Parkinson's Disease

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1. Exploring the experiences, priorities and preferences of people living with Parkinson's on exercise and physical activity promotion in the UK.

Authors: Agley, Ledia;Hartley, Peter and Lafortune, Louise

Abstract: BACKGROUND: People with Parkinson's (PwP) want access to timely, relevant, and specific exercise and physical activity (PA) information to enable them to manage their symptoms and maintain wellbeing and quality of life. Research that promotes exercise in this population group is limited. Little is also known about the clinical practice around PA promotion in this population, especially around the time of diagnosis. OBJECTIVE: To explore the experiences, preferences, and priorities of PwP around exercise and PA promotion and assess their knowledge on these topics. METHODS: A cross-sectional online survey for PwP in the United Kingdom was conducted from July to December 2021. RESULTS: 430 participants started the survey and 405 completed it. Participants had a mean age of 65.1 (+/- 9.2) and had been living with Parkinson's for a varying time (up to 2 years = 38%, up to 6 years = 39% and for 7 or more years = 23%). Most participants reported they had not received an education (68%; n = 276) or exercise intervention (54%; n = 217) as part of their routine management by the National Health Service (NHS) since diagnosis and had sought services privately. Knowledge of the overall benefits of exercise was good, however participants lacked specific knowledge on the impact of Parkinson's Disease (PD) on posture, falls and muscle strength. 90% of participants reported they would participate in an exercise and PA education interventions. CONCLUSIONS: PwP want exercise and PA education interventions that provide knowledge, skills and access to opportunities that enable participation. For the majority, these interventions have not been provided as part of their routine care pathway. To align with the priorities and preferences of PwP, interventions should be offered around the time of diagnosis, include content that is relevant and specific to how exercise and PA can mitigate symptoms of PD and should be delivered in person or online in a group setting.

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2. Wearable biofeedback device to assess gait features and improve gait pattern in people with parkinson's disease: a case series.

Authors: Bowman, Thomas;Pergolini, Andrea;Carrozza, Maria Chiara;Lencioni, Tiziana;Marzegan, Alberto;Meloni, Mario;Vitiello, Nicola;Crea, Simona and Cattaneo, Davide

Abstract: INTRODUCTION: People with Parkinson's Disease (PD) show abnormal gait patterns compromising their independence and quality of life. Among all gait alterations due to PD, reduced step length, increased cadence, and decreased ground-reaction force during the

loading response and push-off phases are the most common. Wearable biofeedback technologies offer the possibility to provide correlated single or multi-modal stimuli associated with specific gait events or gait performance, hence promoting subjects' awareness of their gait disturbances. Moreover, the portability and applicability in clinical and home settings for gait rehabilitation increase the efficiency in the management of PD. The Wearable Vibrotactile Bidirectional Interface (BI) is a biofeedback device designed to extract gait features in real-time and deliver a customized vibrotactile stimulus at the waist of PD subjects synchronously with specific gait phases. The aims of this study were to measure the effect of the BI on gait parameters usually compromised by the typical bradykinetic gait and to assess its usability and safety in clinical practice. METHODS: In this case series, seven subjects (age: 70.4 +/- 8.1 years; H&Y: 2.7 +/- 0.3) used the BI and performed a test on a 10-meter walkway (10mWT) and a two-minute walk test (2MWT) as pre-training (Pre-trn) and post-training (Post-trn) assessments. Gait tests were executed in random order with (Bf) and without (No-Bf) the activation of the biofeedback stimulus. All subjects performed three training sessions of 40 min to familiarize themselves with the BI during walking activities. A descriptive analysis of gait parameters (i.e., gait speed, step length, cadence, walking distance, double-support phase) was carried out. The 2-sided Wilcoxon sign-test was used to assess differences between Bf and No-Bf assessments (p : In this case series, seven subjects (age: 70.4 +/- 8.1 years; H&Y: 2.7 +/- 0.3) used the BI and performed a test on a 10-meter walkway (10mWT) and a two-minute walk test (2MWT) as pre-training (Pre-trn) and post-training (Post-trn) assessments. Gait tests were executed in random order with (Bf) and without (No-Bf) the activation of the biofeedback stimulus. All subjects performed three training sessions of 40 min to familiarize themselves with the BI during walking activities. A descriptive analysis of gait parameters (i.e., gait speed, step length, cadence, walking distance, double-support phase) was carried out. The 2-sided Wilcoxon sign-test was used to assess differences between Bf and No-Bf assessments (p RESULTS: After training subjects improved gait speed (Pre-trn_No-Bf: 0.72(0.59,0.72) m/sec; Post-trn_Bf: 0.95(0.69,0.98) m/sec; p = 0.043) and step length (Pre-trn_No-Bf: 0.87(0.81,0.96) meters; Post-trn_Bf: 1.05(0.96,1.14) meters; p = 0.023) using the biofeedback during the 10mWT. Similarly, subjects' walking distance improved (Pre-trn_No-Bf: 97.5 (80.3,110.8) meters; Post-trn_Bf: 118.5(99.3,129.3) meters; p = 0.028) and the duration of the double-support phase decreased (Pre-trn_No-Bf: 29.7(26.8,31.7) %; Post-trn_Bf: 27.2(24.6,28.7) %; p = 0.018) during the 2MWT. An immediate effect of the BI was detected in cadence (Pre-trn_No-Bf: 108(103.8,116.7) step/min; Pre-trn_Bf: 101.4(96.3,111.4) step/min; p = 0.028) at Pre-trn, and in walking distance at Post-trn (Post-trn_No-Bf: 112.5(97.5,124.5) meters; Post-trn_Bf: 118.5(99.3,129.3) meters; p = 0.043). SUS scores were 77.5 in five subjects and 80.3 in two subjects. In terms of safety, all subjects completed the protocol without any adverse events. CONCLUSION: The BI seems to be usable and safe for PD users. Temporal gait parameters have been measured during clinical walking tests providing detailed outcomes. A short period of training with the BI suggests improvements in the gait patterns of people with PD. This research serves as preliminary support for future integration of the BI as an instrument for clinical assessment and rehabilitation in people with PD, both in hospital and remote environments. TRIAL REGISTRATION: The study protocol was registered (DGDMF.VI/P/I.5.i.m.2/2019/1297) and approved by the General Directorate of Medical Devices and Pharmaceutical Service of the Italian Ministry of Health and by the ethics committee of the Lombardy region (Milan, Italy). Copyright © 2024. The Author(s).

3. **Long-Term Impact of Deep Brain Stimulation in Parkinson's Disease: Does It Affect Rehabilitation Outcomes?.**

Authors: Canesi, Margherita;Lippi, Lorenzo;Rivaroli, Simone;Vavassori, Daniele;Trenti, Marta;Sartorio, Francesco;Meucci, Nicoletta;de Sire, Alessandro;Siri, Chiara and Invernizzi, Marco

Abstract: Background and Objectives : Although the growing literature is now focusing on the long-term effects of Deep Brain Stimulation (DBS) in Parkinson's disease (PD), there is still a large gap of knowledge about its long-term implications in rehabilitation. Therefore, this study aimed at investigating the effects of rehabilitation in PD patients years after DBS implantation. Materials and Methods: This retrospective case-control study analyzed records from Moriggia-Pelascini Hospital, Italy from September 2022 to January 2024. Data of PD patients (n = 47) with (DBS group, n = 22) and without (control group, n = 25) DBS were considered. All study participants underwent a daily rehabilitation program lasting four weeks, including warm-up, aerobic exercises, strength training, postural exercises, and proprioceptive activities. The outcomes assessed were the Unified Parkinson's Disease Rating Scale (UPDRS), Berg Balance Scale (BBS), Timed Up and Go (TUG), 6 Min Walk Test (6MWT), and Self-Assessment Parkinson Disease Scale (SPDDS). Results: DBS group showed significant improvements in terms of all outcome measures after the rehabilitation intervention (UPDRS III: -7.0 (-11.5 to -1.0); p = 0.001; UPDRS I II IV: -12.0 (-19.0 to -4.5); p = 0.001; BBS: 7.0 (3.8 to 10.3); p p p p Conclusions: This study emphasizes positive rehabilitation effects on PD patients irrespective of DBS status. Further research is essential to elucidate long-term effects of DBS on rehabilitation outcomes of PD patients.

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4. **Distinct effects of long-term Tai Chi Chuan and aerobic exercise interventions on motor and neurocognitive performance in early-stage Parkinson's disease: a randomized controlled trial.**

Authors: Chang, C. L.;Pan, C. Y.;Wang, T. C.;Tseng, Y. T.;Chien, C. Y.;Lin, T. K. and Tsai, C. L.

Abstract: BACKGROUND: Parkinson's disease (PD) is a neurodegenerative condition characterized by movement disorders and probable cognitive impairment. Exercise plays an important role in PD management, and recent studies have reported improvement in motor symptoms and cognitive function following aerobic and Tai Chi Chuan exercise. AIM: To explore the different effects of Tai Chi Chuan and aerobic exercise on the clinical motor status and neurocognitive performance of patients with early-stage PD. DESIGN: A randomized controlled trial. SETTING: Parkinson's Disease Center at Kaohsiung Chang Gung Memorial

Hospital and National Cheng Kung University Hospital. POPULATION: Patients with idiopathic PD. METHOD(S): Fifty-six patients with PD were recruited and divided into three groups: aerobic exercise (AE, N.=14), Tai Chi Chuan exercise (TE, N.=16), and control (CG, N.=13). Before and after a 12-week intervention period, we used unified Parkinson's disease rating scale Part III (UPDRS-III) scores and neuropsychological (e.g., accuracy rates [ARs] and reaction times [RTs]) and neurophysiological (e.g., event-related potential [ERP] N2 and P3 latencies and amplitudes) parameters to respectively assess the patients' clinical motor symptoms and neurocognitive performance when performing a working memory (WM) task. RESULT(S): Compared to baseline, UPDRS-III scores were significantly lower in the AE and TE groups after the intervention period, whereas those for the CG group were higher. In terms of the neurocognitive parameters, when performing the WM task after the intervention period, the AE group exhibited significantly faster RTs and larger ERP P3 amplitudes, the TE group exhibited an improvement only in ERP P3 amplitude, and the CG group exhibited a significantly reduced ERP P3 amplitude. However, neither the TE nor the AE group exhibited improved ARs and ERP N2 performance. CONCLUSION(S): The present study supported the distinct effectiveness of Tai Chi Chuan and aerobic exercise for improving motor symptoms and providing neurocognitive benefits in PD patients. CLINICAL REHABILITATION IMPACT: These results have important implications regarding the use of these exercise interventions for managing PD, particularly in the early stages.

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5. **The neurophysiological brain-fingerprint of Parkinson's disease.**

Authors: da Silva Castanheira, Jason;Wiesman, Alex I.;Hansen, Justine Y.;Misic, Bratislav and Baillet, Sylvain

Abstract: BACKGROUND: Research in healthy young adults shows that characteristic patterns of brain activity define individual "brain-fingerprints" that are unique to each person. However, variability in these brain-fingerprints increases in individuals with neurological conditions, challenging the clinical relevance and potential impact of the approach. Our study shows that brain-fingerprints derived from neurophysiological brain activity are associated with pathophysiological and clinical traits of individual patients with Parkinson's disease (PD). METHODS: We created brain-fingerprints from task-free brain activity recorded through magnetoencephalography in 79 PD patients and compared them with those from two independent samples of age-matched healthy controls (N = 424 total). We decomposed brain activity into arrhythmic and rhythmic components, defining distinct brain-fingerprints for each type from recording durations of up to 4 min and as short as 30 s. FINDINGS: The arrhythmic spectral components of cortical activity in patients with Parkinson's disease are more variable over short periods, challenging the definition of a reliable brain-fingerprint. However, by isolating the rhythmic components of cortical activity, we derived brain-fingerprints that distinguished between patients and healthy controls with about 90% accuracy. The most prominent cortical features of the resulting Parkinson's brain-fingerprint are mapped to polyrhythmic activity in unimodal sensorimotor regions. Leveraging these features, we also demonstrate that Parkinson's symptom laterality can be decoded directly from cortical neurophysiological activity. Furthermore, our study reveals that the cortical topography of the

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6. **Disease Progression of Data-Driven Subtypes of Parkinson's Disease: 5-Year Longitudinal Study from the Early Parkinson's disease Longitudinal Singapore (PALS) Cohort.**

Authors: Deng, X.;Saffari, S. E.;Xiao, B.;Ng, S. Y. E.;Chia, N.;Choi, X.;Heng, D. L.;Ng, E.;Xu, Z.;Tay, K. Y.;Au, W. L.;Tan, E. K. and Tan, L. C. S.

Publication Date: 2024

Abstract: Background: The detailed trajectory of data-driven subtypes in Parkinson's disease (PD) within Asian cohorts remains undisclosed. Objective(s): To evaluate the motor, non-motor symptom (NMS) progression among the data-driven PD clusters. Method(s): In this 5-year longitudinal study, NMS scale (NMSS), Hospital Anxiety Depression Scale (HADS), and Epworth sleepiness scale (ESS) were carried out annually to monitor NMS progression. H& Y staging scale, MDS-UPDRS part III motor score, and postural instability gait difficulty (PIGD) score were assessed annually to evaluate disease severity and motor progression. Five cognitive standardized scores were used to assess detailed cognitive progression. Linear mixed model was performed to assess the annual progression rates of the longitudinal outcomes. Result(s): Two hundred and six early PD patients, consisting of 43 patients in cluster A, 98 patients in cluster B and 65 subjects in cluster C. Cluster A (severe subtype) had significantly faster progression slope in NMSS Domain 3 (mood/apathy) score (p = 0.01), NMSS Domain 4 (perceptual problems) score (p = 0.02), NMSS Domain 7 (urinary) score (p = 0.03), and ESS Total Score (p = 0.04) than the other two clusters. Cluster A also progressed

significantly in PIGD score (p = 0.04). For cognitive outcomes, cluster A deteriorated significantly in visuospatial domain (p = 0.002), while cluster C (mild subtype) deteriorated significantly in executive domain (p = 0.04). Conclusion(s): The severe cluster had significantly faster progression, particularly in mood and perceptual NMS domains, visuospatial cognitive performances, and postural instability gait scores. Our findings will be helpful for clinicians to stratify and pre-emptively manage PD patients by developing intervention strategies to counter the progression of these domains.

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7. **Air pollution, greenspace exposure and risk of Parkinson's disease: a prospective study of 441,462 participants.**

Authors: Feng, Y.;Li, M.;Hao, X.;Ma, D.;Guo, M.;Zuo, C.;Li, S.;Liang, Y.;Hao, C.;Wang, Z.;Sun, Y.;Qi, S.;Sun, S. and Shi, C.

Abstract: Background: The current understandings of the relationship between air pollution (AP), greenspace exposure and Parkinson's Disease (PD) remain inconclusive. Method(s): We engaged 441,462 participants from the UK Biobank who were not diagnosed with PD. Utilizing Cox proportional hazard regression model, relationships between AP [nitrogen dioxide (NO2), and nitrogen oxides (NOX), particulate matter), particulate matter 2.5), coarse particulate matter between 2.5 mum and 10 mum in aerodynamic diameter(PM2.5-10), particulate matter), particulate matter 10)], greenspace exposure, and PD risk were determined independently. Our analyses comprised three models, adjusted for covariates, and affirmed through six sensitivity analyses to bolster the robustness of our findings. Moreover, mediation analysis was deployed to discern the mediating effect of AP between greenspaces and PD. Result(s): During a median follow-up of 12.23 years (5,574,293 person-years), there were 3,293 PD events. Each interquartile (IQR) increment in NO2 and PM10 concentrations were associated with 10% and 8% increase in PD onset risk, while the increases in NOX, PM2.5 and PM2.5-10 were not associated with PD risk. Additionally, greenspace may safeguard by reducing NO2 and PM10 levels, with the effect mediated by NO2 and PM10 in greenspace-PD relationship. Conclusion(s): Our findings indicate that an IQR increase in ambient NO2 and PM10 concentrations was associated with risk of PD development, while other pollutants (NOX, PM2.5 and PM2.5-10) were not associated with PD risk. Firstly, we find that augmented exposure to greenspace was associated with the lower PD risk by reducing NO2 and PM10 levels.Copyright © Springer-Verlag GmbH Germany, part of Springer Nature 2024.

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8. **Cross-Sectional and Longitudinal Association of Clinical and Neurocognitive Factors With Apathy in Patients With Parkinson Disease.**

Authors: Le Heron, C.;Horne, K. L.;MacAskill, M. R.;Livingstone, L.;Melzer, T. R.;Myall, D.;Pitcher, T.;DalrympleAlford, J.;Anderson, T. and Harrison, S.

Abstract: BACKGROUND AND OBJECTIVES: A robust understanding of the natural history of apathy in Parkinson disease (PD) is foundational for developing effective clinical management tools. However, large longitudinal studies are lacking while the literature is inconsistent about even cross-sectional associations. We aimed to determine the longitudinal predictors of apathy development in a large cohort of people with PD and its cross-sectional associations and trajectories over time, using sophisticated Bayesian modeling techniques. METHOD(S): People with PD followed up in the longitudinal New Zealand Parkinson's progression project were included. Apathy was defined using the neuropsychiatric inventory subscale >=4, and analyses were also repeated using a less stringent cutoff of >=1. Both MoCA and comprehensive neuropsychological testing were used as appropriate to the model. Depression was assessed using the hospital anxiety and depression scale. Cross-sectional Bayesian regressions were conducted, and a multistate predictive model was used to identify factors that predict the initial onset of apathy in nonapathetic PD, while also accounting for the competing risk of death. The relationship between apathy presence and mortality was also investigated. RESULT(S): Three hundred forty-six people with PD followed up for up to 14 years across a total of 1,392 sessions were included. Apathy occurrence did not vary significantly across the disease course (disease duration odds ratio [OR] = 0.55, [95% CI 0.28-1.12], affecting approximately 11% or 22% of people at any time depending on the NPI cutoff used. Its presence was associated with a significantly higher risk of death after controlling for all other factors (hazard ratio [HR] = 2.92 [1.50-5.66]). Lower cognition, higher depression levels, and greater motor severity predicted apathy development in those without motivational deficits (HR [cognition] = 0.66 [0.48-0.90], HR [depression] = 1.45 [1.04-2.02], HR [motor severity] = 1.37 [1.01-1.86]). Cognition and depression were also associated with apathy cross-sectionally, along with male sex and possibly lower dopaminergic therapy level, but apathy still occurred across the full spectrum of each variable (OR [cognition] = 0.58 [0.44-0.76], OR [depression] = 1.43 [1.04-1.97], OR [female sex] = 0.45 [0.22-0.92], and OR [levodopa equivalent dose] = 0.78 [0.59-1.04]. DISCUSSION: Apathy occurs across the PD time course and is associated with higher mortality. Depressive symptoms and cognitive impairment in particular predict its future development in those with normal motivation.

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9. **Clinical Outcome Assessments and Digital Health Technologies Supporting Clinical Trial Endpoints in Early Parkinson's Disease: Roundtable Proceedings and Roadmap for Research.**

Authors: O'Hanlon, Claire E.;Farmer, Carrie M.;Ryan, Jamie and Ernecoff, Natalie

Publication Date: Jun ,2024

Journal: Rand Health Quarterly 11(3), pp. 1

Abstract: This article summarizes the Parkinson's Disease (PD) Endpoints Roundtable, which was held in Washington, D.C., on November 2-3, 2022, and hosted by The Michael J. Fox Foundation for Parkinson's Research, Parkinson's UK, and Parkinson Canada. This event brought representatives from academia and industry together with those from regulatory agencies, community partners, and research funders to discuss challenges in clinical outcome assessment development for treatments in early PD and to identify priorities for the field and opportunities for collaboration. This article provides a summary of the presentations given and topics discussed at the roundtable and synthesizes the discussions about the development of

10. 21st century accelerating neurological deaths in UK and major Western countries: - Demographic and/or multiple-interactive-environmental causes?.

Authors: Pritchard, Colin;Silk, Anne;Hansen, Lars;Panesar, Harpal and Berendt, Therese

Publication Date: Jul 15 ,2024

Journal: Journal of the Neurological Sciences 462, pp. 123094

Abstract: OBJECTIVE: We examine whether the rise in neurological death rates over the 21st century are solely explained by the Gompertzian hypothesis. STUDY DESIGN: We examine two data-sets. First, Office of National Statistics (ONS, 2022) for nineteen mortality categories in England/Wales, including Alzheimer's, Dementias and Parkinson's Disease. Secondly, WHO (2020) Combined Neurological Mortality (CNM), from WHO Global mortality categories, Nervous Disease Deaths, and Alzheimer's & Other Dementias. METHODS: Based on ONS data we investigate trends in Age-Standardised Mortality Rates (ASMR) of CNM 2000-2022. Based on WHO data we examine rates of Early Deaths (55-74) and ASMR, for CNM between 2000 and 2015 in the ten Major 'Western' economies: Australia, Canada, France, Germany, Italy, Japan, Netherlands, Spain, UK, and the USA. RESULTS: In England & Wales death rates have increased 348% for Alzheimer's, 235% for Dementias, and 105% for Parkinson's Disease in contrast with falls in most other cause mortality. Early Adults Deaths CNM rates increased in eight countries, an average of 19%. Neurological ASMR rose in every country, averaging 43%, the highest was the UK 95%. CONCLUSION: We reject the Gompertzian hypothesis as an all-encompassing explanation for these marked increases in ASMR. Increases in early adult neurological deaths suggests this cannot be solely explained by an aging population. Furthermore, increases in mortality could be related to an increased prevalence of neurological conditions in this age group. Action is urgently needed to investigate factors - whether environmental, lifestyle or health systems - that could explain these findings. Copyright © 2024 Elsevier B.V. All rights reserved.

11. Predictors of short-term anxiety outcome in subthalamic stimulation for Parkinson's disease.

Authors: Sauerbier, Anna;Herberg, Johanna;Stopic, Vasilija;Loehrer, Philipp A.;Ashkan, Keyoumars;Rizos, Alexandra;Jost, Stefanie T.;Petry-Schmelzer, Jan Niklas;Gronostay, Alexandra;Schneider, Christian;Visser-Vandewalle, Veerle;Evans, Julian;Nimsky, Christopher;Fink, Gereon R.;Antonini, Angelo;Martinez-Martin, Pablo;Silverdale, Monty;Weintraub, Daniel;Schrag, Anette;Ray Chaudhuri, K., et al

Publication Date: Jun 08 ,2024

Journal: Npj Parkinsons Disease 10(1), pp. 114

Abstract: The effects of subthalamic nucleus deep brain stimulation (STN-DBS) on anxiety in Parkinson's disease (PD) are understudied. We identified clinical predictors of STN-DBS

effects on anxiety in this study. In this prospective, open-label, multicentre study, we assessed patients with anxiety undergoing STN-DBS for PD preoperatively and at 6-month follow-up postoperatively. We assessed the Hospital Anxiety and Depression Scale (HADS-anxiety and depression subscales), Unified PD Rating Scale-motor examination, Scales for Outcomes in PD-motor (SCOPA-M)-activities of daily living (ADL) and -motor complications, Non-Motor Symptom Scale (NMSS), PDQuestionnaire-8 (PDQ-8), and levodopa-equivalent daily dose. We tested changes at follow-up with Wilcoxon signed-rank test and corrected for multiple comparisons (Bonferroni method). We identified patients with a clinically relevant anxiety improvement of anxiety based on a designated threshold of 1/2 standard deviation of baseline HADS-anxiety. Moreover, we investigated predictors of HADS-anxiety changes with correlations and linear regressions. We included 50 patients with clinically relevant baseline anxiety (i.e., HADS-anxiety >= 8) aged 63.1 years +/- 8.3 with 10.4 years +/- 4.5 PD duration. HADS-anxiety improved significantly at 6-month follow-up as 80% of our cohort experienced clinically relevant anxiety improvement. In predictor analyses, worse baseline SCOPA-ADL and NMSS-urinary domain were associated with greater HADS-anxiety improvements. HADS-anxiety and PDQ-8 changes correlated moderately. Worse preoperative ADL and urinary symptoms predicted favourable postoperative anxiety outcome, which in turn was directly proportionate to greater QoL improvement. This study highlights the importance of detailed anxiety assessments alongside other non-motor and motor symptoms when advising and monitoring patients undergoing STN-DBS for PD. Copyright © 2024. The Author(s).

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12. **Association of Baseline Depression and Anxiety with Longitudinal Health Outcomes in Parkinson's Disease.**

Authors: Shi, Y.;Dobkin, R.;Weintraub, D.;Cho, H. R.;CaspellGarcia, C.;Bock, M.;Brown, E.;Aarsland, D. and Dahodwala, N.

Abstract: Background: Anxiety and depression are common non-motor symptoms in Parkinson's disease (PD) but remain under-recognized and under-treated. Objective(s): To evaluate functional outcomes associated with baseline anxiety or depression and effects related to the initiation of new psychiatric treatment. Method(s): We analyzed 7 years of data from patients with de novo PD enrolled in the Parkinson's Progression Markers Initiative. Longitudinal regression models evaluated the association between baseline anxiety and depression with Schwab and England (SE) and MDS-UPDRS total scores over time. Cox proportional hazard models assessed effects of baseline anxiety and depression on time to initiation of dopaminergic therapy. Piecewise linear regression models examined the association of treatment initiation for anxiety and depression with SE and MDS-UPDRS. Result(s): 490 participants with baseline depression and anxiety data were included. Anxiety and depression were associated with lower SE (anxiety: beta = -1.31, P = 0.038, depression: beta = -1.96, P = 0.012, co-morbid: beta = -2.70, P = 0.003) and higher MDS-UPDRS scores (anxiety: beta = 5.37, P Result(s): 490 participants with baseline depression and anxiety data were included. Anxiety and depression were associated with lower SE (anxiety: beta = -1.31, P = 0.038, depression: beta = -1.96, P = 0.012, co-morbid: beta = -2.70, P = 0.003) and higher MDS-UPDRS scores (anxiety: beta = 5.37, P Result(s): 490 participants with baseline

depression and anxiety data were included. Anxiety and depression were associated with lower SE (anxiety: beta = -1.31, P = 0.038, depression: beta = -1.96, P = 0.012, co-morbid: beta = -2.70, P = 0.003) and higher MDS-UPDRS scores (anxiety: beta = 5.37, P Result(s): 490 participants with baseline depression and anxiety data were included. Anxiety and depression were associated with lower SE (anxiety: beta = -1.31, P = 0.038, depression: beta = -1.96, P = 0.012, co-morbid: beta = -2.70, P = 0.003) and higher MDS-UPDRS scores (anxiety: beta = 5.37, P Result(s): 490 participants with baseline depression and anxiety data were included. Anxiety and depression were associated with lower SE (anxiety: beta = -1.31, P = 0.038, depression: beta = -1.96, P = 0.012, co-morbid: beta = -2.70, P = 0.003) and higher MDS-UPDRS scores (anxiety: beta = 5.37, P Conclusion(s): Anxiety and depression at PD onset are associated with multiple negative longitudinal trajectories. However, preliminary findings suggest that anxiety and depression treatment may be linked with improved motor and non-motor outcomes.Copyright © 2024 The Author(s). Movement Disorders Clinical Practice published by Wiley Periodicals LLC on behalf of International Parkinson and Movement Disorder Society.

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13. **Basal ganglia theta power indexes trait anxiety in people with Parkinson's disease.**

Authors: Swinnen, Bart E. K. S.;Hoy, Colin W.;Pegolo, Elena;Matzilevich, Elena Ubeda;Sun, Julia;Ishihara, Bryony;Morgante, Francesca;Pereira, Erlick;Baig, Fahd;Hart, Michael;Tan, Huiling;Sawacha, Zimi;Beudel, Martijn;Wang, Sarah;Starr, Philip;Little, Simon and Ricciardi, Lucia

Abstract: Background: Neuropsychiatric symptoms are common and disabling in Parkinson's disease (PD), with troublesome anxiety occurring in one-third of patients. Management of anxiety in PD is challenging, hampered by insufficient insight into underlying mechanisms, lack of objective anxiety measurements, and largely ineffective treatments. In this study, we assessed the intracranial neurophysiological correlates of anxiety in PD patients treated with deep brain stimulation (DBS) in the laboratory and at home. We hypothesized that low-frequency (theta-alpha) activity would be associated with anxiety. Methods: We recorded local field potentials (LFP) from the subthalamic nucleus (STN) or the globus pallidus pars interna (GPi) DBS implants in three PD cohorts: 1) patients with recordings (STN) performed in hospital at rest via perioperatively externalized leads, without active stimulation, both ON or OFF dopaminergic medication; 2) patients with recordings (STN or GPi) performed at home while resting, via a chronically implanted commercially available sensing-enabled neurostimulator (Medtronic Percept TM device), ON dopaminergic medication, with stimulation both ON or OFF; 3) patients with recordings performed at home while engaging in a behavioral task via STN and GPi leads and electrocorticography paddles (ECoG) over premotor cortex connected to an investigational sensing-enabled neurostimulator, ON dopaminergic medication, with stimulation both ON or OFF.Trait anxiety was measured with validated clinical scales in all participants, and state anxiety was measured with momentary assessment scales at multiple time points in the two at-home cohorts. Power in theta (4-8 Hz) and alpha (8-12 Hz) ranges were extracted from the LFP recordings, and their relation with anxiety ratings was assessed using linear mixed-effects models. Results: In total, 33 PD patients (59

hemispheres) were included. Across three independent cohorts, with stimulation OFF, basal ganglia theta power was positively related to trait anxiety (all p: In total, 33 PD patients (59 hemispheres) were included. Across three independent cohorts, with stimulation OFF, basal ganglia theta power was positively related to trait anxiety (all p: In total, 33 PD patients (59 hemispheres) were included. Across three independent cohorts, with stimulation OFF, basal ganglia theta power was positively related to trait anxiety (all pConclusion: We showed that basal ganglia theta activity indexes trait anxiety in PD. Our data suggest that theta could be a possible physiomarker of neuropsychiatric symptoms and specifically of anxiety in PD, potentially suitable for guiding advanced DBS treatment tailored to the individual patient's needs, including non-motor symptoms.

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14. **Acupuncture and Sleep Quality Among Patients With Parkinson Disease: A Randomized Clinical Trial.**

Authors: Yan, Mingyue;Fan, Jingqi;Liu, Xin;Li, Yingjia;Wang, Yuting;Tan, Weiqiang;Chen, Yuanyuan;He, Jun and Zhuang, Lixing

Publication Date: Jun 03 ,2024

Journal: JAMA Network Open 7(6), pp. e2417862

Abstract: Importance: Poor sleep quality greatly impairs quality of life and accelerates deterioration in patients with Parkinson disease (PD), but current remedies remain limited. Acupuncture, used as an adjunctive therapy with anti-Parkinson medications, has shown positive effects in patients with PD. However, high-quality clinical evidence to support the effectiveness of acupuncture for patients with PD and poor sleep quality is lacking. Objective: To assess the safety and efficacy of real acupuncture (RA) vs sham acupuncture (SA) as an adjunctive therapy for patients with PD who have poor sleep quality. Design, Setting, and Participants: This single-center randomized clinical trial was performed at The First Affiliated Hospital of Guangzhou University of Chinese Medicine in China from February 18, 2022, to February 18, 2023. Patients with PD and sleep complaints were recruited and randomized (1:1) to receive RA or SA treatment for 4 weeks. Data analysis was performed from April 12 to August 17, 2023. Intervention: Treatment with RA or SA for 4 weeks. Main Outcomes and Measures: The main outcome was the change in Parkinson Disease Sleep Scale (PDSS) scores measured at baseline, after 4 weeks of treatment, and at 8 weeks of follow-up. Results: Of the 83 participants enrolled, 78 (94.0%) completed the intervention and were included in the analysis. Their mean (SD) age was 64.1 (7.9) years; 41 (52.6%) were men and 37 (47.4%) were women. A significant increase in PDSS scores from baseline was observed for both the RA group (29.65 [95% CI, 24.65-34.65]; P : Of the 83 participants enrolled, 78 (94.0%) completed the intervention and were included in the analysis. Their mean (SD) age was 64.1 (7.9) years; 41 (52.6%) were men and 37 (47.4%) were women. A significant increase in PDSS scores from baseline was observed for both the RA group (29.65 [95% CI, 24.65-34.65]; P : Of the 83 participants enrolled, 78 (94.0%) completed the intervention and were included in the analysis. Their mean (SD) age was 64.1 (7.9) years; 41 (52.6%) were men and 37 (47.4%) were women. A significant increase in PDSS scores from baseline was observed for both the RA group (29.65 [95% CI, 24.65-34.65]; P : Of the 83 participants enrolled, 78 (94.0%) completed the intervention and were included in the analysis. Their mean (SD) age was 64.1 (7.9) years; 41 (52.6%) were men and 37 (47.4%) were women. A significant increase in

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15. **Risk factors for falls in Parkinson's disease: a cross-sectional observational and Mendelian randomization study.**

Authors: Zhang, Yifan;Zhang, Yuehui;Yan, Yuexin;Kong, Xiangxu and Su, Shengyuan

Publication Date: 2024

Journal: Frontiers in Aging Neuroscience 16, pp. 1420885

Abstract: Background: Patients with Parkinson's disease (PD) exhibit a heightened risk of falls and related fractures compared to the general population. This study aims to assess the clinical characteristics associated with falls in the patient with PD and to gain further insight into these factors through Mendelian randomization analysis. Methods: From January 2013 to December 2023, we included 591 patients diagnosed with Parkinson's disease at Shenzhen Baoan People's Hospital. Using univariate and multivariate logistic regression analyses, we identified clinical variables associated with falls. We constructed a nomogram based on these variables and evaluated the predictive efficacy of the model. Additionally, we employed summary statistics from genome-wide association studies to conduct two-sample Mendelian randomization (MR) analyses on key variables influencing falls. Results: Compared to the control group, we identified osteoporosis, motor dysfunction, higher Hoehn and Yahr scale as significant risk factors for falls in PD patients. Conversely, treatment with levodopa and a higher level of education exhibited a protective effect against the risk of falling. MR analysis further confirmed a causal relationship between osteoporosis, education level and falls in PD patients. Conclusion: Osteoporosis and educational attainment are correlated with falls in Parkinson's disease. Copyright © 2024 Zhang, Zhang, Yan, Kong and Su.

Conference Proceedings

A sense of Community - the value of online exercise groups for people with Parkinson's disease during the pandemic

Item Type: Conference Proceeding

Authors: Alexander, J., Appel, C., Constantinou, Y. and Schrag, A.

Publication Date: 2024

Abstract: Purpose: Online group exercise is popular for people with Parkinson's disease (PwP) with the COVID-19 pandemic creating a step change in online exercise group provision for this population. To improve equity of access to exercise, online exercise classes could form a larger part of future healthcare services. Little is known about the experiences of PwP and how this could inform future online group exercise delivery. Objective(s): To explore the experiences of PwP who have utilised online exercise groups in managing their condition. Method(s): A qualitative study utilising semi-structured interviews and thematic analysis. A purposive sample of PwP who have participated in a live online exercise group. Result(s): Five females and four males participated (mean age 69.5 years range 63-78, mean disease duration 9.1 years, range 3 years to 20 years). Analysis revealed four overarching themes: 'Opportunities and challenges to online exercise groups' which related to concepts of adapting to online exercise programmes and how the online format can offer greater access to exercise; 'Role of exercise for Parkinson's disease' which incorporated individuals' rationale for participating in an online exercise group; 'Setup and structure' incorporating the planning and organization of the class; and finally 'Online exercise groups: are they worth it?' which incorporated constructs related to the value of online exercise groups. Conclusion(s): Participants found transitioning to online exercise groups manageable allowing for continued self-management of physical activity. Holistic health-related benefits reported included maintenance of physical ability as well as improved mental health and well-being. Participants valued the flexibility that online exercise groups provide but recognised that there may be people who need support to access online groups and that technology issues such as poor internet connection can impede groups from being effective. Building a community within the class and voluntary options for socialisation were experienced positively by participants and consideration of these elements could aid adherence and peer-support enabling PwP to physically self-manage their symptoms. Impact: With the ending of COVID-19 restrictions the integration of both in-person and online exercise groups may offer greater opportunities for PwP to manage their symptoms through physical activity. The NHS Long Term plan advocates for greater use of technology to support health and well-being and online exercise groups are a feasible and acceptable way of achieving this. They offer greater accessibility and flexibility to exercise for PwP. Online exercise groups expanded exponentially during the pandemic with little understanding of how they could best support PwP. This research provides perspectives from PwP to help inform and advise healthcare professionals in the planning and organisation of online exercise groups. The positive response from PwP to online exercise groups adds weight to support creation of new commissioned online exercise groups in NHS clinical settings. Keywords: Parkinson's disease, Online exercise, Physical activity Funding acknowledgements: This work was not funded.Copyright © 2024

An international survey of experiences and attitudes towards Pacing using a heart rate monitor for people with ME / CFS

Item Type: Conference Proceeding

Authors: ClagueBaker, N., Dickinson, K., Bull, M., Leslie, K. and Hilliard, N.

Publication Date: 2024

Abstract: Purpose: Myalgic Encephalomyelitis (ME) is a "complex, acquired multi-systemic disease with a profound dysfunction /dysregulation of the neurological control system"1 affecting >250,000 people in the UK, this compares to 100,000 people with Multiple Sclerosis and Parkinson's Disease. ME is highly disabling, causing greater functional impairment and poorer quality of life than many other chronic conditions2. Although the causative mechanisms are unclear, most cases are triggered by a viral infection1 including COVID193. With cases of LongCOVID estimated to be over 2 million in the UK and evidence showing that ~50% of people with LongCOVID will develop ME4 potentially the numbers of people with ME (PWME) could soon double. People with Myalgic Encephalomyelitis (PWME) appear to have a blunted heart rate (HR) response to maximum exercise and a reduced anaerobic threshold (AT)5. If PWME keep their heart rate below their AT it can lead to less post-exertional malaise (PEM)6. PWME use heart rate monitors (HRM) to assess their physical activity and to set alerts 7. There are no studies identified that explore the use of HRMs in PWME, therefore, the aim of this study was to identify the experiences and attitudes of PWME towards pacing using a heart rate monitor Methods: Ethical approval was obtained. An online survey was developed by PWME and the research team, and 40 questions were devised. The link for the survey was sent out via facebook, twitter and websites. Participants read the information sheet and consent form before completing the survey. Consent was assumed if they completed the survey. The survey was open for three weeks. Result(s): 488 PWME completed the survey. 87% were female, mean age group 35 - 50 years. 54% had ME for 10 years or more. Over 100 different types of HRM were being used. Over 30 benefits were identified. Main benefits were understanding PEM triggers better (72%) and real-time feedback on effects of current or prior activity (68%). Over 30 negatives were identified. Main negatives were financial (44%) and difficulty with initial restrictions (42%). 32% identified that they had an improved ability for Activities of Daily Living, 23% had increased time with family and friends and 23% were able to enjoy a hobby as a result of pacing with a HRM. HRM reduced severity of ME and severity and duration of PEM. Only 14% stated that healthcare professionals (HCPs) were supportive. Conclusion(s): Although there are limitations, pacing with a HRM is beneficial for PWME leading to more understanding of their ME and PEM and increased activity in some people. There is a need for more research and education of healthcare professionals in the safe use of HRM for PWME. Impact: Identifying the impact, benefits and negatives of HRM in PWME can significantly inform physiotherapy practice as using these measures can potentially reduce the exacerbation of post-exertional symptoms during treatment and provide a measure of the impact of treatment. In addition, PWME can potentially use HRM for self-management and self-efficacy. The results can be implemented into physiotherapy practice and can be used to inform physiotherapy education and research. Keywords: Myalgic Encephalomyelitis, Heart rate monitors, survey Funding acknowledgements: None.Copyright © 2024

The Role of High Intensity Exercise for People with Parkinson's within an NHS Outpatient Setting- A Quality Improvement Project

Item Type: Conference Proceeding

Authors: Khan, A., Curtis, A. and Mullin, R.

Abstract: Purpose: Parkinson's is a progressive neurological condition that is caused by a lack of dopamine within the Basal Ganglia. Physiotherapy is a well-known and NICE recommended treatment for Parkinson's (NICE, 2017) and is advocated at all stages of the disease. Within the field of Parkinson's, there is currently great focus on the impact of early intensive exercise. Recent research as demonstrated that intensive exercise can elicit positive neuro-plastic changes within the basal ganglia, these changes were also shown in improved objective and subjective markers (Johansson et al, 2021). However all researched interventions require high dosage levels of physiotherapy which cannot be replicated within an NHS setting. Our aim was to assess whether an NHS based exercise programme could have short term benefits on the quality of life and motor symptoms for Parkinson's patients. Method(s): Patients were recruited from our current caseload. They had to have a confirmed diagnosis of Parkinson's, English speaking, Hoehn and Yahr stage 1-3, independent with floor transfers and have no existing co-morbidities that would impact their ability to exercise at a high level. They attended a 6 week intervention consisting of a 45 minute high intensity exercise class and 15 minute education session; topics included 'What is Parkinson's', Parkinson's symptoms, medication and exercise. Each work-out consisted of a warm up, high intensity section, balance/core section and a cool down. If appropriate, dual tasking challenges were also incorporated. Prior to joining the class, patients were provided with appropriate education on the importance of exercise, habit forming, goal setting and how to appropriately challenge their Parkinson's symptoms. Patients were assessed using the Parkinson's Disease Questionnaire 39 (PDQ-39), Mini BESTest and the 60 second sit to stand pre and post intervention. We also gained post intervention evaluation from all patients. Result(s): All patient's improved on their PDQ-39 scores and on their sit to stand results. Improvements in the Mini BESTest varied across all patients, possibly due to the ceiling effect of the outcome measure as some patient's had a high score on their initial assessment (26-28/28). On their evaluation forms, all patients stated they enjoyed the class and would have benefited from it when they were initially diagnosed. All patients also benefited from meeting and exercising with other people with Parkinson's. Conclusion(s): An NHS based high intensity exercise class does offer some short term benefits to people with Parkinson's, including on their quality of life. However due to the possible ceiling effects of the chosen outcome measures, it's hard to establish the true impact on the motor symptoms of the patient's. Further projects need to use alternative methods of assessment and consider assessing the change in patient's exercise habits over a longer time period. Numerical data should also be collected to monitor the patient's intensity levels Impact: The results from this project will allow for further funding to be obtained to continue project work assessing the effectiveness of an NHS based exercise class. It can also help promote the necessity for rigorous, NHS based research to be completed in this field. Keywords: Parkinson's, Exercise, Intensity Funding acknowledgements: Parkinson's UK Physical Activity Grant.Copyright © 2024

Mortality and functional outcome in patients with idiopathic Parkinson's disease who sustained a femoral neck fracture

Item Type: Conference Proceeding

Authors: van Mierlo, R., Perry, J., Challen, K. and McLauchlan, G.

Publication Date: 2024

Abstract: Purpose: Currently 145,000 people in the UK are living with Parkinson's disease. Patients with Parkinson's disease can expect a near normal life expectancy. It is the fastest growing neurodegenerative disease in the world. The incidence of hip fractures in the UK is 70,000 and expanding rapidly. One year mortality for patients with hip fractures is between 25 and 30%. It remains unknown whether patients with Parkinson's disease who sustain a hip fracture have the same mortality rates and health related outcomes. Current literature is scarce and conflicting. This abstract examines the outcomes of patients with Parkinson's disease and a proximal femoral neck fracture. Method(s): We extracted data from our local prospective clinical hip fracture data base of all patients over the age of 65 years who were surgically treated for a non-pathological single hip fracture from November 2013 to November 2022 Results: We identified 2976 patients from our database including 142 patients with Parkinson's disease (PG). The control group (CG) contained 2834 patients. There was no statistical difference in the 30 day mortality (PG 9.8%, CG 7.5%, $p > 0.1$). The mortality at one and median four year follow up was higher and statistically significant in the Parkinson group (37.9% & 26.6% and 76% & 60%, p Method(s): We extracted data from our local prospective clinical hip fracture data base of all patients over the age of 65 years who were surgically treated for a non-pathological single hip fracture from November 2013 to November 2022 Results: We identified 2976 patients from our database including 142 patients with Parkinson's disease (PG). The control group (CG) contained 2834 patients. There was no statistical difference in the 30 day mortality (PG 9.8%, CG 7.5%, $p > 0.1$). The mortality at one and median four year follow up was higher and statistically significant in the Parkinson group (37.9% & 26.6% and 76% & 60%, p Method(s): We extracted data from our local prospective clinical hip fracture data base of all patients over the age of 65 years who were surgically treated for a non-pathological single hip fracture from November 2013 to November 2022 Results: We identified 2976 patients from our database including 142 patients with Parkinson's disease (PG). The control group (CG) contained 2834 patients. There was no statistical difference in the 30 day mortality (PG 9.8%, CG 7.5%, $p > 0.1$). The mortality at one and median four year follow up was higher and statistically significant in the Parkinson group (37.9% & 26.6% and 76% & 60%, p Method(s): We extracted data from our local prospective clinical hip fracture data base of all patients over the age of 65 years who were surgically treated for a non-pathological single hip fracture from November 2013 to November 2022 Results: We identified 2976 patients from our database including 142 patients with Parkinson's disease (PG). The control group (CG) contained 2834 patients. There was no statistical difference in the 30 day mortality (PG 9.8%, CG 7.5%, $p > 0.1$). The mortality at one and median four year follow up was higher and statistically significant in the Parkinson group (37.9% & 26.6% and 76% & 60%, p Copyright © 2024

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