Parkinson's Disease Current Awareness Bulletin

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Title: Turning problems and freezing of gait in Parkinson's disease: a systematic review and meta-analysis.

Citation: Disability & Rehabilitation; Dec 2019; vol. 41 (no. 25); p. 2994-3004

Author(s): Spildooren, Joke; Vinken, Cathérine; Van Baekel, Laura; Nieuwboer, Alice

Objective: To understand the differences of step and turn parameters between freezers and non-freezers during turning and determine the influence of turn angle and turn characteristics on freezing of gait.

Data sources: PubMed and Web of Science were searched from the earliest data available to August 2017. Study selection: Case–control studies that examined the differences in turning while walking between freezers and non-freezers were included. Two reviewers selected studies independently.

Data extraction: Methodological quality was evaluated by two independent reviewers using the STROBE checklist for case–control studies. Mean differences and 95% confidence intervals were calculated from pooled data for turn duration, peak turn velocity, number of steps and cadence. Center of mass deviation, segmental rotation, phase coordination and freezing of gait frequency were also extracted. When possible, different turning angles or spatial confounds were compared.

Data synthesis: Sixteen studies met the inclusion criteria. Freezing of gait occurred in 38.2% of the freezers. Freezing appeared most frequently at the end of a turn and at the inner leg of the turn cycle. The meta-analysis revealed that turning in freezers was characterized by an increased turn duration, cadence and number of steps and a decreased peak turn velocity. Qualitative analysis showed that results concerning step width, step length and step time variability were inconsistent. Turning was characterized by an increased head–pelvis coupling and worse coordination in freezers compared to non-freezers. A decreased medial deviation of the center of mass was present prior to a freezing episode.

Conclusions: Both step and rotational parameters differed in freezers compared to non-freezers while turning. These differences increased with increasing task complexity (i.e., larger turning angle or spatial confounds during turning). The results suggest that improving axial rotation could be a valuable rehabilitation target to ameliorate freezing. Patients with freezing of gait turn with a larger arc and a smaller angle compared to non-freezing patients Freezing–related turning deficits have both spatiotemporal and rotational motor control components Improving axial rotation could be a novel rehabilitation target to ameliorate freezing

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Title: Symptom progression in advanced Parkinson's disease: Dyadic perspectives.

Citation: Applied Nursing Research; Dec 2019; vol. 50

Author(s): Horning, Melanie A.; Shin, Ju Young; DiFusco, Leigh Ann; Norton, Michelle; Habermann, Barbara

Abstract: This qualitative descriptive study investigated the self-reported symptoms of people with advanced Parkinson's disease. Fifteen dyads (person with Parkinson's and family caregiver) participated in two semi-structured interviews over a six-month time period; content analysis was used to explore the progression and new onset of symptoms. Reported symptoms in descending order included gait deterioration, falls, speech impairment, cognitive decline, functional decline, gastrointestinal and genitourinary changes, and swallowing impairment. The presence of multiple, compounding symptoms present

challenges for maintaining safety in the home, highlighting the need for in-home services to assist with symptom management. Change in self-reported symptom experience was not significantly different after a six-month time frame. Symptom progression in advanced Parkinson's disease may take longer than six months to appreciatively manifest. Therefore, future research should explore the progression of advanced Parkinson's disease longitudinally over of period of time that exceeds six months. • Dyads reported multiple, compounding symptoms in Advanced Parkinson's disease (PD). • Advanced PD symptoms presented challenges for maintaining safety in the home. • Dyads needed in-home services to assist with symptom management. • Self-reported advanced PD symptoms were not different after a six-month time frame.

Title: Unmet needs of people with Parkinson's disease: A cross-sectional study.

Citation: Journal of Advanced Nursing (John Wiley & Sons, Inc.); Dec 2019; vol. 75 (no. 12); p. 3504-3514

Author(s): Lee, JuHee; Kim, YonJi; Kim, SungHae; Kim, Yielin; Lee, Young Joo; Sohn, Young Ho

Aims: To identify the type and extent of unmet needs in people with Parkinson's disease and to examine the impact of health locus of control and family support on these needs. Design: A cross-sectional study.

Methods: This study was conducted from October 2015 - February 2016 in Korea. Data were collected through questionnaires focusing on unmet needs, health locus of control, family support and clinical features.

Results: Therapeutic needs represented the highest percentage of unmet needs in people with Parkinson's disease (85.05%), followed by social/spiritual/emotional needs (82.72%). Physical needs were the lowest reported score (75.01%). Unmet needs were more frequent in those with more severe non-motor symptoms. Also, higher family support, internal locus of control and doctor locus of control were correlated with more unmet needs.

Conclusion: Understanding factors that determine the type and degree of unmet needs in people with PD is important to provide appropriate nursing care. The findings of this study can be used for providing nursing interventions reflecting unmet needs and reducing their unmet needs to improve the overall well-being of people with PD. Impact: This study addressed unmet needs unmet needs specific to Parkinson's disease with respect to their nursing needs. Therapeutic needs were the highest unmet needs in people with PD, followed by social/spiritual/emotional needs, need for certainty and physical needs. The findings may be useful for nurses to identify the unmet needs of people with PD which need to be addressed. By reflecting on unmet needs, nurses can give personally tailored nursing care.

Title: Occupational therapists' perceptions of psychosocial strategies for clients with Parkinson's disease.

Citation: Nursing & Health Sciences; Dec 2019; vol. 21 (no. 4); p. 479-486

Author(s): Coleman, Ashleigh A.; Driver, Christina; Parker, John K.; Lovell, Geoff P.

Abstract: Psychological strategies are a promising adjunct to pharmacological treatment for symptoms, including depression and anxiety associated with Parkinson's disease. In this study, we investigated perceptions and reported behaviors of occupational therapists regarding the use of psychosocial strategies during their practice with clients with

Parkinson's disease. The results of a cross-sectional online survey (n = 115 occupational therapists) demonstrated that the majority of participants (83%) reported using psychosocial strategies with their clients living with Parkinson's disease, with goal setting the most frequent. Almost all occupational therapists (99.1%) reported that it was moderately to extremely important to have knowledge about psychosocial strategies for practice with clients living with Parkinson's disease, and 96.5% rated it important to be able to offer these strategies in practice with their clients living with Parkinson's disease. The majority (91.3%) felt incorporating psychosocial strategies into their practice was moderately to extremely beneficial, and 93.9% reported that psychosocial strategies have a moderate-to-extremely positive effect on Parkinson's disease management outcomes. These findings have important implications for the education and training of occupational therapists working with clients living with Parkinson's disease to help ensure the best possible outcomes for people with Parkinson's disease.

Title: Intense Exercise Improved Motor Function in Parkinson Disease.

Citation: JAMA: Journal of the American Medical Association; Nov 2019; vol. 322 (no. 20); p. 1948-1948

Author(s): Slomski, Anita

Abstract: The article reports that intense exercise in patients with mild Parkinson disease helped improve their motor function and adherence to a minimally supervised exercise program, according to a clinical trial published in the periodical "Lancet Neurology."

Title: Controlling the Uncontrollable: Perceptions of Balance in People With Parkinson Disease.

Citation: Physical Therapy; Nov 2019; vol. 99 (no. 11); p. 1501-1510

Author(s): Johansson, Hanna; Franzén, Erika; Roaldsen, Kirsti Skavberg; Hagströmer, Maria; Leavy, Breiffni

Background: Exercise improves balance in Parkinson disease (PD), yet the majority of people with the diagnosis are physically inactive. Insights gained from understanding how people with PD (PwPD) make sense of their symptoms and their ability to control them may inform the communication strategies and motivational approaches adopted by physical therapists. To our knowledge, no previous study has qualitatively explored how PwPD perceive the concept of balance and the beliefs they hold concerning their ability to affect balance.

Objective: This study aimed to explore the meaning of balance for PwPD and the beliefs they hold regarding their ability to influence their balance in everyday life. Design The design was a qualitative study with an inductive approach.

Methods: In-depth interviews were conducted with 18 participants with PD (age range 46–83 years, Hoehn and Yahr range 1–4), and transcripts were analyzed using qualitative content analysis.

Results: Five main themes emerged from the analysis: remaining in control over the body, adapting behavior to deal with uncertainty, directing focus to stay 1 step ahead, resilience as a defense, and exercise beliefs and reservations. Interpretation of the underlying patterns in the main themes yielded the overarching theme of focus and determination to regain control over shifting balance.

Conclusions: The concept of balance was perceived as both bodily equilibrium and mind-body interplay and was described in the context of remaining in control over one's body and everyday life. Cognitive resources were utilized to direct focus and attention during balance-challenging situations in a process involving internal dialogue. Even participants who did not express beliefs in their ability to affect balance through exercise used psychological resilience to counter the challenges of impaired balance.

Title: Mobility Disorders in Stroke, Parkinson Disease, and Multiple Sclerosis: A Multicenter Cross-Sectional Study.

Citation: American Journal of Physical Medicine & Rehabilitation; Jan 2020; vol. 99 (no. 1); p. 41-47

Author(s): Cattaneo, Davide; Gervasoni, Elisa; Pupillo, Elisabetta; Bianchi, Elisa; Aprile, Irene; Imbimbo, Isabella; Russo, Rita; Cruciani, Arianna; Jonsdottir, Johanna; Agostini, Michela; Beghi, Ettore

Abstract: Supplemental digital content is available in the text. Objective: The aims of the study were to compare mobility in multiple sclerosis, Parkinson disease, and stroke, and to quantify the relationship between mobility and participation restrictions. Design: This is a multicenter cross-sectional study. Included were compliant subjects with Parkinson disease, multiple sclerosis, and stroke seen for rehabilitation, with no comorbidities interfering with mobility. Functional scales were applied to each subject to investigate gait speed (10-meter walking test), balance while maintaining body position (Berg Balance Scale), dynamic balance and mobility (Timed Up and Go and Dynamic Gait Index), and participation (Community Integration Questionnaire). Results: Two hundred ninety-nine patients (111 multiple sclerosis, 94 Parkinson disease, and 94 stroke) were enrolled. Stroke had the slowest gait speed (mean gait speed = 0.9 m/sec) compared with Parkinson disease (1.1 m/sec), and multiple sclerosis (1.2 m/sec) ($P < 0.001$). Multiple sclerosis was more limited than Parkinson disease and stroke in dynamic balance both in the Timed Up and Go Test (multiple sclerosis = 16.7 secs, Parkinson disease = 11.4 secs, stroke = 14.0 secs; $P < 0.001$) and Dynamic Gait Index (multiple sclerosis = 11.6 points, Parkinson disease = 12.9 points, stroke = 13.6 points; $P = 0.03$); ability to maintain balance and body position (Berg Balance Scale) was more affected in stroke and Parkinson disease than multiple sclerosis (multiple sclerosis = 42.6 points, Parkinson disease = 39.4 points, stroke = 39.7 points; $P = 0.03$). Balance disorders were associated with participation restrictions but not gait speed. Conclusions: Neurological conditions have differing impacts on gait and balance, leading to different levels of participation restriction.

Title: Predictive Factors of Concerns about Falling in People with Parkinson's Disease: A 3-Year Longitudinal Study.

Citation: Parkinson's Disease (20420080); Dec 2019 ; p. 1-9

Author(s): Lindh-Rengifo, Magnus; Jonasson, Stina B.; Mattsson, Niklas; Ullén, Susann; Nilsson, Maria H.

Introduction: Fear of falling (FOF) is more common in people with Parkinson's disease (PD) than in healthy controls. It can lead to several negative consequences such as restrictions in everyday life. Moreover, FOF is a risk factor for future falls.

Aim: This study aimed to identify predictive factors of FOF (conceptualized as concerns about falling) after three years, with and without adjusting for concerns about falling at baseline, in people with PD.

Methods: This study included 151 participants (35% women) with PD. At baseline, their mean (SD) age and PD duration were 68 (±9.0) and 9 (±6.1) years, respectively. The Falls Efficacy Scale-International (FES-I) was used as the dependent variable in multivariable linear regression analyses.

Results: The mean (SD) FES-I score increased from 28.1 (11.9) to 33.1 (14.0) three years later ($p<0.001$). The strongest (according to the standardized regression coefficient, β) predictor of concerns about falling was walking difficulties ($\beta = 0.378$), followed by age (0.227), problems maintaining balance while dual tasking (0.172), and needing help in daily activities (0.171). When adjusting for baseline FES-I scores, the strongest predictive factor was problems maintaining balance while dual tasking ($\beta = 0.161$), which was followed by age (0.131) and female sex (0.105).

Conclusions: This study pinpoints several predictive factors of concerns about falling that are modifiable and which could be addressed in rehabilitation: perceived walking difficulties, having problems maintaining balance while dual tasking, and dependence on others in daily activities. The importance of dual tasking is a novel finding, which future studies need to confirm or refute. One should be aware of the fact that an increased age predicts concerns about falling with and without adjusting for baseline FES-I scores, whereas female sex predicts concerns about falling only when adjusting for baseline FES-I scores.

Title: Review of studies considering the effect of forced exercise on symptoms of Parkinson's disease.

Citation: Clinical Kinesiology (Online Edition); Dec 2019 ; p. 26-38

Author(s): Kohler, William J.

Abstract: Forced exercise ("FE") is exercise at an elevated pace beyond the subject's preferred rate, while the subject achieves a specified aerobic intensity range. Investigations have demonstrated favorable effects of FE on symptoms of Parkinson's Disease ("PD").

First Purpose: To analyze investigations into the effects of FE on PD symptoms to identify their contributions toward, and limitations with respect to, identifying therapeutically prescriptive FE activities.

Second Purpose: To summarize accompanying etiological theories and investigations regarding possible neurological dynamics that may cause favorable effects on PD symptoms.

Methods: Fifteen studies (the "FE/PD Studies") were identified for review through a search of electronic databases. A sophisticated rubric (the "FE/PD Studies Rubric") was developed to archive key aspects of the FE/PD Studies for analysis.

Conclusions: The FE/PD Studies Rubric facilitated analysis of the FE/PD Studies by (i) cadence type and forms of equipment, (ii) duration and frequency, (iii) pace, and (iv) forms of exercise. On a qualified basis: Eight weeks of FE may dramatically improve PD symptoms in subjects off-medication; one FE bout may dramatically improve PD symptoms in subjects off-medication; three to six FE sessions will less dramatically improve symptoms of PD in subjects on medication; variable cadence may be a contributing factor. Further, studies indicate that FE and PD medication produce similar activation patterns of neurological functional connectivity. Claims that FE and medication may use the same pathways to produce relief of PD symptoms may be misplaced, given activation patterns and connectivity only partially explain the full neurological dynamic at work. The etiology behind the favorable

effects of FE on symptoms of PD may be found in the sequence of neurological events preceding FE, including the provocative effect of FE. There is a need for systematic iterative studies to identify optimal therapeutically prescriptive FE activities, and a process is proposed. Any results should be considered within a broad context of therapeutic, medicinal and surgical alternatives.

Title: Economic Evaluation of Exercise-Based Fall Prevention Programs for People with Parkinson's Disease: A Systematic Review.

Citation: Journal of Alternative & Complementary Medicine; Dec 2019; vol. 25 (no. 12); p. 1225-1237

Author(s): Winser, Stanley John; Paul, Li Francis; Magnus, Leung Ka Long; Yan, Szeto; Shenug, Tsui Pui; Sing, Yuen Man; Cheing, Gladys

Objectives: Falls are common in Parkinson's disease (PD). Exercise interventions can prevent falls. This review aims to (1) explore the existing evidence regarding the cost-effectiveness of exercise-based fall prevention programs for people with PD and (2) discuss the implications of the review findings for future research and clinical practice.

Design: Databases AMED Allied and Complementary Medicine, CINAHL, CRD, EBSCO, EMBASE, MEDLINE, PubMed, Scopus, and Web of Science were searched from their inception until June 2019. Randomized and nonrandomized trials that included an economic evaluation of fall prevention programs for people with PD were considered. Quality of the economic evaluation was assessed using the Consensus on Health Economic Criteria list (CHEC-list), and the methodological quality was assessed using the Physiotherapy Evidence Database (PEDro) and Cochrane risk of bias tool.

Results: Nine hundred and sixty-five studies were screened to include three studies involving 556 participants. Quality of economic evaluation assessed using CHEC-list was high. The methodological quality was high for two studies and low for one study. Tested interventions included Tai Ji Quan, physiotherapist-led, supervised, weekly and monthly balance, and strengthening exercises. The duration of the interventions ranged from 10 weeks to 6 months, while the intervention frequency ranged from two sessions per week to one session per month. Treatment sessions lasted for 60 min in all three studies. One high economic and methodological quality study comparing Tai Ji Quan with resistance and stretching exercises reported least cost resource use among Tai Ji Quan group (USD 80,441) and greater incremental number of falls prevented. All three tested interventions had an 80% probability of being cost-effective with the corresponding country-specific threshold incremental cost-effectiveness ratio values.

Conclusions: The findings provide some evidence for exercise-based intervention as a cost-effective treatment option for preventing falls in PD; however, due to the limited number of available studies, heterogeneity of the interventions, and diversity of assessment settings, a firm conclusion cannot be established. Additional studies evaluating the cost-effectiveness of fall prevention programs involving larger samples and using different treatment parameters in various settings are warranted.

Title: Systematic Audiological Assessment of Auditory Functioning in Patients With Parkinson's Disease.

Citation: Journal of Speech, Language & Hearing Research; Dec 2019; vol. 62 (no. 12); p. 4564-4577

Author(s): De Keyser, Kim; De Letter, Miet; De Groote, Evelien; Santens, Patrick; Talsma, Durk; Botteldooren, Dick; Bockstael, Annelies

Purpose: Alterations in primary auditory functioning have been reported in patients with Parkinson's disease (PD). Despite the current findings, the pathophysiological mechanisms underlying these alterations remain unclear, and the effect of dopaminergic medication on auditory functioning in PD has been explored insufficiently. Therefore, this study aimed to systematically investigate primary auditory functioning in patients with PD by using both subjective and objective audiological measurements.

Method: In this case--control study, 25 patients with PD and 25 age-, gender-, and education-matched healthy controls underwent an audiological test battery consisting of tonal audiometry, short increment sensitivity index, otoacoustic emissions (OAEs), and speech audiometry. Patients with PD were tested in the on- and off-medication states.

Results: Increased OAE amplitudes were found when patients with PD were tested without dopaminergic medication. In addition, speech audiometry in silence and multitalker babble noise demonstrated higher phoneme scores for patients with PD in the off-medication condition. The results showed no differences in auditory functioning between patients with PD in the on-medication condition and healthy controls. No effect of disease stage or motor score was evident.

Conclusions: This study provides evidence for a top-down involvement in auditory processing in PD at both central and peripheral levels. Most important, the increase in OAE amplitude in the off-medication condition in PD is hypothesized to be linked to a dysfunction of the olivocochlear efferent system, which is known to have an inhibitory effect on outer hair cell functioning. Future studies may clarify whether OAEs may facilitate an early diagnosis of PD.

Title: Using Implementation Frameworks to Provide Proactive Physical Therapy for People With Parkinson Disease: Case Report.

Citation: Physical Therapy; Dec 2019; vol. 99 (no. 12); p. 1644-1655

Author(s): Rafferty, Miriam R; MacDonald, Jillian; Byskosh, Alexandria; Sloan, Laura; Toledo, Santiago; Marciniak, Christina; Simuni, Tanya

Background and Purpose: European clinical practice guidelines recommend physical therapy for people with Parkinson disease (PD) soon after diagnosis to provide education, physical activity advice, and individualized interventions when needed. However, therapy is frequently not used until after gait and balance problems occur. The purpose of this administrative case study is to present the application of a proactive physical therapy (PAPT) approach at 1 rehabilitation center using implementation frameworks to support the (1) implementation process, (2) determinants of implementation success, and (3) implementation evaluation.

Case Description: The PAPT program targeted people with PD before the onset of significant mobility dysfunction. It was initiated in 1 outpatient neurological rehabilitation center. The program used shared decision-making to promote long-term maintenance of independent exercise. The Knowledge-to-Action Framework was used by champions to plan implementation processes. Implementation barriers were addressed using the Consolidated Framework for Implementation Research. The program was evaluated using the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) framework with mixed methods.

Outcomes: In the program's first year, 38 people were referred, 28 were evaluated, and 20 participated in the 6-month program evaluation. Following PAPT, the number of participants reporting regular participation in aerobic, strengthening, and flexibility exercise approximately doubled, while those engaging in balance activities increased from 1 to 8. They reported a median of 140 minutes of aerobic exercise per week. Implementation barriers included location, insurance coverage, and difficulty scheduling long-term follow-up visits. Participants reported physical and emotional benefits of the program.

Discussion: Implementation frameworks assisted with the implementation and evaluation of a PAPT delivery model that helped people with PD to increase and maintain independent exercise participation.

Title: The Therapeutic Effect of Nordic Walking on Freezing of Gait in Parkinson's Disease: A Pilot Study.

Citation: Parkinson's Disease (20420080); Dec 2019 ; p. 1-11

Author(s): Wróblewska, Agata; Gajos, Agata; Smyczyńska, Urszula; Bogucki, Andrzej

Introduction: The effectiveness of the currently utilized therapies for FoG is limited. Several studies demonstrated a beneficial impact of Nordic walking (NW) on several gait parameters in Parkinson's disease, but only one paper reported reduction of freezing. Research **Question:** In the present study, the question is whether NW is an effective therapeutic intervention in FoG.
Methods: Twenty PD subjects trained NW for 12 weeks, with a frequency of twice per week. Each session lasted about 60 minutes. Twenty patients in the control group did not use any form of physiotherapy (no-intervention group). Freezing of Gait Questionnaire (FOGQ), the Timed Up and Go (TUG) test, and the Provocative Test for Freezing and Motor Blocks (PTFMB) were performed at baseline, immediately after the end of NW program, and three months later.
Results: The results of FOGQ, TUG, and total PTFMB revealed significant improvement after completing the exercise program, and this effect persisted at follow-up. The results of the PTFMB subtests showed a different effect of NW on particular subtypes of FoG. Start hesitation, sudden transient blocks that interrupt gait, and blocks on turning improved considerably, while motor blocks, when walking through narrow space and on reaching the target, did not respond to NW training.
Significance: The results show, for the first time, that FoG during turning and step initiation, two most common forms of this gait disorder, has been significantly reduced by NW training. Different responses of particular subtypes of FoG to NW probably reflect their different pathophysiologies.
Conclusions: The present study showed that NW training had a beneficial effect on FOG in PD and that the achieved improvement is long-lasting. Future research should clarify whether the observed improvement limited to FoG triggered by only some circumstances reflects different pathomechanisms of FoG subtypes

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Title: Effectiveness of occupational therapy intervention for people with Parkinson's disease: Systematic review.

Citation: Australian Occupational Therapy Journal; Dec 2019; vol. 66 (no. 6); p. 731-738

Author(s): Welsby, Ellana; Berrigan, Sonja; Laver, Kate

Introduction: Occupational therapists commonly provide intervention that promotes quality of life in people with Parkinson's disease. Existing research supports the effects of multidisciplinary and motor intervention for people with Parkinson's disease. However, few studies have identified the effectiveness of occupational therapy intervention alone. The aim of this review was to examine the efficacy of interventions provided by occupational therapists for people with Parkinson's disease.

Methods: A comprehensive database search of the literature was performed using Medline, EMBASE, PsycInfo and CINAHL between 2003 and January 2018. There were no restrictions on study design and studies with or without a control group were selected for review. Studies were included if intervention consisted of at least 50% of occupational therapy intervention for Parkinson's disease. Two independent reviewers extracted and synthesised data from relevant articles.

Results: In all, 10 studies representing data from 1343 people with Parkinson's disease and 180 caregivers were included in this review. Occupational therapy interventions focussing on meaningful activities were shown to improve perceived occupational performance. Upper limb therapy programmes were shown to improve upper limb function in the short term though longer-term effects are unclear.

Conclusion: Current research supports interventions which are intermittent, short term and intensive, and involve tailored therapy plans working towards an individual's goals. Occupational therapists should implement goal-oriented intervention programmes in conjunction with following the guidance of existing best practice guidelines.

Title: Non-pharmacological management of cognitive impairment in Parkinson's disease.

Citation: Journal of neural transmission (Vienna, Austria : 1996); Dec 2019

Author(s): Pupíková, Monika; Rektorová, Irena

Abstract: We evaluated the therapeutic effects of non-pharmacological interventions (cognitive training, physical activity, and non-invasive brain stimulation) on cognitive symptoms in Parkinson's disease. A comprehensive literature search for non-pharmacological intervention randomized controlled trials was performed and effect sizes were calculated for each suitable study intervention approach and cognitive domain. Despite the heterogeneity of the study results, we report level B evidence for the probable efficacy of cognitive training in improving or maintaining attention/working memory and memory domains. Level C (possible efficacy) evidence was found for specific physical training types with respect to enhancing executive functions. Non-invasive brain stimulation techniques and combinatorial approaches show preliminary but promising results. Prediction markers evaluating distinct treatment responses should be identified that would help to choose the best candidates for specific treatment strategies and cognitive symptoms. Future directions and recommendations are discussed.

Title: A systematic review of body mass gain after deep brain stimulation of the subthalamic nucleus in patients with Parkinson's disease.

Citation: Obesity reviews : an official journal of the International Association for the Study of Obesity; Dec 2019

Author(s): Steinhardt, Julia; Münte, Thomas F; Schmid, Sebastian M; Wilms, Britta; Brüggemann, Norbert

Abstract: This systematic review investigated the effects of deep brain stimulation of the subthalamic nucleus on extent and time course of body mass changes in patients with Parkinson's disease. A computerized search identified relevant articles using a priori defined inclusion and exclusion criteria. A descriptive analysis was calculated for the main outcome parameters body mass and BMI. Thirty-eight out of 206 studies fulfilled the inclusion criteria (979 patients aged 59.0±7.5 years). Considering the longest follow-up time for each study, body mass and BMI showed a mean increase across studies of +5.71kg ($p < .0001$; $d = 0.64$) and +1.8kg/m2 ($p < .0001$; $d = 1.61$). The time course of body mass gain revealed a continuous increase ranging from +3.25kg ($d = 0.69$) at 3 months, +3.88kg ($d = 0.21$) at 6 months, +6.35kg ($d = 0.72$) at 12 months, and +6.11kg ($d = 1.02$) greater than 12 months. Changes in BMI were associated with changes in disease severity ($r = 0.502$, $p = .010$) and pharmacological treatment ($r = 0.440$, $p = .0231$). Data suggest that body mass gain is one of the most common side effects of deep brain stimulation going beyond normalization of preoperative weight loss. Considering the negative health implications of overweight, we recommend the development of tailored therapies to prevent overweight and associated metabolic disorders following this treatment.

Title: Is Aquatic Therapy Optimally Prescribed for Parkinson's Disease? A Systematic Review and Meta-Analysis.

Citation: Journal of Parkinson's disease; Dec 2019

Author(s): Carroll, Louise M; Morris, Meg E; O'Connor, William T; Clifford, Amanda M

Background: Aquatic therapy offers an alternative physiotherapy approach to managing the motor and non-motor symptoms associated with Parkinson's disease (PD).

Objective: This review examined exercise prescription for aquatic therapy in PD and evaluated if aquatic therapy is as effective as land-based physiotherapy for improving movement, disability and wellbeing in people living with PD.METHODSA systematic search of eight databases was conducted to identify suitable randomized controlled trials from inception until August 2019. Aquatic therapy prescription data and outcomes of interest included gait, balance, motor disability, mobility, falls, mood, cognitive function and health related quality of life data was extracted and synthesised. A meta-analysis was performed where appropriate.

Results: Fourteen studies involving 472 participants (Hoehn & Yahr scale I-IV) met the inclusion criteria. Eight were of modest quality, scoring 70-80% on the PEDro scale. Seven studies were included in the meta-analysis. Exercise prescription was highly variable and often insufficiently dosed. Similar gains were shown for aquatic therapy and land exercises for balance, motor disability or quality of life. A statistically significant difference was found for mobility as measured using the TUG (-1.5s, 95 % CI -2.68 to -0.32; $p=0.01$, $I2=13\%$), in favor of aquatic therapy.

Conclusion: Aquatic therapy had positive outcomes for gait, balance and mobility that were comparable to land-based physiotherapy in the early stages of PD. The optimal dosage, content and duration of aquatic interventions for PD could not be confirmed in this meta-analysis. Many trials appeared to be under-dosed and therapy duration was low, ranging from 3-11 weeks.

Title: The role of virtual reality on outcomes in rehabilitation of Parkinson's disease: meta-analysis and systematic review in 1031 participants.

Citation: Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology; Dec 2019

Author(s): Triegaardt, Joseph; Han, Thang S; Sada, Charif; Sharma, Sapna; Sharma, Pankaj

Introduction: Parkinson's disease (PD) is managed primarily by dopamine agonists and physiotherapy while virtual reality (VR) has emerged recently as a complementary method. The present study reviewed the effectiveness of VR in rehabilitation of patients with PD.

Methods: Literature search up to June 2019 identified ten studies (n = 343 participants) suitable for meta-analysis and 27 studies (n = 688 participants) for systematic review. Standard mean difference (SMD) and 95% confidence intervals (CI) were calculated using a random effects model.

Results: In meta-analysis, compared with active rehabilitation intervention, VR training led to greater improvement of stride length, SMD = 0.70 (95%CI = 0.32-1.08, p = 0.0003), and was as effective for gait speed, balance and co-ordination, cognitive function and mental health, quality of life and activities of daily living. Compared with passive rehabilitation intervention, VR had greater effects on balance: SMD = 1.02 (95%CI = 0.38-1.65, p = 0.002). Results from single randomised controlled trials showed that VR training was better than passive rehabilitation intervention for improving gait speed SMD = 1.43 (95%CI = 0.51-2.34, p = 0.002), stride length SMD = 1.27 (95%CI = 0.38-2.16, p = 0.005) and activities of daily living SMD = 0.96 (95%CI = 0.02-1.89). Systematic review showed that VR training significantly (p < 0.05) improved motor function, balance and co-ordination, cognitive function and mental health, and quality of life and activities of daily living.

Conclusion: VR used in rehabilitation for patients with PD improves a number of outcomes and may be considered for routine use in rehabilitation.

Title: High-Intensity Interval Versus Moderate-Intensity Continuous Training in Individuals With Parkinson's Disease: Hemodynamic and Functional Adaptation.

Source: Journal of physical activity & health; Dec 2019 ; p. 1-7

Author(s): Fernandes, Bianca; Barbieri, Fabio Augusto; Arthuso, Fernanda Zane; Silva, Fabiana Araújo; Moretto, Gabriel Felipe; Imaizumi, Luis Felipe Itikawa; Ngomane, Awassi Yophiwa; Guimarães, Guilherme Veiga; Ciolac, Emmanuel Gomes

Purpose: To investigate the effect of high-intensity interval training (HIIT) versus moderate-intensity continuous exercise training (MICE) on hemodynamic and functional variables in individuals with Parkinson's disease.

Methods: Twenty participants (13 men) were randomly assigned to a thrice-weekly HIIT (n = 12) or MICE (n = 8) for 12 weeks. Hemodynamic (resting heart rate and blood pressure, carotid femoral pulse wave velocity, endothelial reactivity, and heart rate variability) and functional variables (5-time sit-to-stand, timed up and go, and 6-min walking tests) assessed before and after training.

Results: Demographic, hemodynamic and functional variables were similar between groups at baseline. Endothelial reactivity tended to increase after HIIT, but not after MICE, resulting in improved level (~8%, P < .01) of this variable in HIIT versus MICE during follow-up. Six-minute walking test improved after HIIT (10.4 ± 3.8%, P < .05), but did not change after

MICE. Sit to stand improved similarly after HIIT (27.2 ± 6.1%, P < .05) and MICE (21.5 ± 5.4%, P < .05). No significant changes were found after HIIT or MICE in any other variable assessed.

Conclusion: These results suggest that exercise intensity may influence training-induced adaptation on endothelial reactivity and aerobic capacity in individuals with Parkinson's disease.

Title: Effectiveness of Physiotherapy on Freezing of Gait in Parkinson's Disease: A Systematic Review and Meta-Analyses.

Citation: Movement disorders : official journal of the Movement Disorder Society; Dec 2019

Author(s): Cosentino, Carola; Baccini, Marco; Putzolu, Martina; Ristori, Diego; Avanzino, Laura; Pelosin, Elisa

Abstract: Freezing of gait is considered one of the most disabling gait disorders in patients with PD. An effective treatment for freezing of gait is missing, thus current management requires a multidisciplinary approach. Among treatment options, physiotherapy is acknowledged to be crucial; however, a systematic review that demonstrates its efficacy is missing. This review aims at examining the short- and long-term effects of physiotherapy in improving freezing of gait in PD patients. Five electronic databases were searched for English-language full-text articles, and only randomized controlled trials were considered. The freezing of gait questionnaire was selected as the primary outcome measure because it is the only validated measure used to evaluate the severity and impact of freezing of gait on patients' daily life. From 1,130 trials, 19 relevant studies, including 913 patients, were selected. The included studies varied for sample size, methodology, and type of intervention. None of the studies had a low risk of bias, but the majority of randomized control trials presented a low risk for at least 6 of 13 biases. Our findings provide evidence for short-term effectiveness of physiotherapy in improving freezing of gait (physiotherapy vs. no treatment: effect size = -0.28 [-0.45, -0.11], P = 0.001; physiotherapy vs. control: effect size = 0.43 [-0.65, -0.21], P < 0.0001), particularly when tailored interventions are applied. These results seem to be maintained at the follow-up examinations (effect size = -0.52 [-0.78, -0.26]; P = 0.001). Promising findings on the potential benefits of physiotherapy in improving freezing of gait were found, although further randomized control trial studies are still needed. Questions remain on the type and duration of intervention that best fits for treating freezing of gait symptom in PD. © 2019 International Parkinson and Movement Disorder Society.

Title: The Effects of Music-Contingent Gait Training on Cognition and Mood in Parkinson Disease: A Feasibility Study.

Citation: Neurorehabilitation and neural repair; Dec 2019 ; p. 1545968319893303

Author(s): Burt, Jacqueline; Ravid, Einat Natalie; Bradford, Sandra; Fisher, Nancy J; Zeng, Yiye; Chomiak, Taylor; Brown, Lesley; McKeown, Martin J; Hu, Bin; Camicioli, Richard

Background: In Parkinson disease (PD), gait impairments often coexist with nonmotor symptoms such as anxiety and depression. Biofeedback training may improve gait function in PD, but its effect on nonmotor symptoms remains unclear. This study explored the cognitive and global effects of Ambulosono, a cognitive gait training method utilizing step size to contingently control the real-time play of motivational music.

Objective: This study examined the feasibility of music-contingent gait training and its effects on neuropsychological test performance and mood in persons with PD.

Methods: A total of 30 participants with mild to moderate PD were semirandomized via sequential alternating assignment into an experimental training group or control music group. The training group received 12 weeks of music-contingent training, whereby music play was dependent on the user achieving a set stride length, adjusted online based on individual performance. The control group received hybrid training beginning with 6 weeks of noncontingent music walking, whereby music played continuously regardless of step size, followed by 6 weeks of music-contingent training. Global cognition, memory, executive function, attention, and working memory assessments were completed by blinded assessors at baseline, 6 weeks, and 12 weeks. Motor function, mood, and anxiety were assessed.

Results: Average training adherence was 97%, with no falls occurring during training sessions. Improvements on cognitive measures were not clinically significant; however, significant decreases in depression and anxiety were observed in both groups over time ($P < .05$).

Conclusions: Music-contingent gait training is feasible and safe in individuals with PD. Further investigation into potential therapeutic applications of this technology is recommended.

Title: Should respiratory muscle training be part of the treatment of Parkinson's disease? A systematic review of randomized controlled trials.

Citation: Clinical rehabilitation; Dec 2019 ; p. 269215519896054

Author(s): Rodríguez, Miguel Ángel; Crespo, Irene; Del Valle, Miguel; Olmedillas, Hugo

Objective: To determine the effectiveness of respiratory muscle training in persons with Parkinson's disease.

Data Sources: PubMed/MEDLINE, EMBASE, Web of Science, Scopus and PEDro electronic databases were searched until 15 November 2019. Reference lists of included studies were hand-searched.

Methods: Randomized controlled trials assessing the effects of respiratory muscle training programmes (both inspiratory and expiratory) in patients with Parkinson's disease were included. Two reviewers independently identified eligible studies and extracted data. Method quality was appraised with the PEDro scale.

Results: Five papers including three randomized controlled trials with a total of 111 patients were identified. Method appraisal showed a mean score of 5 in the PEDro scale. One study analysed inspiratory muscle training, one expiratory muscle training and two established a comparison between both of them. Statistically positive results were found in maximal inspiratory pressure ($P < 0.05$ and $d = 0.76$), maximal expiratory pressure ($P < 0.01$ and $d = 1.40$), perception of dyspnoea ($P < 0.01$), swallowing function ($d = 0.55$) and phonatory measures, without significant differences in spirometric indices.

Conclusions: Respiratory muscle training may be an effective alternative for improving respiratory muscle strength, swallowing function and phonatory parameters in subjects with Parkinson's disease. Nevertheless, the lack of primary studies about this type of training prevents obtaining robust evidence.

Title: Association of intestinal disorders with Parkinson's disease and Alzheimer's disease: A systematic review and meta-analysis.

Citation: ACS chemical neuroscience; Dec 2019

Author(s): Fu, Pengfei; Gao, Meng; Yung, Ken Kin Lam

Abstract: Parkinson's disease (PD) and Alzheimer's disease (AD) are the most common neurodegenerative disorders, with an overall global incidence of 40 million. Many studies have revealed the association of intestinal disorders and bacterial infections with PD, but few studies have found such a relationship with AD. In this meta-analysis, related articles published up to September 2018 were searched in PubMed. Of the 2,121 related articles screened initially, 56 were found to be eligible. Data on the risks of PD and AD due to five intestinal disorders and infection with Helicobacter pylori (H. pylori), as a representative intestinal microbe, were obtained, and a fixed- or random-effects model was used to pool the odds ratios (ORs) with 95% confidence interval (CIs) from individual studies. The combined OR for all types of intestinal disorders with an increased risk of PD was 3.36 (95% CI: 2.70-4.17). The ORs for each category were as follows: constipation, 4.05 (95% CI, 3.24-5.06); inflammatory bowel disease (IBD), 1.16 (95% CI, 0.89-1.52); irritable bowel syndrome (IBS), 1.75 (95% CI, 0.55-5.56); small intestinal bacterial overgrowth, 5.15 (95% CI, 3.33-7.96); and diarrhea, 1.27 (95% CI, 0.28-5.75). The combined OR of all types of intestinal disorders with an increased risk of AD was 1.52 (95% CI, 1.09-2.13). The ORs for IBS and IBD were 1.42 (95% CI, 1.02-1.99) and 2.40 (95% CI, 1.00-5.76), respectively. The risk estimates of H. pylori infection in PD and AD patients were as follows: OR, 1.65 (95% CI, 1.43-1.91) and OR, 1.40 (95% CI, 1.12-1.76), respectively. These findings suggest that PD and AD are significantly associated with intestinal disorders. The negative roles of H. pylori in the development of PD or AD should be evaluated to shed new light on the diagnosis and treatment of PD and AD. National governments should periodically inspect the intestinal condition of residents and extend health plans to improve intestinal health to prevent potential neurological disorders.

Sources Used:

The following databases are searched on a regular basis in the development of this bulletin: Amed, British Nursing Index, Cinahl, Medline

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