Parkinson's Disease
Current Awareness Bulletin
February 2020

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Title: Emergencies and critical issues in Parkinson's disease.

Author(s): Simonet, Cristina; Tolosa, Eduardo; Camara, Ana; valldeoriola, Francesc

Abstract: Complications from Parkinson's disease may develop over the disease course, sometimes unexpectedly, and require prompt or even urgent medical intervention. The most common are associated with aggravation of motor symptoms; serious non-motor complications, such as psychosis, orthostatic hypotension or sleep attacks, also occur. Here we review such complications, their clinical presentation, precipitating factors and management, including those related to using device-aided therapies. Early recognition and prompt attention to these critical situations is challenging, even for the Parkinson's disease specialist, but is essential to prevent serious problems.

Title: Applied Cognitive Strategy Behaviours In People With Parkinson's Disease During Daily Activities: A Cross-Sectional Study.

Author(s): Sturkenboom, Ingrid H. W. M.; Nott, Melissa T.; Bloem, Bastiaan R.; Chapparo, Christine; Steultjens, Esther M. J.

Objective: To explore the use of applied cognitive strategy behaviours during performance of daily activities in people with Parkinson's disease.

Design: Quantitative cross-sectional design. Methods: A total of 190 persons living at home with non-dementing Parkinson's disease were videotaped while performing a self-chosen activity in their natural environment. The videotaped performance was scored using the "Perceive, Recall, Plan & Perform System of Task Analysis" to measure: (i) performance mastery; and (ii) effective use of 34 cognitive strategy behaviours covering: attention and sensory processing (Perceive), accessing taskrelated knowledge (Recall), response planning and evaluation (Plan) and performance control (Perform). Mean performance mastery and a hierarchy of least to most effective applied cognitive strategy behaviours were determined for the total group and for 2 sub-groups based on disease severity. A multifaceted Rasch model was used for data analysis.

Results: Mean performance mastery was 56% (standard deviation 28%). Least efficient cognitive strategy behaviours were those used for planning, evaluating and controlling performance and most efficient strategies were those used for sensory discrimination and recalling factual information. More advanced disease indicated less efficient use of applied cognition.

Conclusion: The results suggest that the efficiency of applied cognitive strategy behaviours is compromised in a certain pattern in people with Parkinson's disease, and that it declines with disease progression.

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

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: Cognitive and motor effects of Kinect-based games training in people with and without Parkinson disease: A preliminary study.

Author(s): Melo Cerqueira, Thília Maria; Moura, Júlia Araújo; Lira, Juliana Onofre; Leal, Josevan Cerqueira; D'Amelio, Marco; Santos Mendes, Felipe Augusto

Objective: Purpose of this study is to evaluate the effects of training with six commercial Xbox KinectTM games on cognitive and motor aspects in Parkinson's disease (PD) patients and to compare the effects with a group of paired healthy subjects.

Methods: This study was a quasi-experimental, controlled trial. Eight individuals with PD (mean age 68.9 ± 7.9) and eight older adults without PD, matched by age (mean age 67.6 ± 7.3) were enrolled in the study. Ten sessions of six Xbox 360 KinectTM commercial games were performed for 5 weeks. Subjects were evaluated before and 7 and 30 days after intervention. They were assessed using Montreal Cognitive Assessment, Frontal Assessment Battery (FAB), Timed Up and Go test, Ten Meters Walking test, and Balance Berg Scale. The Freezing of Gait Questionnaire, the Movement Disorder Society Unified Parkinson Disease Rating Scale, and the Parkinson's disease Questionnaire were also applied to PD group.

Results: Significant improvement was found for cognitive aspects measured by Montreal Cognitive Assessment and FAB in both groups but without retention on FAB in PD group. No significant improvements were found for motor aspects in none group.

Conclusion: Motor–cognitive training using Xbox Kinect™ games is a feasible resource to improve executive functions in PD patients and in older healthy people.

Title: Combining aquatic physiotherapy with usual care physiotherapy for people with neurological conditions: A systematic review.

Author(s): Moritz, Tamara A.; Snowdon, David A.; Peiris, Casey L.

Objective: The objective of this review was to determine whether the combination of aquatic physiotherapy with usual care and results in greater improvements in activity limitations and neurological-related impairments in individuals with neurological conditions than usual care physiotherapy alone.

Methods: A systematic review of controlled trials was utilized to compare usual care physiotherapy with usual care physiotherapy combined with aquatic physiotherapy for adults with any neurological condition. Standardized mean differences and 95% confidence intervals were calculated from postintervention means and standard deviations.

Results: Ten trials with a total of 490 participants met the inclusion criteria. Of the included trials, combined aquatic and usual care physiotherapy was evaluated in people with stroke in eight trials and in people with Parkinson's disease in two trials. Trial and outcome heterogeneity prevented the completion of meta-analyses. Data from five trials (n = 259) in people with stroke suggest that aquatic physiotherapy improves measures of balance, walking, mobility, and activities of daily living. No significant differences were detected in measures of activity limitation for people with Parkinson's disease nor measures of impairment for people with stroke or Parkinson's disease.

Conclusion: This review provides preliminary evidence that the combination of aquatic physiotherapy with usual care physiotherapy may improve activity limitations in people with stroke. This review found no evidence to support the combination of aquatic physiotherapy with usual care physiotherapy to improve activity limitations in Parkinson's disease or other neurological populations. These results should be interpreted with caution due to the mixed quality of the included trials.

Title: Retention of touchscreen skills is compromised in Parkinson's disease.

Author(s): Nackaerts, Evelien; Ginis, Pieter; Heremans, Elke; Swinnen, Stephan P; Vandenberghe, Wim; Nieuwboer, Alice

Abstract: Fine motor skill impairments likely have a severe impact on the use of touchscreens in Parkinson's disease (PD). Although recent work showed positive effects of intensive writing training, many questions remained regarding the consolidation of motor learning in PD. The current study examined the effects of PD on practicing the manipulation of touchscreen technology and whether this can lead to 24h-retention and transfer. We developed the Swipe-Slide Pattern (SSP)-task, similar to handling a touchscreen unlock-trace. On day 1, 11 patients and 10 healthy, age-matched controls underwent two consecutive runs of early and late learning (9 × 36 s SSP and 36 s rest). This was followed by a retention test after 24 h, including the assessment of transfer. Movement time (MT, s), Euclidean distance (ED) and a performance index (PI = MT/ED) were compared across the learning phases (early, late, retention and transfer) for both groups. Additionally, a learning, retention and transfer index were compared between groups and correlated to clinical

characteristics. Both groups significantly improved in MT and PI across practice. However, while healthy adults showed further improvements after a 24h-retention period, patients presented with impaired retention indices. This was correlated with disease duration, disease severity and performance on a daily life mobile phone task. Finally, transfer to a similar, but untrained pattern was comparable between both groups. Overall, short-term practice of the SSP-task results in improvements for PD patients, albeit with impaired retention. Future work should investigate whether prolonged touchscreen skill training can be retained in motor memory in PD.

Title: Precision medicine in Parkinson's disease: emerging treatments for genetic Parkinson's disease.

Citation: Journal of neurology; Jan 2020

Author(s): Schneider, Susanne A; Alcalay, Roy N

Abstract: In recent years, numerous clinical trials for disease modification in Parkinson's disease (PD) have failed, possibly because of a "one-size-fits all" approach. Alternatively, a precision medicine approach, which customises treatments based on patients' individual genotype, may help reach disease modification. Here, we review clinical trials that target genetic forms of PD, i.e., GBA-associated and LRRK2-associated PD. In summary, six ongoing studies which explicitly recruit GBA-PD patients, and two studies which recruit LRRK2-PD patients, were identified. Available data on mechanisms of action, study design, and challenges of therapeutic trials are discussed.

Title: The benefits and mechanisms of exercise training for Parkinson's disease.

Citation: Life sciences; Jan 2020 ; p. 117345

Author(s): Feng, Ya-Shuo; Yang, Si-Dong; Tan, Zi-Xuan; Wang, Man-Man; Xing, Ying; Dong, Fang; Zhang, Feng

Abstract: Parkinson's disease (PD) is a significantly progressive neurodegenerative disease characterised by both motor and nonmotor disorders. The main pathological characteristics of PD consist of the loss of dopaminergic neurons and the formation of alpha-synuclein-containing Lewy bodies in the substantia nigra. Currently, the main therapeutic method for PD is anti-Parkinson medications, including levodopa, madopar, sirelin, and so on. However, the effect of pharmacological treatment has its own limitations, the most significant of which is that the therapeutic effect of dopaminergic treatments gradually diminishes with time. Exercise training, as an adjunctive treatment and complementary therapy, can improve the plasticity of cortical striatum and increase the release of dopamine. Exercise training has been proven to effectively improve motor disorders (including balance, gait, risk of falls and physical function) and nonmotor disorders (such as sleep impairments, cognitive function and quality of life) in PD patients. In recent years, various types of exercise training have been used to treat PD. In this review, we summarise the exercise therapy mechanisms and the protective effects of different types of exercise training on PD patients.

Title: Immunotherapy for Parkinson's disease.

Citation: Neurobiology of disease; Jan 2020 ; p. 104760

Author(s): Schwab, Aaron D; Thurston, Mackenzie J; Machhi, Jatinkumar P; Olson, Katherine E; Namminga, Krista L; Gendelman, Howard E; Mosley, R Lee

Abstract: With the increasing prevalence of Parkinson's disease, there is an immediate need to interdict disease signs and symptoms. In recent years this need was met through therapeutic approaches focused on regenerative stem cell replacement and alpha-synuclein clearance. However, neither have shown long-term clinical benefit. A novel therapeutic approach designed to affect disease is focused on transforming the brain's immune microenvironment. As disordered innate and adaptive immune functions are primary components of neurodegenerative disease pathogenesis, this has emerged as a clear opportunity for therapeutic development. Interventions that immunologically restore the brain's homeostatic environment can lead to neuroprotective outcomes. These have recently been demonstrated in both laboratory and early clinical investigations. To these ends, efforts to increase the numbers and function of regulatory T cells over dominant effector cells that exacerbate systemic inflammation and neurodegeneration have emerged as a primary research focus. These therapeutics show broad promise in affecting disease outcomes beyond PD, such as for Alzheimer's disease, stroke and traumatic brain injuries, which share common neurodegenerative disease processes.

Title: Comparing GPS-based community mobility measures with self-report assessments in older adults with Parkinson's disease.

Author(s): Zhu, Lynn; Duval, Christian; Boissy, Patrick; Odasso, Manuel Montero; Zou, Guangyong; Jog, Mandar; Speechley, Mark

Background: Real-life community mobility measures for older adults, especially those with Parkinson's disease, are important tools when helping individuals maintain optimal function and quality of life. This is one of the first studies to compare an objective GPS sensor and subjective self-report community mobility measures in an older clinical population.

Methods: Over 14 days, 54 people in Ontario, Canada with early to mid-stage Parkinson's Disease (mean age = 67.5 ± 6.3 years; 47 men; 46 retired) wore a wireless inertial measurement unit with GPS (WIMU-GPS), and completed the Life Space Assessment and mobility diaries. We assessed the convergent validity, reliability and agreement on mobility outcomes using Spearman's correlation, intraclass correlation coefficient and Bland-Altman analyses, respectively.

Results: Convergent validity was attained by the WIMU-GPS for trip frequency ($rs = 0.69$, 95% CI = 0.52 to 0.81) and duration outside ($rs = 0.43$, 95% CI = 0.18 to 0.62), but not for life space size ($rs = 0.39$, 95% CI = 0.14 to 0.60). The Life Space Assessment exhibited floor and ceiling effects. Moderate agreements were observed between WIMU-GPS and diary for trip frequency and duration (intraclass correlation coefficients = 0.71, 95% CI = 0.51 to 0.82; 0.67, 95% CI = 0.42 to 0.82, respectively). Disagreement was more common among non-retired individuals.

Conclusions: WIMU-GPS could replace diaries for trip frequency and duration assessments in older adults with Parkinson's Disease. Both assessments are best used for retired persons. However, the Life Space Assessment may not reflect actual mobility.

Title: Supplementary management with Pycnogenol® in Parkinson's disease to prevent cognitive impairment.

Author(s): Cesarone, Maria Rosaria; Belcaro, Gianni; Hosoi, Morio; Ledda, Andrea; Feragalli, Beatrice; Maione, Claudia; Scipione, Claudia; Scipione, Valeria; Cotellese, Roberto; Hu, Shuh

Background: The aim of this registry study in patients with Parkinson's Disease (PD) in treatment, was to evaluate the effects of Pycnogenol® supplementation on some accessory symptoms and cognitive functions (COFU).

Methods: The registry included 43 PD patients who had been diagnosed at least one year before the registry. The condition was considered 'mild', with minimal progression. The management for these patients was a monotherapy using carbidopa/levodopa (standard management; SM). Supplementary Pycnogenol® was used at 150 mg/day for 4 weeks. The neurological management was not affected.

Results: Tolerability and safety were very good; the two registry groups were comparable with comparable symptoms at baseline. The most disabling symptoms were considered tremor, bradychinesia, alterations in COFU, rigidity and speech changes. All symptoms were rated as mild-to-moderate. After 4 weeks, these target symptoms were attenuated with the supplement more than with the SM only (p<0.05). Particularly the score relative to COFU was significantly higher (p<0.05) with the supplement. No interference between the main neurological management and the supplement was observed. Oxidative stress (plasma free radicals), increased in both registry groups at inclusion, was significantly lower in the supplement group at 4 weeks (p<0.05). The main PD.associated items (cognitive aspects, motory and postural aspects) considered the most common and disturbing problems were evaluated and scored (0 to 4) wiith a visual scale line. At 4 weeks, the scores for all items were lower in the supplement group in comparison with the control, SM group. Peripheral edema was present in all patients at inclusion. The edema was minimal at inclusion (at the ankle-foot level with pretibial extension) and present in all subjects. It changed in two SM subjects and was still present at 4 weeks in 19 out 22 of the SM patients. In the supplemented patients, edema (present at inclusion in all subjects), was visible in 4 subjects out of 21 (19 %) at 4 weeks.

Conclusions: Pycnogenol® supplementation may help in selected patients with PD - under stable neurological treatment - to improve some of signs and symptoms and some aspects associated with COFU. Studies are in progress on a larger population sample and with new evaluation methods.

Title: Evaluation of cognitive function in relation to progression of Parkinson's disease.

Author(s): Yamawaki, Rie; Nankaku, Manabu; Kusano, Yusuke; Tajima, Ayumi; Ikeguchi, Ryosuke; Matsuda, Shuichi

Objective: Cognitive impairments are among the non-motor symptoms in patients with Parkinson's disease (PD). Understanding the cognitive impairments in patients with PD may be critical for developing effective rehabilitation interventions. The purpose of this study is to assess cognitive function in patients with PD using the Wechsler Adult Intelligence Scale-third edition (WAIS-III) and the Wechsler Memory Scale-revised (WMS-R), and investigate

how cognitive impairments relate to progression of disease in patients with PD according to the Hoehn and Yahr (HY) stages.

Design: Seventy-eight patients with PD participated in the present study. Our study consisted of patients in the following HY groups: I (no disability, n=11), II (mild, n=34), III (moderate, n=26), and IV-V (severe, n=7). Cognitive function was assessed using the WAIS-III and the WMS-R.

Results: The verbal memory was significantly higher in group I (106.4±12.0) than in the other groups (II: 90.5 ±14.0, III: 89.9±16.9, IV-V: 89.6 ±11.4). Visual memory and delayed recall were similar to the results seen with verbal memory, however, the differences between groups were not statistically significant. The full-scale IQ was not significantly different (I: 107.3±8.1, II: 96.9±18.2, III: 96.7±14.8, IV-V: 91.7±9.5).

Conclusions: These results suggest that a comprehensive assessment focused on memory impairments is important for applying the appropriate interventions in patients with early-stage PD.

Title: The cost-effectiveness of specialized nursing interventions for people with Parkinson's disease: the NICE-PD study protocol for a randomized controlled clinical trial.

Author(s): Radder, Danique L M; Lennaerts, Herma H; Vermeulen, Hester; van Asseldonk, Thies; Delnooz, Cathérine C S; Hagen, Rob H; Munneke, Marten; Bloem, Bastiaan R; de Vries, Nienke M

Background: Current guidelines recommend that every person with Parkinson's disease (PD) should have access to Parkinson's disease nurse specialist (PDNS) care. However, there is little scientific evidence of the cost-effectiveness of PDNS care. This hampers wider implementation, creates unequal access to care, and possibly leads to avoidable disability and costs. Therefore, we aim to study the (cost-)effectiveness of specialized nursing care provided by a PDNS compared with usual care (without PDNS) for people with PD in all disease stages. To gain more insight into the deployed interventions and their effects, a preplanned subgroup analysis will be performed on the basis of disease duration (diagnosis 10 years ago).

Methods: We will perform an 18-month, single-blind, randomized controlled clinical trial in eight community hospitals in the Netherlands. A total of 240 people with PD who have not been treated by a PDNS over the past 2 years will be included, independent of disease severity or duration. In each hospital, 30 patients will randomly be allocated in a 1:1 ratio to receive either care by a PDNS (who works according to a recent guideline on PDNS care) or usual care. We will use two co-primary outcomes: quality of life (measured with the Parkinson's Disease Questionnaire-39) and motor symptoms (measured with the Movement Disorders Society-sponsored revision of the Unified Parkinson's Disease Rating Scale part III). Secondary outcomes include nonmotor symptoms, health-related quality of life, experienced quality of care, self-management, medication adherence, caregiver burden, and coping skills. Data will be collected after 12 months and 18 months by a blinded researcher. A healthcare utilization and productivity loss questionnaire will be completed every 3 months.

Discussion: The results of this trial will have an immediate impact on the current care of people with PD. We hypothesize that by offering more patients access to PDNS care, quality of life will increase. We also expect healthcare costs to remain equal because increases in direct medical costs (funding additional nurses) will be offset by a reduced number of consultations with the general practitioner and neurologist. If these outcomes are reached,

wide implementation of PDNS care will be warranted.TRIAL REGISTRATION: ClinicalTrials.gov, NCT03830190. Registered February 5, 2019 (retrospectively registered).

Title: Voice changes in Parkinson's disease: What are they telling us?

Author(s): Ma, Andrew; Lau, Kenneth K; Thyagarajan, Dominic

Abstract: Emerging evidence suggests voice dysfunction is the earliest sign of motor impairment in Parkinson's disease (PD). The complexity and fine motor control involved in vocalization may result in dysfunction here before the limbs. The voice in PD demonstrates characteristic changes on perceptual and acoustic analyses. The physiological and anatomical correlates of these have been investigated through laryngoscopy, stroboscopy, photoglottography, laryngeal electromyography, computed-tomography, pulmonary function testing and aerodynamic assessments. These have revealed numerous abnormalities including incomplete glottic closure and vocal fold hypoadduction/bowing to account for these voice changes. Many of these phenomena are likely related to rigidity or bradykinesia of the laryngeal muscles. The early onset of voice changes is resonant with the pathophysiological insights offered by Braak's hypothesis and murine models of the disease. These physiological abnormalities and pathological models largely stand to support dopaminergic and non-dopaminergic mechanisms being implicated in the pathogenesis of voice dysfunction. This review focuses on characterizing the voice changes in PD. These stand as a promising area of enquiry to further our understanding of the pathophysiology of the disease and offer potential to be utilized as an early diagnostic biomarker or marker of disease progression.

Title: The Beneficial Effects of Computer-Based Cognitive Training in Parkinson's Disease: A Systematic Review.

Author(s): Nousia, Anastasia; Martzoukou, Maria; Tsouris, Zisis; Siokas, Vasileios; Aloizou, Athina-Maria; Liampas, Ioannis; Nasios, Grigorios; Dardiotis, Efthimios

Background: Cognitive dysfunction is one of the most prevalent non-motor aspects of Parkinson's disease (PD). The present review focuses on published studies investigating the effect of computer-based cognitive training (CT) on neuropsychological performance in PD.

Methods: A systematic search of the PubMed database and Google Scholar was carried out. Randomized controlled studies published before September 2019, investigating the effect of computer-based CT (regardless of the comparator, active or placebo) on PD patients were included. Literature search, data extraction, and Risk of Bias (RoB) evaluation (based on the RoB Cochrane tool for Randomized Trials) were performed by two authors (A.N. and M.M), independently.

Results: Among 31 full-texts assessed for eligibility, eight articles fulfilled the inclusion criteria and were involved in the qualitative analysis. The main outcomes of the retrieved studies (all studies used similar cognitive rehabilitation methodologies) were indicative of cognitive improvement in most cognitive domains, particularly memory, executive function, processing speed, and attention, that is, the domains primarily impaired in the disease.

Conclusion: Multidomain CT, which is exclusively based on computer software, leads to measurable improvements in most cognitive domains affected in patients with PD. The present review is the first to include studies assessing the effect of computer-based CT techniques without deploying CT with paper-pencil techniques. Limitations originate mainly due to the heterogeneity among included studies (differences in CT softwares, PD stages, number, and duration of training sessions.

Title: Effects of vibratory stimulation on balance and gait in Parkinson's disease: a systematic review and meta-analysis.

Author(s): Marazzi, Silvia; Kiper, Pawel; Palmer, Katie; Agostini, Michela; Turolla, Andrea

Introduction: Among the different rehabilitative approaches to Parkinson's disease, there is conflicting evidence about the effects of vibratory stimulation and its capability to modulate the central elaboration of proprioceptive stimuli. The hypothesis is that the vibration-induced sensorial perturbation (through Whole Body Vibration (WBV) or localized vibration) can influence the motor response in complex tasks such as postural control and gait. Thus, the objective of this review was to evaluate the effect of different modalities of vibratory stimulation treatment on balance, gait signs and symptoms, and quality of life, in patients with Parkinson's disease.

Evidence Acquisition: From the initial 1249 records, 10 of them which compared Whole Body Vibration (WBV) or localized vibration to conventional physiotherapy were included (i.e. randomized controlled trials, crossover trials, and quasi-experimental trials). Finally, five papers on WBV were included in quantitative synthesis (meta-analysis), while for three studies on localized vibrations a qualitative synthesis was performed. Two independent reviewers selected potentially relevant studies based on the inclusion criteria, extracted data, and evaluated the methodological quality.

Evidence Synthesis: Meta-analysis was performed among five studies on WBV treatment, whose effect was found to be significantly better than standard treatment for improving gait (measured by Timed Up and Go test and Stand-walk-sit test: Standardized Mean Difference= -0.51; 95% confidence interval= -1.00 to -0.01). Conversely, WBV was not significantly better than standard treatment for all the other outcomes. Due to high heterogeneity it was not possible to conduct a quantitative meta-analysis on studies of localized vibration.

Conclusions: Results of the review show that WBV can improve gait performance in patients with Parkinson's disease.

Title: Assessing the Relationship between the Enhanced Gait Variability Index and Falls in Individuals with Parkinson's Disease.

Author(s): Schmitt, Abigail C.; Baudendistel, Sidney T.; Fallon, Michaela S.; Roper, Jaimie A.; Hass, Chris J.

Abstract: Gait impairment and increased gait variability are common among individuals with Parkinson's disease (PD) and have been associated with increased risk for falls. The development of composite scores has gained interest to aggregate multiple aspects of gait into a single metric. The Enhanced Gait Variability Index (EGVI) was developed to compare an individual's gait variability to the amount of variability in a healthy population, yet the

EGVI's individual parts may also provide important information that may be lost in this conversion. We sought to contrast individual gait measures as predictors of fall frequency and the EGVI as a single predictor of fall frequency in individuals with PD. 273 patients (189M, 84F; 68 ± 10 yrs) with idiopathic PD walked over an instrumented walkway and reported fall frequency over three months (never, rarely, monthly, weekly, or daily). The predictive ability of gait velocity, step length, step time, stance time, and single support time and the EGVI was assessed using regression techniques to predict fall frequency. The EGVI explained 15.1% of the variance in fall frequency ($p < 0.001$, $r = 0.389$). Although the regression using the combined spatiotemporal measures to predict fall frequency was significant ($p = 0.002$, $r = 0.264$), none of the components reached significance (gait velocity: $p = 0.640$, step length: $p = 0.900$, step time: $p = 0.525$, stance time: $p = 0.532$, single support time: $p = 0.480$). The EGVI is a better predictor of fall frequency in persons with PD than its individual spatiotemporal components. Patients who fall more frequently have more variable gait, based on the interpretation of the EGVI. While the EGVI provides an objective measure of gait variability with some ability to predict fall frequency, full clinical interpretations and applications are currently unknown.

Title: Freezing More than Gait: A Case Report of Freezing of Urination (FOU) in Parkinson's Disease.

Author(s): Xu, Mengyuan; Chen, Tao; Yang, Caifei; Meng, Xu; Peng, Qingyun; Lei, Xiaoguang

Abstract: Freezing of gait (FOG) is a disabling phenomenon that is described by patients with Parkinson's disease (PD). Not only gait may be involved in the freezing phenomenon, but also some nonmotor symptoms, such as freezing of urination (FOU) in this case. The characters of urinary dysfunctions in this case resemble "off" freezing: (1) abrupt difficulty in starting or continuing in urination; (2) the urinary dysfunctions fluctuated with medication state; and (3) the urinary dysfunctions could be alleviated dramatically by an external cueing. Urinary dysfunctions in this patient (and maybe more PD patients) are associated not only with the classical "nonmotor symptoms" but also the freezing phenomenon. FOU could be a part of the spectrum of freezing symptoms. The subtypes of the freezing phenomenon will shed light on the PD pathophysiology and clinical treatment.

Title: Motor-cognitive approach and aerobic training: a synergism for rehabilitative intervention in Parkinson's disease.

Author(s): Ferrazzoli, Davide; Ortelli, Paola; Cucca, Alberto; Bakdounes, Leila; Canesi, Margherita; Volpe, Daniele

Abstract: Parkinson's disease (PD) results in a complex deterioration of motor behavior. Effective pharmacological or surgical treatments addressing the whole spectrum of both motor and cognitive symptoms are lacking. The cumulative functional impairment may have devastating socio-economic consequences on both patients and caregivers. Comprehensive models of care based on multidisciplinary approaches may succeed in better addressing the overall complexity of PD. Neurorehabilitation is a highly promising non-pharmacological intervention for managing PD. The scientific rationale beyond rehabilitation and its practical applicability remain to be established. In the present perspective, we aim to discuss the

current evidence supporting integrated motor-cognitive and aerobic rehabilitation approaches for patients with PD while suggesting a practical framework to optimize this intervention in the next future.

Title: The pharmacological management of constipation in patients with Parkinson's disease: a much-needed relief.

Citation: Expert opinion on pharmacotherapy; Feb 2020 ; p. 1-7

Author(s): Mozaffari, Shilan; Nikfar, Shekoufeh; Daniali, Marzieh; Abdollahi, Mohammad

Introduction: Constipation is common in patients with Parkinson's disease (PD). Due to the considerable negative outcomes of constipation, significant efforts have been made to prevent and manage chronic constipation in these patients.

Areas covered: Herein, the authors review some of the known pathophysiological causes for slow gastrointestinal (GI) transit in PD patients and the different pharmacological options. All relevant clinical and experimental data found through online databases were included. Bulking agents, osmotic and stimulant laxatives, chloride channel activators, ghrelin agonists, 5-HT4 receptor agonists, and probiotics are some of the proposed medicinal agents. of the authors further review the evidence on alpha-synuclein and botulinum neurotoxin in these patients. It should be noted, however, that some of these interventions are required to be further validated.

Expert opinion: Reduction of GI transit and dysfunction of the anorectum is obvious in PD, affecting the incidence of constipation and thus, quality of life (QOL). Furthermore, due to an inadequate and delayed absorption of oral anti PD medications, dose adjustments and changes in the route of administration are recommended.

Title: Group singing improves quality of life for people with Parkinson's: an international study.

Citation: Aging & mental health; Feb 2020 ; p. 1-7

Author(s): Irons, J Yoon; Hancox, Grenville; Vella-Burrows, Trish; Han, Eun-Young; Chong, Hyun-Ju; Sheffield, David; Stewart, Donald E

Objectives: Group singing has been reported to enhance quality of life (QoL) and mental health in older people. This paper explored whether there are differences in the effects of group singing intervention on people with Parkinson's (PwPs) in Australia, UK and South Korea.

Methods: The study included PwPs (N = 95; mean age = 70.26; male 45%) who participated in a standardised 6-month weekly group singing programme. Parkinson's health-related QoL measure (PDQ39) and mental health assessment (DASS) were administered at baseline and follow-up. ANOVAs were performed with significance set as $p < .05$.

Results: ANOVAs revealed main effects of Time on the Stigma and Social Support subscales of PDQ39; both showed a small but significant improvement over time. However, the social support reduction was moderated by country; social support was improved only in South Korean participants. The reduction in stigma was greater than previously reported minimal clinically important differences, as was the social support reduction in South Korean participants. In terms of mental health, ANOVAs revealed that the scores of Anxiety and Stress domains of DASS significantly decreased from pre-test to post-test with small effect sizes.

Conclusion: This first international singing study with PwPs demonstrated that group singing can reduce stigma, anxiety and stress and enhance social support in older adults living with Parkinson's. The findings are encouraging and warrant further research using more robust designs.

Title: Gut microbiota differences between healthy older adults and individuals with Parkinson's disease: A systematic review.

Author(s): Nuzum, Nathan D; Loughman, Amy; Szymlek-Gay, Ewa A; Hendy, Ashlee; Teo, Wei-Peng; Macpherson, Helen

Abstract: The 'Dual Hit' hypothesis, stating that Parkinson's disease (PD) begins via olfactory pathways and the gut, and the gastrointestinal symptoms PD individuals face, have largely driven the interest of the gut's involvement in PD. Studies have since observed gut microbiota differences between PD groups and controls, with these alterations potentially relating to PD pathophysiology. However, differences in the studies' methodologies precludes unanimity on the relationships of gut microbiota to PD. Thirteen observational case-control studies investigating gut microbiota in PD and controls were reviewed to assess how microbiota abundance and diversity relates to PD. Nine studies showed butyrate producing gut microbiota had lower abundances in PD compared to controls. Three studies reported α-diversity was higher, with one reporting it was lower, in PD compared to controls. Given most studies show abundance, not diversity, differences of butyrate producing bacteria between groups, we propose abundance differences are more associated with PD than microbiota diversity. As current research is observational, investigating how specific bacteria and their metabolites may alter throughout PD progression is warranted.

Title: Empathy and theory of mind in Parkinson's disease: A meta-analysis.

Author(s): Coundouris, Sarah P; Adams, Alexandra G; Henry, Julie D

Abstract: In contrast to well-documented deficits in the core social cognitive domains of social perception and theory of mind (ToM), how Parkinson's disease (PD) affects one's empathic capacity remains poorly understood. The current study provides the first meta-analytic review of both ToM and empathy as broad constructs, and also breaks these constructs down to clearly differentiate their overlapping (affective ToM and cognitive empathy) and distinct (affective empathy and cognitive ToM) components. A total of 38 studies contributed to these analyses, with results revealing that, relative to controls, PD is associated with significant and substantial deficits in the domain of cognitive ToM ($g = -0.78$), as well as the overlapping domains of affective ToM/cognitive empathy ($g = -0.69$). However, no group differences were identified for affective empathy ($g = -0.08$). These data speak to there being a potential preservation of affective empathic processing in PD, but because of the relatively limited research base on this topic, recommendations for future research are highlighted.

Title: Management of Urologic and Sexual Dysfunction in Parkinson Disease.

Author(s): Margolesky, Jason; Betté, Sagari; Singer, Carlos

Abstract: Parkinson disease (PD) is a complex of motor and nonmotor symptoms. Among the nonmotor symptoms, urinary and sexual dysfunctions are common and negatively affect the quality of life. More than 50% of patients with PD complain of urinary dysfunction and 20% have sexual dysfunction. Understanding the anatomy and physiology of the urogenital system informs the rationale for the mechanism of action of drug therapies. The management of urinary and sexual dysfunction in PD, including behavioral, medical, and procedural interventions, is reviewed in this article.

Title: Orthopedic Care of Patients with Parkinson Disease.

Author(s): Dale, Marian Livingston

Abstract: This article summarizes existing literature examining orthopedic interventions for patients with Parkinson disease (PD). It reviews complications and functional outcomes of shoulder, spine, knee, and hip surgeries in PD. Causes of fall-related fractures in PD and the risk of postoperative cognitive decline after orthopedic interventions in PD are also briefly discussed.

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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