Parkinson's Disease
Current Awareness Bulletin

June 2021

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Title: Are mobile persons with parkinson disease necessarily more active?

Author(s): Zajac J.A.; Baker T.; Deangelis T.R.; Nordahl T.; Ellis T.D.; Fulford D.; Cavanaugh J.T.; Colon-Semenza C.; Duncan R.P.; Rawson K.S.; Earhart G.M.; Lavalley M.; Saint-Hilaire M.; Thomas C.A.

Background and Purpose: Walking activity in persons with Parkinson disease (PD) is important for preventing functional decline. The contribution of walking activity to home and community mobility in PD is poorly understood.

Method(s): Cross-sectional baseline data (N = 69) were analyzed from a randomized controlled PD trial. The Life-Space Assessment (LSA) quantified the extent, frequency, and independence across 5 expanding levels of home and community mobility, producing individual subscores and a total score. Two additional summed scores were used to represent mobility within (Levels 1-3) and beyond (Levels 4-5) neighborhood limits. An accelerometer measured walking activity for 7 days. Regression and correlation analyses evaluated relationships between daily steps and mobility scores. Mann-Whitney U tests secondarily compared differences in mobility scores between the active and sedentary groups.

Result(s): Walking activity contributed significantly to the summed Level 1-3 score (beta = 0.001, P = 0.004) but not to the summed Level 4-5 (beta = 0.001, P = 0.33) or total (beta = 0.002, P = 0.07) scores. Walking activity was significantly related to Level 1 (rho = 0.336, P = 0.005), Level 2 (rho = 0.307, P = 0.010), and Level 3 (rho = 0.314, P = 0.009) subscores. Only the summed Level 1-3 score (P = 0.030) was significantly different between the active and sedentary groups.

Discussion and Conclusion(s): Persons with PD who demonstrated greater mobility beyond the neighborhood were not necessarily more active; walking activity contributed more so to home and neighborhood mobility. Compared with LSA total score, the Level 1-3 summed score may be a more useful participation-level measure for assessing the impact of changes in walking activity. Copyright © 2021 Academy of Neurologic Physical Therapy.

Title: Basic Tips: How Do I Start Programming Deep Brain Stimulation in Parkinson Disease Patients?

Author(s): Gorodetsky C.; Fasano A.

Abstract: Deep brain stimulation (DBS) has become an integral component of Parkinson disease treatment. Programming a DBS device is a time-consuming process and requires a highly trained specialist to obtain optimal results. During the last few years, we have witnessed a rapid technological advance of DBS systems, making the programming process even more complex and emphasizing the need for a structured approach. In this manuscript and the attached videos, we will demonstrate a step-by-step programming approach for DBS targeting the subthalamus and the globus pallidus pars Interna. In doing so we will show the main features and differences of the three main systems available on the market, including the newest ones able to record braingenerated local field potentials for clinical applications. Copyright © 2021 International Parkinson and Movement Disorder Society

Title: Calidad de sueno, trastorno conductual del sueno MOR y somnolencia diurna en adultos con y sin ParkinsonSleep quality, REM sleep behavior disorder and daytime sleepiness in adults with and without Parkinson's

Author(s): Andrea D.-P.; Jesus M.-E.

Abstract: In Parkinson's disease (PD), poor sleep quality and sleep disorders are central part of the non-motor symptoms. The aim was to compare sleep quality (SQ), REM sleep behavior disorder (RBD) and excessive daytime sleepiness (EDS) among adults with and without Parkinson's disease (PD). A second objective was to know the relationship of SQ and RBD with EDS in patients with PD. Method. Sixty adults (38% women, mean age 66.7+/-8.11 years), 50% with PD diagnosis and 50% healthy controls, Instruments: Epworth Sleepiness Scale, Sleep Quality Pittsburgh Index and REM Behavioral Disorder Sleep Questionnaire, which was designed for this study. Results. Differences were found in SQ (PD = 9.90 +/-4.47 vs Control group = 7.23 +/-4.71, t = 2.25, p = .028), and the percentage of cases with symptoms of RBD (PD = 30%, control group = 6.7%, ji2 = 5.455, p = .020). No differences were found in EDS (PD = 7.43 +/-5.46 vs Control group = 6.50 +/-5.28, t = .673, p = .504). According to the linear regression analysis, the increase in EDS was not associated with SQ, EDS was only associated with RBD. Conclusion, the PD group presents a poor sleep quality and a higher prevalence of RBD symptoms. EDS did not differ between adults with and without PD. However, RBD was associated with an increase in EDS in the PD group.Copyright © 2021 Instituto Nacional de Neurologia y Neurocirurgia. All rights reserved.

Title: Cognitive Impairment in Parkinson's Disease: Epidemiology, Clinical Profile, Protective and Risk Factors.

Author(s): Gonzalez-Latapi, Paulina; Bayram, Ece; Litvan, Irene; Marras, Connie

Abstract: Cognitive impairment is a common non-motor symptom in Parkinson's Disease (PD) and an important source of patient disability and caregiver burden. The timing, profile and rate of cognitive decline varies widely among individuals with PD and can range from normal cognition to mild cognitive impairment (PD-MCI) and dementia (PDD). Beta-amyloid and tau brain accumulation, oxidative stress and neuroinflammation are reported risk factors for cognitive impairment. Traumatic brain injury and pesticide and tobacco exposure have also been described. Genetic risk factors including genes such as COMT, APOE, MAPT and BDNF may also play a role. Less is known about protective factors, although the Mediterranean diet and exercise may fall in this category. Nonetheless, there is conflicting evidence for most of the factors that have been studied. The use of inconsistent criteria and lack of comprehensive assessment in many studies are important methodological issues. Timing of exposure also plays a crucial role, although identification of the correct time window has been historically difficult in PD. Our understanding of the mechanism behind these factors, as well as the interactions between gene and environment as determinants of disease phenotype and the identification of modifiable risk factors will be paramount, as this will allow for potential interventions even in established PD.

Title: Current Knowledge on the Evolution of Care Partner Burden, Needs, and Coping in Parkinson's Disease

Author(s): Hulshoff M.J.; Book E.; Dahodwala N.; Tanner C.M.; Robertson C.; Marras C.

Background: Care partners support people with Parkinson's disease through a long journey ranging from independence to dependence for many daily tasks. Longitudinal studies are important to understand the evolution of this process and predictors of future needs of care partners.

Method(s): A scoping review was conducted, searching PubMed for longitudinal studies examining care partner burden, needs or coping in Parkinson's disease published through May 2020.

Result(s): Eight observational studies and 19 interventional studies met the eligibility criteria. Longitudinal observation ranged from 7 weeks to 10 years, involving between six and 8515 care partners. All studies addressed care partner burden, while two and three studies respectively addressed needs and coping. Only one study related burden to specific stages or duration of disease. Results from identified studies show that care partners in Parkinson's disease are at risk for increasing burden over time. Multiple predictors of future burden have been identified related to the person with Parkinson's disease, the care partner, or an intervention. No studies examined the evolution of needs and coping in caregiving in Parkinson's disease.

Conclusion(s): The scarcity of longer term, observational research on the temporal evolution of burden and particularly needs and coping in caregiving for someone with PD is a main identified gap. Even within these observational studies, the impact of caregiving is not often reported. Longitudinal studies on these topics are needed to help understand their change over time and relation to each other, which can inform support planning for care partners. Copyright © 2021 International Parkinson and Movement Disorder Society

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Title: Dance as Lifeline: Transforming Means for Engagement and Connection in Times of Social Isolation

Author(s): Portman, Kelly Maria; Leventhal, David

Abstract: Over the past 20 years, dance has emerged as a safe, effective, and evidence-based community intervention that helps thousands of people living with Parkinson's disease around the globe maintain well-being and improve quality of life. From its initial emergence to the present, COVID-19 has posed fundamental challenges to people living with Parkinson's, forcing them to balance the need and desire to stay active and socially connected with the requirement to adhere to strict shelter-at-home orders. As cities and towns worldwide began shutting down in early 2020, people living with Parkinson's found themselves unable to access live dance activities that had provided consistent, reliable physical support; joyful cognitive stimulation; emotional connection; and social engagement. Government sanctioned closures and stay-at-home orders increased the potential for apathy, isolation, anxiety, and stress—factors that are already heightened in people with Parkinson's. COVID-19 also exacerbated disparities based on race, language, socioeconomic background, and age, inequities already present in the Parkinson's community and in Parkinson's-focused dance programming. In this article, the authors

provide a description and analysis of ways one dance for Parkinson's program addressed multiples challenges through three key initiatives: online group classes in English and Spanish, telephone-based resources for people without internet access, and robust online training opportunities for teaching artists. The authors outline ways in which the pandemic has increased the inclusive nature of dance for Parkinson's programming and suggest that changes implemented during the pandemic will permanently alter program delivery for the better when it is safe to restore group classes in community settings.

Title: Exploring Nonmotor Neuropsychiatric Manifestations of Parkinson Disease in a Comprehensive Care Setting

Author(s): Dhingra A.; Janjua A.U.; Hack L.; Waserstein G.; Palanci J.; Hermida A.P.

Abstract: Parkinson disease (PD) is a debilitating neurological condition that includes both motor symptoms and nonmotor symptoms (NMS). Psychiatric complaints comprise NMS and are collectively referred to as neuropsychiatric manifestations. Common findings include atypical depressive symptoms, anxiety, psychosis, impulse control disorder, deterioration of cognition, and sleep disturbances. Quality of life (QoL) of patients suffering from NMS is greatly impacted and many times can be more debilitating than motor symptoms of PD. We expand on knowledge gained from treatment models within a comprehensive care model that incorporates multidisciplinary specialists working alongside psychiatrists to treat PD. Insight into background, clinical presentations, and treatment options for patients suffering from neuropsychiatric manifestations of PD are discussed. Identifying symptoms early can help improve QoL, provide early symptom relief, and can assist tailoring treatment plans that limit neuropsychiatric manifestations. Copyright © The Author(s) 2020.

Title: Exploring the acoustic perceptual relationship of speech in parkinson's disease

Author(s): Chiu Y.-F.; Neel A.; Loux T.

Purpose: Auditory perceptual judgments are commonly used to diagnose dysarthria and assess treatment progress. The purpose of the study was to examine the acoustic underpinnings of perceptual speech abnormalities in individuals with Parkinson's disease (PD).
Method(s): Auditory perceptual judgments were obtained from sentences produced by 13 speakers with PD and five healthy older adults. Twenty young listeners rated overall ease of understanding, articulatory precision, voice quality, and prosodic adequacy on a visual analog scale. Acoustic measures associated with the speech subsystems of articulation, phonation, and prosody were obtained, including second formant transitions, articulation rate, cepstral and spectral measures of voice, and pitch variations. Regression analyses were performed to assess the relationships between perceptual judgments and acoustic variables.
Result(s): Perceptual impressions of Parkinsonian speech were related to combinations of several acoustic variables. Approximately 36%-49% of the variance in the perceptual ratings

were explained by the acoustic measures indicating a modest acoustic perceptual relationship.

Conclusion(s): The relationships between perceptual ratings and acoustic signals in Parkinsonian speech are multifactorial and involve a variety of acoustic features simultaneously. The modest acoustic perceptual relationships, however, suggest that future work is needed to further examine the acoustic bases of perceptual judgments in dysarthria. Copyright © 2021 American Speech-Language-Hearing Association.

Title: Factors Associated with Health-Related Quality of Life in Late-Stage Parkinson's Disease

Author(s): Rosqvist K.; Odin P.; Lorenzl S.; Meissner W.G.; Bloem B.R.; Ferreira J.J.; Dodel R.; Schrag A.

Background: There is limited knowledge on health-related quality of life (HRQoL) in late-stage Parkinson's disease (PD). Objective(s): To assess factors associated with HRQoL in patients with late-stage PD, with a focus on health care provision.

Method(s): The Care of Late Stage Parkinsonism (CLaSP) project is the largest study on late-stage PD to date. The current study analyzed data of 401 patients from 6 European countries in whom HRQoL was assessed with the 8-item PD Questionnaire in patients without dementia. Factors potentially associated with HRQoL were assessed and examined in linear regression analyses.

Result(s): Better HRQoL was associated with living at home, greater independence in activities of daily living (Schwab and England Scale), less severe disease (Hoehn and Yahr stage), better motor function (Unified PD Rating Scale Part III), and lower non-motor symptoms burden (Non-Motor Symptoms Scale [NMSS]) across all NMSS domains. Having a PDspecialist as physician for PD, contact with a PDnurse, and no hospital admission during the past 3 months were associated with better HRQoL, but having seen a physiotherapist or occupational therapist was associated with worse HRQoL.

Conclusion(s): The results emphasize the importance of optimizing treatment for motor and multiple non-motor symptoms to improve HRQoL in patients with late-stage PD. PD-specific health care resources, particularly PDnurses, are likely important in addressing issues to improve HRQoL in this population. Worse HRQoL in those who had recently seen a physiotherapist or occupational therapist may reflect referral based on factors not measured in this study.
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Title: Healthy communication partners modify their speech when conversing with individuals with Parkinson's disease

Author(s): Lubold N.; Berisha V.; Willi M.M.; Borrie S.A.; Barrett T.S.

Purpose: For individuals with Parkinson's disease (PD), conversational interactions can be challenging. Efforts to improve the success of these interactions have largely fallen on the individual with PD. Successful communication, however, involves contributions from both the

individual with PD and their communication partner. The current study examines whether healthy communication partners naturally engage in different acoustic-prosodic behavior (speech compensations) when conversing with an individual with PD and, further, whether such behavior aids communication success.

Method(s): Measures of articulatory precision, speaking rate, and pitch variability were extracted from the speech of healthy speakers engaged in goal-directed dialogue with other healthy speakers (healthy-healthy dyads) and with individuals with PD (healthy-PD dyads). Speech compensations, operationally defined as significant differences in healthy speakers' acoustic-prosodic behavior in healthy-healthy dyads versus healthy-PD dyads, were calculated for the three speech behaviors. Finally, the relationships between speech behaviors and an objective measure of communicative efficiency were examined.

Result(s): Healthy speakers engaged in speech characterized by greater articulatory precision and slower speaking rate when conversing with individuals with PD relative to conversations with other healthy individuals. However, these adaptive speech compensations were not predictive of communicative efficiency.

Conclusion(s): Evidence that healthy speakers naturally engage in speech compensations when conversing with individuals with PD is novel, yet consistent with findings from studies with other populations in which conversation can be challenging. In the case of PD, these compensatory behaviors did not support communication outcomes. While preliminary in nature, the results raise important questions regarding the speech behavior of healthy communication partners and provide directions for future work. Copyright © 2021 American Speech-Language-Hearing Association.

Title: Impaired Touchscreen Skills in Parkinson's Disease and Effects of Medication

Author(s): De Vleeschhauwer J.; Broeder S.; Nieuwboer A.; Nackaerts E.; Janssens L.; Heremans E.

Background: Deficits in fine motor skills may impair device manipulation including touchscreens in people with Parkinson's disease (PD). Objective(s): To investigate the impact of PD and anti-parkinsonian medication on the ability to use touchscreens.

Method(s): Twelve PD patients (H&Y II-III), OFF and ON medication, and 12 healthy controls (HC) performed tapping, single and multi-direction sliding tasks on a touchscreen and a mobile phone task (MPT). Task performance was compared between patients (PD-OFF, PD-ON) and HC and between medication conditions.

Result(s): Significant differences were found in touchscreen timing parameters, while accuracy was comparable between groups. PD-OFF needed more time than HC to perform single ($P = 0.048$) and multi-direction ($P = 0.004$) sliding tasks and to grab the dot before sliding (i.e., transition times) ($P = 0.040$; $P = 0.004$). For tapping, dopaminergic medication significantly increased performance times ($P = 0.046$) to comparable levels as those of HC. However, for the more complex multi-direction sliding, movement times remained slower in PD than HC irrespective of medication intake ($P < 0.050$ during ON and OFF). The transition times for the multi-direction sliding task was also higher in PD-ON than HC ($P = 0.048$). Touchscreen parameters significantly correlated with MPT performance, supporting the ecological validity of the touchscreen tool.

Conclusion(s): PD patients show motor problems when manipulating touchscreens, even when optimally medicated. This hinders using mobile technology in daily life and has implications for developing adequate E-health applications for this group. Future work needs

to establish whether touchscreen training is effective in PD. Copyright © 2021 International Parkinson and Movement Disorder Society

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Title: Incidence and Progression of Rapid Eye Movement Behavior Disorder in Early Parkinson's Disease

Author(s): Zimansky L.; Trenkwalder C.; Muntean M.-L.; Mollenhauer B.; Sixel-Doring F.; Leha A.

Background: Rapid eye movement (REM) sleep behavior disorder (RBD) is associated with neurodegenerative diseases; however, few longitudinal studies assess the individual evolution of RBD and REM sleep without atonia (RWA) in Parkinson's disease (PD).

Objective(s): We aimed to evaluate RBD and RWA changes over time as well as potentially influential factors. Method(s): RBD and RWA were analyzed using video-supported polysomnography (vPSG) in initially de novo PD patients at baseline and every 2 years for a total of 6 years. The influence of time, age, sex, levodopa equivalent daily dose (LEDD), unified Parkinson's disease rating scale (UPDRS) sum scores, benzodiazepine intake, Mini-Mental State Examination (MMSE) total scores, and dyskinesia on RWA were investigated using mixed-effect models to account for intra-individual correlations.

Result(s): After 6 years, vPSG data were available from 98 of the initial 159 de novo PD patients. RBD prevalence increased from 25% at baseline to 52%. Of the 31 PD patients with RBD and valid vPSGs at all time-points, RWA increased from an average of 19% at baseline to 41% at 6-year follow-up modeled to grow by 29.7% every 2 years ($P < 0.001$). Time was an independent factor ($P < 0.001$) for RWA increase. Age was an independent factor influencing RWA increase ($P = 0.04$). Sex, LEDD, UPDRS sum scores, benzodiazepines, MMSE total scores, and dyskinesia did not have any significant influence.

Conclusion(s): RBD and RWA increased significantly over time in PD; time and age were independent factors in a prospective cohort. RBD and RWA can be considered PD progression markers. Copyright © 2021 The Authors. Movement Disorders Clinical Practice published by Wiley Periodicals LLC. on behalf of International Parkinson and Movement Disorder Society.

Title: Machine Learning for the Diagnosis of Parkinson's Disease: A Review of Literature

Author(s): Mei J.; Frasnelli J.; Desrosiers C.

Abstract: Diagnosis of Parkinson's disease (PD) is commonly based on medical observations and assessment of clinical signs, including the characterization of a variety of motor symptoms. However, traditional diagnostic approaches may suffer from subjectivity as they rely on the evaluation of movements that are sometimes subtle to human eyes and therefore difficult to classify, leading to possible misclassification. In the meantime, early non-motor symptoms of PD may be mild and can be caused by many other conditions. Therefore, these symptoms are often overlooked, making diagnosis of PD at an early stage challenging. To address these difficulties and to refine the diagnosis and assessment procedures of PD, machine learning methods have been implemented for the classification of PD and healthy controls or patients with similar clinical presentations (e.g., movement

disorders or other Parkinsonian syndromes). To provide a comprehensive overview of data modalities and machine learning methods that have been used in the diagnosis and differential diagnosis of PD, in this study, we conducted a literature review of studies published until February 14, 2020, using the PubMed and IEEE Xplore databases. A total of 209 studies were included, extracted for relevant information and presented in this review, with an investigation of their aims, sources of data, types of data, machine learning methods and associated outcomes. These studies demonstrate a high potential for adaptation of machine learning methods and novel biomarkers in clinical decision making, leading to increasingly systematic, informed diagnosis of PD.© Copyright © 2021 Mei, Desrosiers and Frasnelli.

Title: Occupational therapy interventions for instrumental activities of daily living for adultswith parkinson's disease: A systematic review

Citation: American Journal of Occupational Therapy; May 2021; vol. 75 (no. 3)
Author(s): Foster E.R.; Carson L.G.; Archer J.; Hunter E.G.

Importance: Instrumental activities of daily living (IADLs) are important for independence, safety, and productivity, and people with Parkinson's disease (PD) can experience IADL limitations. Occupational therapy practitioners should address IADLs with their clients with PD. Objective(s): To systematically review the evidence for the effectiveness of occupational therapy interventions to improve or maintain IADL function in adults with PD.

Data Sources: MEDLINE, CINAHL, PsycINFO, OTseeker, and Cochrane databases from January 2011 to December 2018. Study Selection and Data Collection: Primary inclusion criteria were peer-reviewed journal articles describing Level 1-3 studies that tested the effect of an intervention within the scope of occupational therapy on an IADL outcome in people with PD. Three reviewers assessed records for inclusion, quality, and validity following Cochrane Collaboration and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Finding(s): Twenty-two studies met the inclusion criteria and were categorized into four themes on the basis of primary focus or type of intervention: Physical activity, specific IADL-focused, cognitive rehabilitation, and individualized occupational therapy interventions. There were 9 Level 1b, 9 Level 2b, and 4 Level 3b studies. Strong strength of evidence was found for the beneficial effect of occupational therapy-related interventions for physical activity levels and handwriting, moderate strength of evidence for IADL participation and medication adherence, and low strength of evidence for cognitive rehabilitation.

Conclusions and Relevance: Occupational therapy interventions can improve health management and maintenance (i.e., physical activity levels, medication management), handwriting, and IADL participation for people with PD. Further research is needed on cognitive rehabilitation. This review is limited by the small number of studies that specifically addressed IADL function in treatment and as an outcome. Copyright © 2021 American Occupational Therapy Association, Inc. All rights reserved.

Title: Parkinson's disease case ascertainment in a large prospective cohort

Citation: PLoS ONE; May 2021; vol. 16 (no. 5)
Author(s): Shrestha S.; Parks C.G.; Sandler D.P.; Richards-Barber M.; Chen H.

Background: In epidemiologic studies where physician-based case adjudication is not feasible, Parkinson's disease (PD) case ascertainment is often limited to self-reports which may not be accurate. We evaluated strategies to identify PD cases in the Agricultural Health Study (AHS).

Methods: Doctor-diagnosed PD was self-reported on all cohort-wide surveys; potential cases were also identified from death certificates. Follow-up surveys asked about PD-related motor and non-motor symptoms. For PD confirmation, we collected additional diagnosis, symptom, and treatment data from 510 potential PD cases or their proxy (65% of those contacted) in a supplemental screener and obtained medical records for a subset (n = 65). We classified PD cases using established criteria and screener data.

Results: Of 510 potential PD cases, 75% were considered "probable" or "possible"; this proportion increased among participants diagnosed by a specialist (81.2%), taking PD medication (85.2%), or reporting >=5 motor symptoms (86.8%) in a regular AHS survey. Of those with medical records, 93% (57 of 61) of probable or possible PD was confirmed. Never-smoking and non-motor and motor symptoms reported in prior AHS surveys were more common with probable/possible PD than unconfirmed PD.

Conclusion: In this retrospective PD case ascertainment effort, we found that PD self-report with information on motor symptoms or medications may be a reasonable alternative for identifying PD cases when physician exam is not feasible. Because of intervening mortality, screeners could not be obtained from about one-third of those contacted. Thus, findings warrant replication. Copyright © 2021 Public Library of Science. All rights reserved.

Title: Respiratory Dysfunctions in Parkinson's Disease Patients.

Author(s): Docu Axelerad, Any; Stroe, Alina Zorina; Arghir, Oana Cristina; Docu Axelerad, Daniel; Gogu, Anca Elena

Abstract: Respiratory dysfunctions have been associated with Parkinson's disease since the first observations of the disease in 1817. Patients with Parkinson's disease frequently present respiratory disorders with obstructive ventilatory patterns and restrictive modifications, as well as limitations in respiratory volumes. In addition, respiratory impairments are observed due to the rigidity and kyphosis that Parkinson's disease patients experience. Subsidiary pulmonary complications can also appear as side effects of medication. Silent aspiration can be the cause of pneumonia in Parkinson's disease. Pulmonary dysfunction is one of the main factors that leads to the morbidity and mortality of patients with Parkinson's disease. Here, we performed a narrative review of the literature and reviewed studies on dyspnea, lung volumes, respiratory muscle function, sleep breathing disorders, and subsidiary speech and swallow impairments related to pulmonary dysfunction in patients with Parkinson's disease.

Title: Role of occupational therapy in facilitating participation among caregivers of people with parkinson's disease: A systematic review

Author(s): Boone A.E.; Henderson W.; Hunter E.G.

Importance: Caregivers play a critical role in facilitating the performance of people with Parkinson's disease (PD). Knowledge on how occupational therapy practitioners can mitigate the negative effects of caregiving is needed to enable caregiver participation.

Objective(s): To explore the effectiveness of interventions within the scope of occupational therapy practice for caregivers of people with PD to facilitate or maintain their participation in the caregiver role.

Data Sources: We conducted a systematic review of the literature published in CINAHL, MEDLINE, PsycINFO, and OTseeker between 2011 and 2019. Article reference lists were also hand searched for additional articles. Study Selection and Data Collection: Articles were screened and evaluated using the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) guidelines. The review was conducted in accordance with steps outlined by the American Occupational Therapy Association's Evidence-Based Practice Project.

Finding(s): Six articles met the inclusion criteria. Interventions in each article were distinct, prohibiting theme development. Overall, the strength of evidence was low, and the risk of bias was high. None of the studies included in this review were obtained from the occupational therapy literature.

Conclusions and Relevance: Little evidence is available to support interventions within the scope of occupational therapy practice for caregivers of people with PD. Existing evidence suggests that interventions need to be flexible (e.g., in terms of time, cost, and delivery method) and tailored to the unique needs of this population.Copyright © 2021 American Occupational Therapy Association, Inc. All rights reserved.

Title: Self-Reported Barriers to Exercise and Factors Impacting Participation in Exercise in Patients with Parkinson's Disease

Author(s): Prakash P.; Scott T.F.; Baser S.M.; Leichliter T.; Schramke C.J.

Title: Surgical Management of Parkinson's Disease in the Elderly

Author(s): Azevedo P.; Fasano A.; Aquino C.C.

Background: Deep Brain Stimulation (DBS) is an increasingly popular therapy for Parkinson's Disease (PD). Despite the experience gained over time with DBS of either the subthalamus or the globus pallidus pars interna, there is still no consensus regarding the age limit for DBS indication.

Objective(s): This narrative review of the literature discusses the issues of age and DBS, emphasizing the critical need for good quality evidence to support the surgical management of elderly patients with PD.

Method(s): We searched PubMed using the terms Parkinson's Disease; Parkinson's Disease therapy; deep brain stimulation; antiparkinsonian agents therapeutic use; age factors; aged; aged, 80 and over; middle aged; treatment outcome; and risk assessments.

Result(s): We identified several limitations of the available evidence, such as under-representation of older patients in DBS studies, small sample sizes in studies with older participants, heterogeneity of outcomes, and conflicting results.

Conclusion(s): Despite preliminary suggestions that age might affect the outcomes of DBS, the evidence to support the hypothesis of age as an independent predictor of DBS outcomes is limited and results are controversial. Ultimately, finding an age-independent biomarker predicting DBS outcome is the final goal to expand this powerful treatment to all patients age in an effective and safe manner. Copyright © 2021 International Parkinson and Movement Disorder Society

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Title: The Impact of Exercise Intervention with Rhythmic Auditory Stimulation to Improve Gait and Mobility in Parkinson Disease: An Umbrella Review.

Author(s): Forte, Roberta; Tocci, Nicoletta; De Vito, Giuseppe

Abstract: Difficulties in walking, controlling balance, and performing activities of daily living are common problems encountered by individuals affected by Parkinson disease. Scientific evidence suggests that exercise performed with music or auditory or rhythmical cues facilitates movement and improves balance, gait, mobility, and activities of daily living (ADL) performance in patients with PD. The aim of this umbrella review was to summarize available high-quality evidence from systematic reviews and meta-analyses on the effectiveness of rhythmically cued exercise to improve gait, mobility, and ADL performance in individuals with PD. PubMed, Cochrane, and Embase databases were searched from January 2010 to October 2020 for systematic reviews and meta-analyses which had to be (1) written in English, (2) include studies on populations of males and females with PD of any age, (3) analyze outcomes related to gait, mobility, and ADL, and (4) apply exercise interventions with music or auditory or rhythmical cues. Two independent authors screened potentially eligible studies and assessed the methodological quality of the studies using the AMSTAR 2 tool. Four studies, two systematic reviews and meta-analyses, one a systematic review, and one a meta-analysis, were selected. Overall results indicated positive effects for gait and mobility of the use of rhythmic auditory cueing with exercise and suggested that it should be incorporated into a regular rehabilitation program for patients affected by PD. Nonetheless, more primary level research is needed to address the identified gaps regarding the application of this method to physical exercise interventions.