trial (ISRCTN 11184024) of 10 participants with mild to moderate PD (6 intervention; 4 treatment as usual). Usage and adherence data were recorded during training, and semistructured interviews were conducted with participants. Exploratory outcome measures included dexterity and timed action performance.

Results: Usage and qualitative data provided preliminary evidence of acceptability and usability. Exploratory outcomes also suggested that subjective and objective performance of manual actions should be tested in a larger trial. The importance of personalisation, choice, and motivation was highlighted, as well as the need to facilitate engagement in motor imagery.

Conclusions: The results indicate that a larger RCT is warranted, and the findings also have broader relevance for the feasibility and development of AO + MI interventions for PD and other conditions.

Title: An Update on Medical and Surgical Treatments of Parkinson's Disease.

Citation: Aging and disease; Jul 2021; vol. 12 (no. 4); p. 1021-1035 **Author(s):** Nemade, Dipali; Subramanian, Thyagarajan; Shivkumar, Vikram

Abstract: Parkinson's disease (PD) is characterized by degeneration of dopaminergic neurons in the substantia nigra pars compacta and other neuronal populations. The worldwide prevalence of PD is over 7 million and has been increasing more rapidly than many other neurodegenerative disorders. PD symptoms can be broadly divided into motor (slowness, stiffness, tremor) and non-motor symptoms (such as depression, dementia, psychosis, orthostatic hypotension). Patients can also have prodromal symptoms of rapid eye movement sleep behavior disorder, hyposmia, and constipation. The diagnosis of PD is mainly clinical, but dopamine transporter single-photon emission computed tomography can improve the accuracy of the diagnosis. Dopamine based therapies are used for the treatment of motor symptoms. Non-motor symptoms are treated with other medications such as selective serotonin reuptake inhibitors (depression/anxiety), acetylcholinesterase inhibitors (dementia), and atypical antipsychotics (psychosis). Patients with motor fluctuations or uncontrolled tremor, benefit from deep brain stimulation. Levodopa-carbidopa intestinal gel is an alternative to deep brain stimulation for uncontrolled motor fluctuations. Rehabilitative therapies such as physical, occupational, and speech therapy are important during all stages of the disease. Management of PD is complex but there have been significant advancements in the treatment of motor and non-motor symptoms over the past few years. This review discusses the updates in the medical and surgical management of PD.

Title: Artificial intelligence in neurodegenerative diseases: A review of available tools with a focus on machine learning techniques.

Citation: Artificial Intelligence in Medicine; Jul 2021; vol. 117 **Author(s):** Tăuțan ; Ionescu, Bogdan; Santarnecchi, Emiliano

Abstract: Neurodegenerative diseases have shown an increasing incidence in the older population in recent years. A significant amount of research has been conducted to characterize these diseases. Computational methods, and particularly machine learning techniques, are now very useful tools in helping and improving the diagnosis as well as the disease monitoring process. In this paper, we provide an in-depth review on existing computational approaches used in the whole neurodegenerative spectrum, namely for Alzheimer's, Parkinson's, and Huntington's Diseases, Amyotrophic Lateral Sclerosis, and Multiple System Atrophy. We propose a taxonomy of the specific clinical features, and of the existing computational methods. We provide a detailed analysis of the various modalities and decision systems employed for each disease. We identify and present the sleep

disorders which are present in various diseases and which represent an important asset for onset detection. We overview the existing data set resources and evaluation metrics. Finally, we identify current remaining open challenges and discuss future perspectives.

Title: Bone Mineral Density Loss in Parkinson's Disease: Impact of Clinical Subtypes.

Citation: Experimental Aging Research; Jul 2021; vol. 47 (no. 4); p. 373-385 **Author(s):** Özcan ; Acaröz Candan, Sevim; Gül, Tuba

Background: This study aimed to compare the BMD status among the clinical subtypes of PD and healthy controls.

Methods: Sixty patients with PD and 30 healthy age- and sex-matched controls were included in this study. The patients were divided into postural instability gait difficulty-dominant type (PIGDDT) group and tremor-dominant type (TDT) group based on the Unified Parkinson's Disease Rating Scale (UPDRS) score. BMD was measured using dual-energy X-ray absorptiometry scans in femoral and lumbar regions.

Results: The T-scores in femoral and lumbar regions were similar in all groups. The prevalence of osteopenia was higher than the prevalence of osteoporosis in all three groups for femoral regions. The prevalence of osteoporosis in the intertrochanteric region and total femur in the PIGDDT group was higher than in the TDT group and controls. Our data showed a trend toward higher prevalence of osteoporosis in the PIGDDT group.

Conclusion: The prevalence of osteopenia and osteoporosis may differ between clinical subtypes of PD and healthy controls. Osteopenia is more common than osteoporosis for all groups. The patients with PIGDDT of PD tended to have higher prevalence of osteoporosis, even at early stages of disease, compared to those with TDT and healthy controls.

Title: Cognitive training interventions for dementia and mild cognitive impairment in Parkinson's disease - A cochrane review summary with commentary.

Citation: NeuroRehabilitation; Jul 2021; vol. 48 (no. 3); p. 385-387 **Author(s):** Loetscher

Background: The majority of people living with Parkinson's disease will develop impairments in cognition. These impairments are associated with a reduced quality of life.

Objective: The Cochrane Review aimed to investigate whether cognitive training improves cognition in people with Parkinson's disease and mild cognitive impairments or dementia.

Methods: A Cochrane Review by Orgeta et al. was summarized with comments.

Results: The review included seven studies with a total of 225 participants. There was no evidence for improvements in global cognition when cognitive training was compared to control conditions. Observed improvements in attention and verbal memory measures after cognitive training could not be confirmed in a subsequent sensitivity analysis. There was no evidence for benefits in other cognitive domains or quality of life measures. The certainty of the evidence was low for all comparisons.

Conclusions: The effectiveness of cognitive training for people with Parkinson's disease and cognitive impairments remains inconclusive. There is a pressing need for adequately powered trials with higher methodological quality.

Title: Combining Device-Aided Therapies in Parkinson's Disease: A Case Series and a Literature Review

Citation: Movement Disorders Clinical Practice; Jul 2021; vol. 8 (no. 5); p. 750-757 **Author(s):** Boura I.; Giannopoulou I.-A.; Spanaki C.; Haliasos N.; Karabetsos D.

Background: Deep brain stimulation (DBS), levodopa-carbidopa intestinal gel (LCIG) and subcutaneous apomorphine infusion are device-aided therapies (DATs) for advanced Parkinson's disease (PD). We present a case series from the Cretan PD Registry who required 2 DATs for optimal management along with a systematic review of similar studies.

Cases: From 2009 to 2020, we retrospectively studied all PD patients who were simultaneously treated with 2 DATs. Six patients on DBS required an infusion treatment for persisting or re-emergent fluctuations because of disease progression. Two patients on LCIG infusion received DBS as a levodopa-sparing strategy because of drug-induced complications. Fluctuations and quality of life improved in all patients.

Literature review: We identified 4 case series, 1 prospective and 1 retrospective study that included a total of 50 DBS-treated patients who required an infusion therapy. Improvement in motor outcomes, assessed in different ways, was a constant finding.

Conclusion(s): Selected PD patients on 1 DAT may experience additional benefit from a second DAT, for several reasons along the course of their disease. Although infusion therapies optimize dopaminergic drug delivery in fluctuating DBS-treated patients, DBS added on LCIG treatment has an additive symptomatic effect that allows levodopa dose reduction in patients with drug-induced side effects.

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Title: Diagnosis and Management of Pain in Parkinson's Disease: A New Approach.

Citation: Drugs & Aging; Jul 2021; vol. 38 (no. 7); p. 559-577

Author(s): Mylius ; Möller, Jens Carsten; Bohlhalter, Stephan; Ciampi de Andrade, Daniel; Perez Lloret, Santiago

Abstract: Pain is a frequent and disabling non-motor feature of Parkinson's disease (PD). The recently proposed PD Pain Classification System (PD-PCS) allows for an association of pain with PD to be determined before being allocated to the main pain mechanism (i.e. nociceptive, neuropathic, and nociplastic). In this article, previous studies on treatments for pain in PD are summarized according to the pain mechanisms. A mechanistic approach to treatment is discussed. We suggest that the first step should be optimizing dopaminergic therapy before other therapy is started. When these treatments remain unsuccessful, further causes of pain must be considered. The role of drugs, invasive treatments, and physiotherapeutic interventions are discussed with a focus on older PD patients and considering polypharmacy, altered pharmacokinetics, and comorbidities.

Title: Effect of aerobic exercise on functional capacity and quality of life in individuals with Parkinson's disease: A systematic review of randomized controlled trials.

Citation: Archives of Gerontology & Geriatrics; Jul 2021; vol. 95

Author(s): de Oliveira ; Lobato, Daniel Ferreira Moreira; Smaili, Suhaila Mahmoud; Carvalho, Cristiano; Borges, Juliana Bassalobre Carvalho

Abstract:

- Aerobic exercise (AE) can be recommended for individuals with Parkinson's disease.
- AE promotes benefits in gait parameters, mobility, and lower limb muscle strength.
- There was no significant improvement in quality of life with the AE.
- AE on a treadmill or in the form of walking were used most.
- Based on the GRADE approach, the level of synthesized evidence was low to very low.

Objectives: To investigate the effect of aerobic exercise (AE) on functional capacity and quality of life in individuals with Parkinson's disease (PD) in the mild to moderate stages.

Data Sources: Medline, Embase, Web of Science, The Cochrane Library, Lilacs and PEDro were searched from inception until January 2021 using the MeSH terms.

Study Selection: Studies conducted in individuals with PD involving AE compared to a control group were included.

Data extraction: Characteristics of the studies were independently extracted by two reviewers. The PEDro scale was used to assess the methodological quality, and the level of evidence was analyzed and synthesized using the GRADE approach.

Data Synthesis: Of the ten studies, 411 individuals with PD were included. The level of synthesized evidence for cardiorespiratory function was low and without effect, and very low and without effect. For gait was very low and with effect for speed and stride length and without effect for cadence. For mobility was very low and with effect. For muscle strength was very low and with effect for the lower limbs as well as without effect for the upper limbs. For postural balance was very low and without effect. For quality of life was low and without effect.

Conclusion: Aerobic exercise was capable of promoting improvements in gait (walking speed and stride length), mobility, and lower limb muscle strength in individuals with PD in the mild to moderate stages. No significant improvement in quality of life was found due to the practice of AE.

Title: Effects of home-based exercise on motor, non-motor symptoms and healthrelated quality of life in Parkinson's disease patients: A randomized controlled trial.

Citation: Japan Journal of Nursing Science; Jul 2021; vol. 18 (no. 3); p. 1-15

Author(s): Department of Nursing, School of Nursing, College of Medicine, Chung Shan Medical University, Taichung, Taiwan; Megan Lee; Shey-Lin Wu; Hsueh-Hou Ho; Ming-Hong Chang; Hsia-Sui Lin; Tzu-Ting Huang

Aim: To explore the effect of home-based exercise on motor symptoms (MS), non-motor symptoms (NMS), and health-related quality of life (HRQOL) in Parkinson's disease (PD) patients.

Methods: This study was a randomized control trial with a convenience sample of 98 PD patients. Data were collected at baseline and interventions after 4 and 8 weeks. The exercise group was instructed to perform 150 min/week of exercise at home; the control group maintained their regular lifestyle. Questionnaires measured MS, NMS, and HRQOL. We also compare compliance and non-compliance subgroups of the exercise group. The generalized estimating equation (GEE) was used to determine the exercise effect of 120 and 150 min per week after testing for exercise times was at six time points (90-140 min).

Results: The exercise (n = 49) and control groups (n = 49) were homogeneous except for disease stage at baseline. Significant differences were found for depression, HRQOL, motor ability, activity of daily living, and fatigue (p < .000) between the exercise and control groups, and also between the compliance and non-compliance subgroups (p < .05). The GEE revealed that exercising 150 min/week significantly improved HRQOL, depression, motor ability, ADL, fatigue, and sleep quality (p < .05), though not anxiety, and exercising 120 min/week was also effective.

Conclusions: This home-based exercise was effective in improving MS, NMS, and HRQOL. We recommend PD patients to exercise 30-50 min at least three times a week, or 10-15 min per session daily, to accumulate 120-150 min per week.

Title: Effects of music-based movement therapy on motor function, balance, gait, mental health, and quality of life for patients with Parkinson's disease: A systematic review and meta-analysis.

Citation: Clinical Rehabilitation; Jul 2021; vol. 35 (no. 7); p. 937-951 **Author(s):** Zhou ; Zhou, Ruzhen; Wei, Wen; Luan, Rongsheng; Li, Kunpeng

Objective: To conduct a systematic review evaluating the effects of music-based movement therapy on motor function, balance, gait, mental health, and quality of life among individuals with Parkinson's disease.

Data Sources: A systematic search of PubMed, Embase, Cochrane Library, Web of Science, PsycINFO, CINAHL, and Physiotherapy Evidence Database was carried out to identify eligible papers published up to December 10, 2020.

Review Methods: Literature selection, data extraction, and methodological quality assessment were independently performed by two investigators. Publication bias was determined by funnel plot and Egger's regression test. "Trim and fill" analysis was performed to adjust any potential publication bias.

Results: Seventeen studies involving 598 participants were included in this meta-analysis. Music-based movement therapy significantly improved motor function (Unified Parkinson's Disease Rating Scale motor subscale, MD = -5.44, P = 0.002; Timed Up and Go Test, MD = -1.02, P = 0.001), balance (Berg Balance Scale, MD = 2.02, P < 0.001; Mini-Balance Evaluation Systems Test, MD = 2.95, P = 0.001), freezing of gait (MD = -2.35, P = 0.039), walking velocity (MD = 0.18, P < 0.001), and mental health (SMD = -0.38, P = 0.003). However, no significant effects were observed on gait cadence, stride length, and quality of life.

Conclusion: The findings of this study show that music-based movement therapy is an effective treatment approach for improving motor function, balance, freezing of gait, walking velocity, and mental health for patients with Parkinson's disease.

Title: Implementation of an integrated multidisciplinary Movement Disorders Clinic: applying a knowledge translation framework to improve multidisciplinary care.

Citation: Disability & Rehabilitation; Jul 2021; vol. 43 (no. 14); p. 2071-2083 **Author(s):** Shrubsole

Abstract: To evaluate the implementation of an integrated multidisciplinary Movement Disorder Clinic using a model of knowledge translation. A mixed methods design was used

to evaluate implementation outcomes. After recognising poor referral rates to allied health. Movement Disorder Clinic team-members identified implementation barriers. Team- and process-level implementation strategies were designed and tailored to address these barriers. The primary outcome measure was the change in the proportion of patients referred to allied health, determined by comparing pre- and post-implementation documentation audits. Secondary outcome measures included clinician and consumer surveys to identify ongoing implementation barriers and stakeholder satisfaction. Documentation from 90 medical records was included in the audits (post-intervention n = 45). There was a significant improvement in the referral rates to allied health from 53% to 84% (mean improvement 31%, p = 0.003, Fisher's exact test). However, documentation of disease education decreased by 38% (p = 0.000, Fisher's exact test). Movement Disorder Clinic team-members identified three main barriers to ongoing implementation: "memory and automaticity", "environmental context and resources" and "beliefs about capabilities". Thirty-seven consumer surveys were completed, showing high levels of satisfaction (86%) but ongoing educational needs (51%). Implementation of an integrated multidisciplinary Movement Disorder Clinic was facilitated by a knowledge translation framework, leading to improved allied health referral rates and high levels of staff and consumer satisfaction, but unmet educational needs of consumers. Future research in the field of multidisciplinary healthcare for people with movement disorders is needed to determine the impact of these changes on patients' healthcare outcomes. Multidisciplinary integrated healthcare models may lead to better outcomes in progressive diseases such as Parkinson's disease, however, can be challenging to implement. A knowledge translation framework facilitated successful implementation of an integrated multidisciplinary Movement Disorders Clinic, leading to significantly improved rates of appropriate referrals to allied health, and staff and consumer satisfaction. Team-members identified three main barriers to ongoing implementation - "memory and automaticity", "environmental context and resources," and "beliefs about capabilities" - which may impact sustainability and should be considered in future implementation efforts.

Title: Lateralized effects of deep brain stimulation in Parkinson's disease: evidence and controversies.

Citation: NPJ Parkinson's disease; Jul 2021; vol. 7 (no. 1); p. 64 **Author(s):** Lin, Zhengyu; Zhang, Chencheng; Li, Dianyou; Sun, Bomin

Abstract: The bilateral effects of deep brain stimulation (DBS) on motor and non-motor symptoms of Parkinson's disease (PD) have been extensively studied and reviewed. However, the unilateral effects-in particular, the potential lateralized effects of left-versus right-sided DBS-have not been adequately recognized or studied. Here we summarized the current evidence and controversies in the literature regarding the lateralized effects of DBS on motor and non-motor outcomes in PD patients. Publications in English language before February 2021 were obtained from the PubMed database and included if they directly compared the effects of unilateral versus contralateral side DBS on motor or non-motor outcomes in PD. The current literature is overall of low-quality and is biased by various confounders. Researchers have investigated mainly PD patients receiving subthalamic nucleus (STN) DBS while the potential lateralized effects of globus pallidus interna (GPi) DBS have not been adequately studied. Evidence suggests potential lateralized effects of STN DBS on axial motor symptoms and deleterious effects of left-sided DBS on languagerelated functions, in particular, the verbal fluency, in PD. The lateralized DBS effects on appendicular motor symptoms as well as other neurocognitive and neuropsychiatric domains remain inconclusive. Future studies should control for varying methodological approaches as well as clinical and DBS management heterogeneities, including symptom laterality, stimulation parameters, location of active contacts, and lead trajectories. This would

contribute to improved treatment strategies such as personalized target selection, surgical planning, and postoperative management that ultimately benefit patients.

Title: Lessons from the COVID-19 pandemic for improving outpatient neuropalliative care: A qualitative study of patient and caregiver perspectives

Citation: Palliative Medicine; Jul 2021; vol. 35 (no. 7); p. 1258

Author(s): Macchi, Zachary A; Ayele Roman; Dini, Megan; Jensine, Lamira; Katz, Maya; Pantilat, Steven Z; Jones, Jacqueline; Kluger, Benzi M

Background: COVID-19 has impacted persons with serious illness, including those with chronic, neurodegenerative conditions. While there are several reports on COVID-19's impact on inpatient palliative care, literature is limited about the impact on outpatient care which may be more relevant for these patients.

Aim: To generate a person-centered description of the impact of COVID-19 from the perspectives of patients living with neurodegenerative disease and caregivers to improve outpatient palliative care delivery.

Design: This qualitative study used rapid analysis via matrix design to identify emergent themes related to participant perspectives on the challenges of COVID-19. Data sources included semi-structured interviews, open-ended survey responses, medical record documentation and participant-researcher communications.

Setting/Participants: Data was collected from 108 patients with Parkinson's disease, Alzheimer's disease or related disorders and 90 caregivers enrolled in a multicenter, clinical trial of community-based, outpatient palliative care between March 20, 2020 and August 8, 2020 (NCT03076671).

Results: Four main themes emerged: (1) disruptions to delivery of healthcare and other supportive services; (2) increased symptomatic and psychosocial needs; (3) increased caregiver burden; (4) limitations of telecommunications when compared to in-person contact. We observed that these themes interacted and intersected.

Conclusions: Patients and caregivers have unmet care needs because of the pandemic, exacerbated by social isolation. While telemedicine has helped improve access to healthcare, patients and caregivers perceive clear limitations compared to in-person services. Changes in society and healthcare delivery in response to COVID-19 highlight ongoing and novel gaps that must be addressed to optimize future outpatient palliative care for neurologic illness.

Title: Long-term Outcomes (15 Years) After Subthalamic Nucleus Deep Brain Stimulation in Patients With Parkinson Disease.

Citation: Neurology; Jul 2021; vol. 97 (no. 3); p. 112-112

Author(s): Bove ; Mulas, Delia; Cavallieri, Francesco; Castrioto, Anna; Chabardès, Stephan; Meoni, Sara; Schmitt, Emmanuelle; Bichon, Amélie; Di Stasio, Enrico; Kistner, Andrea; Pélissier, Pierre; Chevrier, Eric; Seigneuret, Eric; Krack, Paul; Fraix, Valerie; Moro, Elena

Objective: To evaluate the effects of deep brain stimulation of the subthalamic nucleus (STN-DBS) in Parkinson disease (PD) patients on motor complications beyond 15 years after surgery.

Methods: Data about motor complications, quality of life (QoL), activities of daily living, the UPDRS motor scores, dopaminergic treatment, stimulation parameters, and side effects of STN-DBS were retrospectively retrieved and compared between before surgery, at 1 year and beyond 15 years after bilateral STN-DBS.

Results: Fifty-one patients with 17.06 \pm 2.18 years STN-DBS follow-up were recruited. Compared to baseline, the time spent with dyskinesia and the time spent in the off state were reduced by 75% (p<0.001) and by 58.7% (p<0.001), respectively. Moreover, dopaminergic drugs were reduced by 50.6% (p<0.001). The PDQL total score, and the emotional function and social function domains improved of 13.8% (p=0.005), 13.6% (p=0.01) and 29.9% (p<0.001), respectively. Few and mostly manageable device-related adverse events were observed during the follow-up.

Conclusions: STN-DBS is still effective beyond 15 years from the intervention, notably with significant improvement in motor complications and stable reduction of dopaminergic drugs. Furthermore, despite the natural continuous progression of PD with worsening of levodoparesistant motor and non-motor symptoms over the years, STN-DBS patients could maintain an improvement in QoL.

Classification Of Evidence: This study provides Class IV evidence that, for patients with PD, STN-DBS remains effective at treating motor complications 15 years after surgery.

Title: Mild and marked executive dysfunction and falls in people with Parkinson's disease.

Citation: Brazilian Journal of Physical Therapy; Jul 2021; vol. 25 (no. 4); p. 437-443 **Author(s):** Pelicioni ; Menant, Jasmine C.; Henderson, Emily J.; Latt, Mark D.; Brodie, Matthew A.; Lord, Stephen R.

Abstract:

• People with PD with executive dysfunction have multiple motor, sensory, and balance impairments

• Executive dysfunction is an independent risk factor for falls in people with PD

 Balance and executive function interventions may prevent falls in people with PD Executive dysfunction and risk of falling are hallmarks of Parkinson's disease (PD). However, it is unclear how executive dysfunction predisposes people with PD to falling. To: (i) identify sensorimotor, balance, and cardiovascular risk factors for falls that discriminate between those with normal executive function and those with mild and marked executive dysfunction in people with PD and (ii) determine whether mild and marked executive dysfunction are significant risk factors for falls when adjusting for PD duration and severity and freezing of gait (FOG). Using the Frontal Assessment Battery, 243 participants were classified into normal executive function (n = 87), mild executive dysfunction (n = 100), and marked executive dysfunction (n = 56) groups. Participants were asked if they had episodes of FOG in the last month and were assessed with the Movement Disorders Society - Unified Parkinson's Disease Rating Scale (MDS-UPDRS), the Hoehn and Yahr Scale, the physiological profile assessment, and tests of orthostatic hypotension, coordinated stability, and gait and were then followed-up prospectively for falls for 32-52 weeks. Several PDspecific (elevated Hoehn and Yahr stage, higher MDS-UPDRS scale scores, a history of FOG, Postural Instability and Gait Difficulty subtype, and longer PD duration), sensorimotor (poor vision, knee extension weakness, slow simple reaction time), and balance (greater postural sway and poor controlled leaning balance) factors discriminated among the normal executive function and mild and marked executive dysfunction groups. Fall rates (mean ± SD) differed significantly among the groups (normal executive function: 1.0 ± 1.7; mild

executive dysfunction: 2.8 ± 5.2 ; marked executive dysfunction: 4.7 ± 7.3) with the presence of both mild and marked executive dysfunction identified as significant risk factors for falls when adjusting for three measures of PD severity (Hoehn and Yahr scale scores, disease duration, and FOG). Several PD-specific, sensorimotor, and balance factors differed significantly among the normal, mild, and marked executive dysfunction groups and both mild and marked executive dysfunction were identified as independent risk factors for falls in people with PD.

Title: Multiculturalism: A Challenge for Cognitive Screeners in Parkinson's Disease

Citation: Movement Disorders Clinical Practice; Jul 2021; vol. 8 (no. 5); p. 733-742 **Author(s):** Statucka M.; Fasano A.; Munhoz R.P.; Cohn M.; Cherian K.

Background: The Montreal Cognitive Assessment (MoCA) and the Dementia Rating Scale-2 (DRS-2) are recommended screeners for Parkinson's disease mild cognitive impairment (PD-MCI). Cross-cultural studies examining their diagnostic precision have not addressed cultural bias in a multicultural setting.

Objective(s): To compare DRS-2 and MoCA performance between patients born in Canada, the USA, and the UK (Anglosphere group) and immigrant patients born elsewhere (International group). To identify sources of cultural bias by comparing group characteristics, and by assessing the relationships between performance and immigration and socio-development variables. To examine the diagnostic precision of both tools in detecting PD-MCI in each group.

Method(s): We conducted a clinical chart review of advanced PD patients who completed cognitive screeners (MoCA: n = 288, 30% International group; DRS-2: n = 426, 31% International group). All completed a comprehensive neuropsychological assessment to apply Level II PD-MCI diagnostic criteria.

Result(s): The International group performed worse than the Anglosphere group on the MoCA and DRS-2, and the only variable that accounted for some of the group difference was the Historical Index of Human Development, a societal variable, which fully mediated the group effect on the DRS-2. Diagnostic precision of the MoCA was at chance level in the International group, and was poorer than that of the DRS-II in this group and that of the MoCA in the Anglosphere group, although these were considered poor.

Conclusion(s): Our results support the recommendation to exert caution in using cognitive screeners to capture PD-MCI in all patients and particularly with first generation immigrants. Copyright © 2021 International Parkinson and Movement Disorder Society

Title: Neurodegenerative disorders and gut-brain interactions.

Citation: Journal of Clinical Investigation; Jul 2021; vol. 131 (no. 13); p. 1-12 **Author(s):** Singh ; Dawson, Ted M.; Kulkarni, Subhash

Abstract: Neurodegenerative disorders (NDs) affect essential functions not only in the CNS, but also cause persistent gut dysfunctions, suggesting that they have an impact on both CNS and gut-innervating neurons. Although the CNS biology of NDs continues to be well studied, how gut-innervating neurons, including those that connect the gut to the brain, are affected by or involved in the etiology of these debilitating and progressive disorders has been understudied. Studies in recent years have shown how CNS and gut biology, aided by the gut-brain connecting neurons, modulate each other's functions. These studies

underscore the importance of exploring the gut-innervating and gut-brain connecting neurons of the CNS and gut function in health, as well as the etiology and progression of dysfunction in NDs. In this Review, we discuss our current understanding of how the various gut-innervating neurons and gut physiology are involved in the etiology of NDs, including Parkinson's disease, Alzheimer's disease, Huntington's disease, and amyotrophic lateral sclerosis, to cause progressive CNS and persistent gut dysfunction.

Title: The effect of body weight-supported overground gait training for patients with Parkinson's disease: A retrospective case control observational study

Citation: PLoS ONE; Jul 2021; vol. 16 (no. 7)

Author(s): Koyanagi Y.; Suzuki K.; Oda N.; Aita T.; Seki H.; Fukushi I.; Nakamura M.

Objective: To evaluate the effects of body weight-supported overground gait training (BWSOGT) on motor abilities, such as gait and balance, in patients with Parkinson's disease (PD).

Design: Retrospective case-controlled observational study with a 4-week follow-up.

Setting: Inpatient rehabilitation.

Participants: We selected 37 of 68 patients with PD. Inclusion criteria were (1) Hoehn & Yahr stage II-IV, (2) no medication adjustment during the study period, (3) at least 1 week since last medication adjustment, and (4) ability to walk more than 10 meters on their own. Exclusion criteria were (1) cerebrovascular disease or other complications affecting movement, (2) difficulty in measurement, (3) early discharge, (4) medication change during the study, and (5) development of complications.

Interventions: Patients were divided into two groups. Patients in Group I underwent 20 minutes of BWSOGT with a mobile hoist in addition to the standard exercises; Group II performed 20 minutes of gait training in place of BWSOGT. In both groups, training was performed for a total of 15 times/4 weeks.

Main outcome measure(s): Participants were evaluated using the Unified Parkinson's Disease Rating Scale total, part II, and part III; 10-m walk test; velocity; stride length; 6-minute walk test; timed up and go test; Berg Balance Scale; and freezing of gait before and after the intervention.

Results: There were significant decreases in the Unified Parkinson's Disease Rating Scale total, part II, and part III in both groups; however, 6-minute walk test, timed up and go test, and freezing of gait results only improved in Group I.

Conclusions: BWSOGT for patients with PD improves gait ability and dynamic balance more than standard gait training.

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Title: The effect of deep brain stimulation of the subthalamic nucleus on language function in parkinson's disease: A systematic review

Citation: Journal of Speech, Language, and Hearing Research; Jul 2021; vol. 64 (no. 7); p. 2794-2810

Author(s): Vos S.H.; Kessels R.P.C.; Piai V.; Vinke R.S.; Esselink R.A.J.

Purpose: This systematic review focuses on the effect of bilateral deep brain stimulation (DBS) of the subthalamic nucleus (STN) on language function in Parkinson's disease (PD). It fills an important gap in recent reviews by considering other language tasks in addition to verbal fluency.

Method(s): We critically and systematically reviewed the literature on studies that investigated the effect of bilateral STN-DBS on language function in PD. All studies included a matched PD control group who were on best medical treatment, with language testing at similar baseline and follow-up intervals as the DBS PD group.

Result(s): Thirteen identified studies included a form of a verbal fluency task, seven studies included picture naming, and only two studies included more language-oriented tasks. We found that verbal fluency was negatively affected after DBS, whereas picture naming was unaffected. Studies investigating individual change patterns using reliable change indices showed that individual variability is larger for picture naming than for verbal fluency.

Conclusion(s): Verbal fluency is the most frequently investigated aspect of language function. Our analysis showed a pattern of decline in verbal fluency across multiple studies after STN-DBS, whereas picture naming was unaffected. Data on more language-oriented tests in a large DBS sample and best medical treatment control group are sparse. The investigation of language function in PD after DBS requires sensitive language tests (with and without time pressure) and experimental designs as used in the studies reviewed here. Reliable change index statistics are a promising tool for investigating individual differences in performance after DBS.

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Title: The effects of bright light therapy on depression and sleep disturbances in patients with Parkinson's disease: a systematic review and meta-analysis of randomized controlled trials.

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Author(s): Lin ; Su, Yixiao; Weng, Yanhong; Lin, Xiaofeng; Weng, Huidan; Cai, Guofa; Cai, Guoen

Background: Depression and sleep disturbance are well-recognized non-motor features in patients with Parkinson's disease (PD). This meta-analysis aimed to explore the potential role of bright light therapy (BLT) in depression and sleep disturbances in Parkinson's Disease (PD).

Methods: Four databases were independently searched by two reviewers: PubMed, Cochrane, Web of Science and Embase until February 2021. We evaluated the following depression related scales: Beck's Depression Inventory (BDI); the Geriatric Depression Rating Scale, 30-item (GDS-30); the Hamilton Depression Rating Scale (HDRS); the Hospital Anxiety and Depression Scale (HADS); the Epworth sleepiness scale (ESS); the Fatigue Severity Scale (FSS); the Pittsburgh sleep quality index (PSQI); the Parkinson's disease sleep scale (PDSS); Scales for Outcomes in Parkinson's disease Sleep Scale (SCOPA) and the Insomnia severity index (ISI) to access the effects of bright light therapy on depression and sleep disturbances in patients with PD. Effect size (standardized mean deviation [SMD] and 95% confidence interval [CI]) were used to analyze the continuous results data of intervention group and control light group. Data from five randomized, controlled trials totaling 173 patients with PD was included.

Results: BLT significantly improved depression symptoms (BDI, GDS-30, HDRS and HADS) of PD patients (0.34, 95% CI = 0.06-0.61). Insomnia symptoms (SCOPA and ISI) for

patients with PD were significantly improved by BLT as well (1.15, 95% CI = 0.71-1.60). Whereas, no difference was observed in the control light group in improving the depression or insomnia symptoms of PD patients.

Conclusion: BLT is an effective intervention for improving depressive symptoms and sleep disturbances in patients with PD.

Title: Virtual Reality Intervention to Help Improve Motor Function in Patients Undergoing Rehabilitation for Cerebral Palsy, Parkinson's Disease, or Stroke: A Systematic Review of Randomized Controlled Trials.

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Abstract: There are many successful interventions in medicine. especially in neurology and rehabilitation. The neurosciences represent an area of medicine with tremendous recent research innovations, one of which is virtual reality. This paper aims to discover the powerful relationship between virtual reality and rehabilitation. We assessed the effectiveness of virtual reality-based rehabilitation compared to conventional rehabilitation on motor function recovery of three patient groups: patients with a diagnosis of cerebral palsy, Parkinson's disease, or stroke. We conducted a systematic review using PubMed and included only articles that were randomized controlled trials that were published in the last five years. We used a general search in combination with a more focused Medical Subject Headings (MeSH) search. After thorough assessment and risk of bias evaluation using the Cochrane risk of bias tool, we included thirteen studies in this review. The majority of the clinical trials showed a statistically significant effect for improved motor function. More specifically, improvements in upper extremity motor function, gait, and balance in patients diagnosed with stroke were seen. Similarly, when evaluating patients with Parkinson's disease, improved gait and posture were also seen. When it came to cerebral palsy, however, there were no significant differences between the experimental group and the control. The level of improvement in motor function with a virtual reality intervention was striking, particularly since a few studies demonstrated sustained motor improvement a few months post-trial as well. Virtual reality-based rehabilitation has promising results for adult patients diagnosed with stroke or Parkinson's disease. For pediatric patients, on the other hand, a larger number of clinical trials would still need to be conducted to validate if virtual reality interventions have the capability of providing improved motor function recovery.

Sources Used:

The following databases are used in the creation of this bulletin: CINAHL, Medline EMCARE and BNI.

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