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SUMMARY
There has been a great deal of research over the last 5 years on different Physiotherapy and Occupational Therapy treatments for Parkinson’s Disease. Therefore, just 2 databases were searched: CINAHL, and Medline.

Physiotherapy / OT
- Current research supports interventions which are intermittent, short term and intensive, and involve tailored therapy plans working towards an individual's goals. Occupational therapists should implement goal-oriented intervention programmes in conjunction with following the guidance of existing best practice guidelines. (8)
- We showed that PD patients who underwent a rehabilitation protocol including OT experienced improvements in finger dexterity and hand functionality. Our results underline the relevance of OT in improving autonomy and QoL in PD patients. (14)
- Versatile physiotherapy is sufficient to improve Gait Speed, range of motion and reduce Freezing Of Gait. (35)
- Our findings support the relevance of disease-specific occupational therapy interventions focusing on the individual fit between person, environment and occupation, and highlight the need for joyful occupations to attain a satisfactory daily life. (61)
• Sensorimotor integration training combined with conventional physiotherapy approach ameliorated postural control by improving vestibular system in patients with Parkinson’s disease by improving sensory processes. (88)
• Specialised physiotherapy as delivered through ParkinsonNet is associated with fewer Parkinson’s disease-related complications and lower costs in real-world practice. Neurologists can facilitate specialised physiotherapy by specific referral to such experts (108)
• Physiotherapy seems to be more effective than a generic exercise programme in patients with Hoehn Yahr stage II PD. (122)
• Anxiety is a common non-motor symptom of Parkinson’s and is an important consideration for occupational therapists working with this population (150)
• Rehabilitative therapy (96.3%) and physiotherapy (89.5%) were rated as most effective, but with vastly temporary effects. 53.3% of patients attributed PD as the main cause for their pain, but only 33.6% found relief from anti-parkinsonian drugs. (171)
• Physiotherapists can efficiently propose physical conditioning to patients with mild to moderate PD, but these interventions are insufficient to improve gait and participation. (173)
• NHS PT and OT did not produce immediate or long-term clinically meaningful improvements in ADL or quality of life in patients with mild to moderate Parkinson’s disease. This evidence does not support the use of low-dose, patient-centred, goal-directed PT and OT in patients in the early stages of Parkinson’s disease. (212)
• Physiotherapy and occupational therapy were not associated with immediate or medium-term clinically meaningful improvements in ADL or quality of life in mild to moderate PD. This evidence does not support the use of low-dose, patient-centered, goal-directed physiotherapy and occupational therapy in patients in the early stages of PD. Future research should explore the development and testing of more structured and intensive physical and occupational therapy programs in patients with all stages of PD (226)
• An unsupervised, home exercise program is the least effective way to deliver exercise to people with PD, and individual and group exercises have differing benefits. Furthermore, people with PD who also have other comorbidities did better in a program directly supervised by a physical therapist (257)
• Occupational therapy did not significantly impact on total costs compared with usual care. Positive cost-effectiveness of the intervention was only significant for caregivers. (269)
• Multidisciplinary rehabilitative care (OT, CBT & task oriented exercises) is useful in changing the course of motor impairment, balance, activities of daily living, and QoL. The effects lasted for at least 1 y after the intervention. (270), (31)

**Agility Programmes**

• A high-intensity sensorimotor agility program with but not without a 2-yr maintenance program slowed the progression of parkinsonian symptoms. (43)
• A high-intensity agility program improved nondemented, stage 2-3 PD patients' clinical symptoms, mobility, and standing balance by functionally meaningful margins at short-term follow-up. (60)

**Balance exercises**

• Home-based prescribed exercise improves balance-related activities and gait speed in people with Parkinson’s disease, and these improvements are similar to improvements with equivalent centre-based exercise(17)
• Training effects diminish within 6 months after balance training, implying that the program may need to be repeated regularly. (70)
• The home-based balance programme was effective in improving some aspects of gait, albeit the programme supervised by an exercise therapist included somewhat more benefits after
the intervention i.e. stride velocity and cadence in individuals with mild to moderate PD. (165)

- Balance training is superior to resistance training in regard to improving postural control of individuals with PD. (174)
- Findings from this study suggest that being pushed to the limits of balance capacity provoked people with mild to moderate PD to rethink their individual motor and cognitive resources, a process that was further enabled by the PD-specific group setting. (183)
- The 4-week rehabilitation training program focused on mobility, balance and gait exercises improved balance, gait, physical performance and trunk rotations in patients with PD. (196)
- Crossover and the stabilometric platform have the same effect on balance dysfunction of Parkinsonian patients, while crossover gets better results on the walking capacity. (249)
- The HiBalance program significantly benefited balance and gait abilities when compared with usual care and showed promising transfer effects to everyday living. (255)
- Multi-dimensional balance training programme can enhance balance and dual-task gait performance up to 12-month follow-up in people with PD. (271)
- Positive findings provide evidence for the clinical use of technology-assisted balance and gait training in reducing falls in people with PD. (280)

**Curved Walking Training**

- A 12-session CWT program can improve curved-walking ability, FOG, and other measures of functional walking performance in individuals with PD. Most of the improvements were sustained for at least one month after training. (137)

**Dance**

- Dance therapy is beneficial in improving executive function for adults with PD. However, there are no positive effects were founded on global cognitive function, depression and apathy for PD. (23)
- Turo PD training might improve the symptoms of PD patients. (54)
- Dance can improve motor parameters of the disease and patients’ functional mobility. (93)
- Positive evidence to support the use of music-based movement therapy on treatment of motor function; there was neutral evidence to support the use of music for the treatment of cognitive function quality of life. (145)
- For people with mild to moderately severe PD, set dancing is feasible and enjoyable and may improve quality of life. (147)
- Those who danced were better able to coordinate their axial and perpendicular segments and surprisingly became more ‘en bloc’ in their turning behaviour, suggesting this may be a beneficial adaptation, rather than a maladaptive result of Parkinson’s, as previously suggested. (166)
- Complementary physical therapies such as dancing, hydrotherapy and robotic gait training appear to afford therapeutic benefits, increasing mobility and quality of life, in some people living with PD. (252)
- For freezing of gait, no significant effects were observed in favor of Argentine Tango (253)
- Argentine tango can improve balance, and functional mobility, and may have modest benefits upon cognition and fatigue in Parkinson’s disease. (273)

**Deep Brain Stimulation**

- In the largest systematic long-term follow-up study, the improvement in subjective sleep quality after bilateral STN DBS was sustained in PD patients. Improved nocturnal sleep and nocturnal motor symptoms were correlated with an improved mood and quality of life. However, STN DBS did not reduce excessive daytime sleepiness despite reductions in antiparkinsonian medications. (6)
STN-DBS decreased perceived voice tremor on a group level. cZi-DBS decreased perceived voice tremor in patients with PD with moderate to severe preoperative levels of the symptom. (24)

DBS is effective in reducing tremor in PD patients regardless of stimulation target. However, the degree of tremor suppression in STN DBS versus GPI DBS was equivalent. (50)

A wide range of frequencies are efficacious in improving acute upper-limb motor function. Reducing the frequency of stimulation down to 80 Hz is safe and has a similar clinical effect to higher frequencies. Therefore, a wider range of frequencies are available when it comes adjusting patients' acute settings without the risk of worsening bradykinesia. (58)

High-frequency STN-DBS leads to an inability to simultaneously process motor and cognitive information while this ability seems preserved with low-frequency STN-DBS. This study supports the potential benefit of 80-Hz STN-DBS on Freezing of Gait. (71), (80)

STN-DBS was 10% more likely to cause cognitive and speech disturbance than GPI-DBS, while STN-DBS had a lower risk of dysphagia (74)

Effective anodic stimulation requires a higher charge injection into the tissue, but may provide a better reduction of off-period motor symptoms within the individual therapeutic window. Therefore, a programming change to anodic stimulation may be considered in patients suffering from residual off-period motor symptoms of PD despite reaching the adverse effect threshold of cathodic stimulation in the subthalamic nucleus. (76)

Bilateral subthalamic nucleus stimulation was overall very effective in improving impulse control disorders and neuropsychiatric fluctuations in parkinsonian patients in the long term despite a counteracting frequent apathy. Transient episodes of impulse control disorders still occurred within the follow-up. These findings recommend a close follow-up in parkinsonian patients presenting with neuropsychiatric symptoms before deep brain stimulation surgery. (84)

STN-DBS improves motor function and enables the reduction in antiparkinson medication with an acceptable adverse effect profile. (91)

The motor benefits of GPI and STN DBS for PD are similar. CONCLUSIONS The motor benefits achieved with GPI and STN DBS for PD are similar. DBS of STN allows for a greater reduction of medication, but not as significant an advantage as DBS of GPI with respect to mood. This difference is sustained at 36 months. Further long-term studies are necessary. (100)

Although lower-frequency STN-DBS stimulation was found to yield consistent improvements in speech outcomes, it was not found to necessarily lead to the best speech outcomes for all participants. Nevertheless, frequency may serve as a starting point to explore settings that will optimize an individual's speech outcomes following STN-DBS surgery. (102)

Low-frequency NBM DBS was safely conducted in patients with Parkinson disease dementia; however, no improvements were observed in the primary cognitive outcomes. (111)

When comparing subthalamus (STN) and globus pallidus internus (GPI) deep brain stimulation (DBS), no statistically significant difference was found. (113)

Urinary incontinence and frequency significantly improved after STN DBS treatment in male and female patients with PD. Nocturia and nighttime incontinence due to parkinsonism did not improve after DBS, irrespective of gender. (115)

A randomized, double-blind study, published in 2018 showed that shorter pulse widths widen the therapeutic window of STN-DBS in PD without increasing the electrical charge required to obtain the same acute clinical benefit. (117)

Subthalamic DBS deepens and consolidates nocturnal sleep and improves daytime wakefulness in Parkinson patients, but several outcomes suggest that it does not normalize sleep. (167)

DBS is a cost-effective intervention in PD patients with early motor complications when compared with existing interventions, offering additional health benefits at acceptable incremental cost. (187)
• The motor improvements observed after STN DBS do not lead to systematic improvements in all aspects of quality of life or increased levels of physical activity. (248)
• DBS did not improve the compensatory step response needed to recover from balance perturbations in the GPi group and caused delays in the preparation phase of the step in the STN group. (265)

**Dual Task Training**
• Dual-task training is safe and effective in improving several spatiotemporal gait parameters under trained and untrained dual-task conditions. (73)
• Consecutive and integrated dual-task training led to similar and sustained improvements in dual-task gait velocity without increasing fall risk. These novel findings support adoption of dual-task training in clinical practice (149)

**Exergames**
• Recent evidence indicates exergame-based therapy has been widely proven to be feasible, safe, and at least as effective as traditional PD rehabilitation. (49)
• Overall, home-based exergame step training was not effective in improving the outcomes assessed. However, the improved physical function in the lower disease severity intervention participants as well as the self-reported improved mobility in the intervention group suggest home-based exergame step training may have benefits for some people with Parkinson’s disease. (105)
• Upper Extremity exergames were acceptable and safe, but did not translate to improvement in functional activities. It is likely that the requirement of the games resulted in increased movement speed at the detriment of accuracy. The design of exergames should consider task specificity. (153)
• In most cases, the introduction of VG training in physical rehabilitation offered similar results as conventional therapy. Therefore, VGs could be added as an adjunct treatment in rehabilitation for various pathologies to stimulate patient motivation. VGs could also be used at home to maintain rehabilitation benefits. (193)
• Balance-based exergaming training resulted in a greater improvement in postural stability compared with conventional balance training (208)

**External Focused Exercise**
• Since dual task walking improvements were found immediately, and 8 weeks after the cessation of an externally focused exercise program, we conclude that externally focused exercise may improve on functioning of automatic control networks in PD. Internally focused exercise hindered dual tasking ability. Overall, externally focused exercise led to greater rehabilitation benefits in dual tasking and motor symptoms compared with internally focused exercise. (116)

**Fall Prevention Programmes**
• The findings provide some evidence for exercise-based intervention as a cost-effective treatment option for preventing falls in PD; however, due to the limited number of available studies, heterogeneity of the interventions, and diversity of assessment settings, a firm conclusion cannot be established. Additional studies evaluating the cost-effectiveness of fall prevention programs involving larger samples and using different treatment parameters in various settings are warranted. (9)
• PDSAFE did not reduce falling in this pragmatic trial of PwP. Other functional tasks improved and reduced fall rates were apparent among those with moderate disease. (25)
• A theory-based, highly challenging, and progressive exercise program was effective in reducing falls, improving balance, and reducing fear of falling (235)
• Rehabilitation combining falls prevention education with strength training or movement strategy training reduces the rate of falls in people with mild to moderately severe PD and is feasible. (263)
**Functional Task Training**

- Exercise interventions containing functional-task training have a clinically important positive effect on ADL performance in pwp directly after intervention and at first follow-up, compared to no intervention or placebo. The intensity rate of the functional-task training should be as intense as possible, within the capabilities of the person with PD. Future research is necessary to determine the exact amount of effect that can be contributed to functional-task training. (41)

**Handwriting Intervention / Manual Dexterity**

- PwP generally adhere to self-directed home handwriting which may provide benefit with minimal risk. Encouraging effects were found in writing amplitude and, moreover, perceived ability. (127)
- an intensive, task specific home-based dexterity program significantly improved fine motor skills in Parkinson's disease. The effect generalized to dexterity-related ADL functions. As these improvements did not sustain, the finding suggest that continuous training is required to maintain the benefit. (152)
- A single hand-exercise session showed an improvement in manual dexterity and strength in persons with PD. (229)

**High Cadence Cycling**

- High cadence cycling does not alter cognition or depression symptoms after three sessions in one week. (28)
- High Cadence Cycling Promotes Sustained Improvement in Bradykinesia, Rigidity, and Mobility in Individuals with Mild-Moderate Parkinson's Disease (37)

**Lee Silverman Voice Treatment**

- Compared to shorter format LSVT-BIG or general exercise, LSVT-BIG was more effective at improving motor function. This provides preliminary, moderate quality evidence that amplitude-oriented training is effective in reducing motor impairments for people with mild Parkinson's disease. (97)

**Multidisciplinary Rehabilitation**

- A rehabilitation treatment such as MIRT could improve QoL in patients with PD in the short-term and long-term period. Even though the single-blind design and the possible role of the placebo effect on the conclusive results must be considered as limitations of this study, the improvement in outcome measure, also maintained after a 3-month follow-up period, suggests the effectiveness of MIRT on the QoL (85)

**Nordic Walking**

- No clear evidence of benefit (129), (168)
- NW improves functional parameters and walking mobility demonstrating that NW is as effective as the Free Walk, including benefits for FW on the functional mobility of people with PD. (175)
- NW may constitute a powerful way to struggle against the randomness of PD gait and the typical gait hypokinesia. Involving a voluntary intersegmental coordination, such improvement could also be due to the upper body rhythmic movements acting as rhythmical external cue to bypass their defective basal ganglia (176)

**Physical Exercise Rehabilitation Programmes**

- Physical-exercise-based rehabilitation programs realized 2-4 times a week, 60 min each session, for 6-12 weeks, and follow-up of 3 months promotes significant positive effects on quality of life in Parkinson's disease patients at mild to moderate stages and disease duration around 6 years. (215)

**Pilates**
Can be safely prescribed for people with mild-to-moderate PD. Preliminary evidence indicates that its practice could have a positive impact on fitness, balance and physical function. Its benefits on lower-body function appear to be superior to those of other conventional exercises. (21)

The Mat Pilates program performed by a sample population with PD led to improvements in dynamic balance, and participants in the MP group showed increased strength in the lower limbs, but such improvements were not permanent after the activity ceased. (75)

**Resistance Training**

- Resistance training reduces depressive symptoms and improves the quality of life and functionality of elderly with PD. (12)
- An 8-week resistance training program was found to be effective at improving dynamic balance and fatigue in patients with PD. (94)
- Progressive RT improved cardiovascular autonomic dysfunction. (132)
- The Progressive Resistance Exercise training can be a helpful and fruitful rehabilitation tool for AR-subtype PD patients. (141)
- RT is recommended as an adjunct therapeutic method for improving sleep quality of subjects with moderate PD and moving these levels to those observed in Healthy Controls. (156)
- Twenty-four months of PRE and modified Fitness Counts were associated with improved off-medication fast gait velocity and improved cadence in all conditions, which is important because temporal gait measures can be resistant to medications. Spatial and stability-related measures were resistant to long-term improvements, but did not decline over 24 months. Strength gains did not appear to transfer to gait (184)
- Both RT and RT+Instability improved muscle strength, but only RTI improved the mobility, motor signs, cognitive impairment, and quality of life, likely because of the usage of high motor complexity exercises. Thus, RTI may be recommended as an innovative adjunct therapeutic intervention for patients with PD. (206)
- There is so far no evidence on the superiority of progressive resistance training compared with other physical training to support the use of this technique in rehabilitation of Parkinson's disease (231)
- Moderate intensity progressive resistance training, 2-3 times per week over 8-10 weeks can result in significant strength, balance and motor symptoms gains in people with early to moderate Parkinson's disease. (238)
- Overall, the current evidence suggests that exercise interventions that contain RT may be effective in improving muscular strength in people with PD compared with no exercise. However, depending on muscle group and/or training dose, RT may not be superior to other exercise types. Interventions which combine RT with other exercise may be most effective. (242)
- RT, Endurance Training and Other Intensive Treatment Modalities all represent feasible, safe and beneficial adjunct rehabilitation therapies in PD. (247)
- Twenty-four months of supervised and structured exercise (either Progressive Resistance Exercise or modified Fitness Counts) is effective at improving functional performance outcomes in individuals with moderate PD. Clinicians should strive to include structured and supervised exercise in the long-term plan of care for individuals with PD. (279)

**Respiratory Muscle Training**

- Two months of expiratory muscle-training program was more beneficial than inspiratory muscle-training program for improving maximum expiratory pressure and voluntary peak cough flow in patients with Parkinson's disease. (77)

**Robot Assisted Gait Training**
Repetitive intensive gait training is an effective treatment for people with Parkinson disease and can increase endurance and gait velocity, especially for those with severe walking disability. Advantages are greater with robot-assisted gait training than treadmill training for individuals with freezing of gait-related disability. (20)

The RAGT showed better outcomes than conventional interventions on some motor aspects in PD. However, RAGT did not seem superior to control interventions. (63)

RAGT may significantly improve walking ability, motor function, and for a maximum period of three months. Thus, our findings support the importance of a RAGT as a valid rehabilitative tool for PD. (130)

Complementary physical therapies such as dancing, hydrotherapy, and robotic gait training appear to afford therapeutic benefits, increasing mobility, and quality of life, in some people living with PD. (252)

Robotic gait training is not superior to balance training for improving postural instability in patients with mild to moderate Parkinson's disease. (274)

**Single Hand Exercise Sessions**

- Single hand-exercise sessions showed an improvement in manual dexterity and strength in persons with PD. (229)

**Slackline Training**

- Slacklining is a simple, safe, and challenging training and rehabilitation tool for PD patients. It could be introduced into their physical activity routine to reduce the risk of falls and improve confidence related to fear of falling. (157)

**Strength Training**

- Sixteen weeks of strength training improves the inspiratory and expiratory muscle strength and QoL of elderly with Parkinson disease. These findings suggest that strength training could be considered an adjunct therapeutic intervention for elderly with Parkinson disease. (18)

- A home program of strength training, movement strategy training, and education did not prevent falls in people with Parkinson’s disease: a randomised trial. (170)

- Strength training was found to significantly improve muscle strength in people with Parkinson disease (15%-83.2%) and multiple sclerosis (4.5%-36%). Significant improvements in mobility (11.4%) and disease progression were also reported in people with Parkinson disease after strength training. (281)

**Tai Chi / Qigong**

- Tai Chi had the potential to slow down the progression of symptoms of Parkinson's disease and delayed the introduction of levodopa. (1)

- Tai Chi is a promising complementary treatment for PD. (19)

- Tai Chi is effective in reducing falls incidence in Parkinson's disease and stroke. (81)

- Evidence to date supports a potential benefit of TCQ for improving motor function, depression, and QoL for individuals with PD, and validates the need for additional large-scale trials. (154)

- Overall, participants enrolled in Tai Chi had better balance and one or more aspect of well-being, though mixed results were reported. (172)

**Telephone Monitoring**

- The individualized guidance and weekly monitoring by telephone in a self-supervised home therapeutic exercises program promoted positive effects on ADL, motor examination and QoL of people in early stages of PD. (158)

**Telerehabilitation**

- VR is a feasible alternative to in-clinic SIBT for reducing postural instability in PD patients having a caregiver. (128)

**Transcranial Direct Current Stimulation**
• Cochrane Systematic Review - There is insufficient evidence to determine the effects of tDCS for reducing off time (when the symptoms are not controlled by the medication) and on time with dyskinesia (time that symptoms are controlled but the person still experiences involuntary muscle movements), and for improving health-related quality of life, disability, and impairment in patients with IPD. Evidence of very low quality indicates no difference in dropouts and adverse events between tDCS and control groups. (213)

Transcranial Magnetic Stimulation
• The results of the meta-analysis propose the favorable effect of rTMS on walking performance in the short term but not over the long term in individuals with PD. (4)
• Treatment with transcranial pulsed electromagnetic fields was superior to placebo regarding functional rate of force development during chair rise among high-performers. Active treatment tended to increase functional rate of force development while placebo did not. Our results suggest that mildly affected persons with Parkinson’s disease have a larger potential for neural rehabilitation than more severely affected persons and indicate that early treatment initiation may be beneficial. (55)
• The cognitive function of patients >65 yrs was favorable influenced by rTMS and tDCS. Age is the main predictor of the effect of NBS. rTMS and tDCS can slow the progression of PD without any side effects but in an age-dependent way. (82)
• Overall positive effect in favour of rTMS (131)
• Results suggest the potential for dual-mode NIBS to modulate 2 different cortices simultaneously. Dual-mode NIBS might be considered a novel therapeutic approach for patients with PD. (163)

Treadmill Training
• Treadmill training had no effect on cadence and did not improve walking endurance in Parkinson’s disease. Over-ground walking did not improve mobility in Parkinson's disease or multiple sclerosis. (27)
• A study adding music to treadmill training suggests that the usefulness of cueing strategies during gait training consists of a reshape of sensorimotor rhythms and fronto-centroparietal/temporal connectivity. Restoring the internal timing mechanisms that generate and control motor rhythmicity, thus improving gait performance, likely depends on a contribution of the cerebellum. Finally, identifying these mechanisms is crucial to create patient-tailored, RAS-based rehabilitative approaches in PD. (29)
• Individuals with mild to moderately severe PD adapted similarly to Healthy Controls to SBT walking for gait variability and bilateral gait coordination. However, those with FOG had impaired perception of belt speed differences and did not adapt their gait so readily. Although SBT can be useful for modulating gait asymmetry in some people with PD, it was not beneficial for all. We recommend standardization of SBT protocols for clinical practice in future studies. (40)
• Treadmill and kinesiotherapy improved physical-functional and clinical aspects. (48)
• Treadmill training performed 3 times a week for about 60 minutes and for a period of 24 weeks produced larger improvements in cognition. (56)
• The addition of a cognitive training component to a treadmill exercise program apparently modifies the effects of the training on the magnitude and lateralization of prefrontal activation and on falls, extending the understanding of the plasticity of the brain in PD. (103)
• The body weight supported treadmill training may promote increase of mobility of lower limbs during gait and it could be a targeted intervention for PD patients treated with DBS. (109)
• The treadmill comprises an effective therapy for people with PD, for important motor aspects such as motor function and postural instability. Additional load had no influence on results. (185)
• a single session of perturbation treadmill training led to gait improvements, which were more pronounced compared to unperturbed treadmill walking. Effects on static postural sway were less pronounced. (201)
• The use of treadmill training in patients with PD may improve clinically relevant gait parameters such as gait speed and stride length. This apparent benefit for patients is, however, not supported by all secondary variables (e.g. cadence and walking distance) (202)
• Specific exercise training and turning-based treadmill training were both effective in improving turning performance in participants with PD (204)
• Posttraining improvements in speed, stride length, step length, double-stance, stance phase, and knee range of motion were observed in all groups, where no load (0%, 5%, or 10%) had any significant effect, suggesting that the influence of load did not make one experimental condition better than another. All participants benefitted from treadmill gait training, irrespective of the use of load. (261)
• Comparing physiotherapy and treadmill training against other alternatives in the treatment of gait hypokinesia such as physiotherapy without treadmill training this type of therapy seems to be more beneficial in practice without increased risk. (262)
• Partial Weight Supported Treadmill Training is a promising intervention tool to improve the clinical and gait outcome measures in patients with PD. (267)

**Trunk Exercises**
• At 12 wks, the exercise group had statistically significant and clinically relevant improvements in anterior-posterior step-to-step trunk symmetry (106)

**Virtual Reality**
• 12 weeks of VR rehabilitation resulted in a greater improvement in the balance and gait of individuals with PD when compared to conventional physical therapy. (30)
• Individuals with PD were able to successfully use immersive VR during walking without adverse effects. This provides systematic evidence supporting the safety of immersive VR for gait training in these populations. (177)
• Low-quality evidence of a positive effect of short-term VR exercise on step and stride length. VR and physiotherapy may have similar effects on gait, balance, and quality of life. (190)

**Water Based exercises**
• 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 (5)
• The suggested dual-task aquatic exercise program was able to improve functional mobility, balance and gait of individuals with PD, which shows that such type of exercise is a promising possibility of therapy. (45)
• The simplicity of treatment and the lack of side effects endorse the use of thermal aquatic environment for the gait and balance recovery in PwP. (51)
• Ai Chi exercises (aquatic exercises) may help improve balance, functional mobility, health-related quality of life, and motor ability in patients with mild to moderate Parkinson’s disease more efficiently than similar land-based exercises. Ai Chi exercises should be considered as a rehabilitation option for treatment of patients with mild or moderate Parkinson’s disease. (101)
• Physical exercise performed in water has positive effects on some of the necessary elements that contribute towards improved biomechanical gait patterns in patients with Parkinson’s disease. (126)
• Aquatic therapy added to land-based rehabilitation could provide a contribution to the treatment of balance dysfunction in patients with moderate-stage PD. (164)
• Aquatic therapy appears feasible and safe for some people in the early stages of PD. (169)
Although patients who underwent underwater treatment exhibited significant changes on spatiotemporal parameters and sagittal plane lower limb kinematics, 3D gait analysis documented a significant (p<0.05) improvement in all movement planes (181).

Complementary physical therapies such as dancing, hydrotherapy and robotic gait training appear to afford therapeutic benefits, increasing mobility and quality of life, in some people living with PD. (252)

Yoga

- Hatha Yoga can be used as a community-based rehabilitation intervention for individuals with PD. Yoga, as part of an interdisciplinary approach to treatment, can improve many types of activities and participation outcomes (e.g., mobility, social relationships, self-care, handling stress, recreation). (68)

- Specially designed yoga program and PowerTraining programs can significantly improve physical performance in older persons with PD. (222)

SEARCH RESULTS

281 results

1. Tai Chi versus routine exercise in patients with early- or mild-stage Parkinson's disease: a retrospective cohort analysis.

Author(s): Li, Quanhao; Liu, Jinmei; Dai, Fei; Dai, Fengling

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Abstract: Parkinson's disease cannot be cured but symptoms can be improved by making use of physical therapy. The objective of the study was to compare the effect of routine exercises and Tai Chi on physical and clinical performance in elderly people suffering from Parkinson's disease. Data from interviews, physical and clinical performance, and levodopa consumption of 500 patients with confirmed Parkinson's disease (severity level I to III) were collected and analyzed. Participants who received 80 min/day Tai Chi 3 times/week for 2 months were included in the Tai Chi (TC) group (n=250) and those who received 90 min/day routine exercise 3 times/week for 2 months were included in routine exercise (RE) group (n=250). Timed up-and-go, 50-foot speed walk, and functional reach were improved by Tai Chi and routine exercise (P<0.05 for all) but intensities of Tai Chi for improvement of such parameters was higher than routine exercise. Incidence of falls was decreased by both physical therapies (P<0.05 for all) but more for the TC group (P<0.0001, q=38.512). In the TC group, at the end of follow-up, 22 (9%) patients were successful in withdrawal of levodopa treatment. Also, the dose of levodopa was decreased in patients of the TC group who had to continue levodopa. Tai Chi had the potential to slow down the progression of symptoms of Parkinson's disease and delayed the introduction of levodopa (level of evidence: III).

Database: Medline

**Author(s):** Winser, Stanley; Lee, Sing Hong; Law, Hung Sing; Leung, Hei Yuen; Bello, Umar Muhammad; Kannan, Priya

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**Publication Date:** Apr 2020

**Publication Type(s):** Academic Journal

**Abstract:** Purpose: To identify the existing evidence evaluating the cost-effectiveness of physiotherapy treatments for people with neurological disorders. Methods: Multiple databases were searched from database inception until July 2018. Studies estimating the cost-effectiveness as incremental cost-effectiveness ratios, cost per quality-adjusted life year, cost per disability-adjusted life year and cost per other measurable results were included. Physiotherapy Evidence Database scale, and Consensus on Health Economic Criteria list were used for rating the quality of the evidence. Results: Ten studies involving 1462 participants were included. Aerobic training, progressive strength training, and a pragmatic physiotherapy program (combination of stretching, strength, and balance training) were reported as potentially cost-effective for older adults with vascular cognitive impairment, falls prevention in Parkinson's disease and multiple sclerosis respectively. Physiotherapy as an adjuvant for pain control was also reported as cost-effective for reflex sympathetic dystrophy. One study testing extra physiotherapy-by-physiotherapy assistant in cerebral palsy and two studies testing extra therapy using a robotic arm and Wii therapy for hand rehabilitation in stroke were reported as not cost-effective. Conclusions: There are limited studies that have evaluated the cost-effectiveness of physiotherapy treatments in neurological disorders. Three studies that combined extra physiotherapy-by-physiotherapy assistant and novel interventions with conventional physiotherapy were found not cost-effective. Progressive muscle strengthening exercise over a period of 6-month is reported to be cost-effective for falls prevention in people with Parkinson's disease Aerobic training is reported as potentially cost-effective for older adults with vascular cognitive impairment Physiotherapy given as an adjuvant treatment is reported to be potentially cost-effective for reflex sympathetic dystrophy of less than 1-year duration One study reported physiotherapy involving static stretching, aerobic exercise, strengthening exercise, and balance training as cost-effective for people with multiple sclerosis Additional physiotherapy-by-physiotherapy assistant or family member for improving motor development in cerebral palsy and the use of novel physiotherapy techniques such as robotics or Wii plus conventional physiotherapy for improving arm function in stroke are found not cost-effective. Group therapy for improving physical activity in mild Alzheimer's disease is found not cost-effective.

**Database:** CINAHL

3. Functional outcomes of an integrated Parkinson’s Disease Wellbeing Program.

**Author(s):** Horne, Jeremey T.; Soh, Derrick; Cordato, Dennis J.; Campbell, Megan L.; Schwartz, Raymond S.

**Source:** Australasian Journal on Ageing; Mar 2020; vol. 39 (no. 1)

**Publication Date:** Mar 2020

**Publication Type(s):** Academic Journal

**Abstract:** Introduction: There is growing evidence that exercise provides benefit in treating motor and non-motor symptoms in Parkinson’s disease (PD). Objectives: The aims of this study were to determine (a) whether a 5-week PD-specific program resulted in sustained physical and psychosocial benefits, and (b) the relationship between patient characteristics, exercise, falls and physical and psychosocial parameters. Design: Single-centre prospective observational study. Methods: A total of
135 consecutive patients with mild-to-moderate PD underwent a 5-week PD-specific education and exercise program from August 2013 to March 2015. Gait, mobility and psychosocial measures were compared at baseline, 6 weeks and 12 months. Results: Significant improvements in physical (walking distance in 2 minutes, number of "Sit To Stands" in 30 seconds, time in seconds taken to "Timed Up and Go," fast gait velocity over 10 m, Berg Balance Scale [BBS]) and psychosocial (quality of life [QoL] [PDQ-39], depression and anxiety [DASS-21], and fatigue [PSF-16]) measures were seen at 6 weeks (all P <.01) with physical improvements sustained at 12 months (all P <.001). The number of patients at 12 months with ≥1 fall reduced from 66% to 33%, and the number not exercising reduced from 42% to 21%. A lack of exercise correlated with ≥1 fall at 12 months (OR 3.39, 95% CI 1.36-8.39, P =.009). It was also associated with poorer balance and psychosocial parameters at 12 months (all P <.05). Conclusions: Patients recruited into a 5-week Parkinson’s disease education and exercise program achieved significant 12-month benefits in physical but not psychosocial measures. Patients with ≥1 fall post-treatment were less likely to have been exercising at 12-month follow-up.

**Database:** CINAHL


**Author(s):** Xie, Yun-Juan; Gao, Qiang; He, Cheng-Qi; Bian, Rong

**Source:** Archives of Physical Medicine & Rehabilitation; Jan 2020; vol. 101 (no. 1); p. 130-140

**Publication Date:** Jan 2020

**Publication Type(s):** Academic Journal

**Abstract:** The purpose of this review was to systematically assess the effectiveness of repetitive transcranial magnetic stimulation (rTMS) intervention on gait in individuals with Parkinson disease (PD). We searched online electronic databases up to March 28, 2019, including MEDLINE, Embase, the Cochrane Library, and so on. The inclusion criteria for this review were randomized controlled trials (RCTs), exploring the effect of rTMS in patients diagnosed with idiopathic PD. Data extraction was performed independently by 2 reviewers based on predefined criteria and the methodologic quality of included studies was quantified by the Physiotherapy Evidence Database scale. The outcome measure was walking performance, including walking time (short term and long term), Timed Up and Go (TUG) test, and so on. Among 14 eligible studies, including 298 participants (mean age ± SD [y], 63.24±9.71; 191 [64%] men) were analyzed in this meta-analysis. Walking time was improved with rTMS compared with sham rTMS (standardized mean difference [SMD] -0.30; 95% confidence interval [CI], -0.57 to -0.03; P =.03). The score for the freezing of gait questionnaire did not differ significantly between rTMS and no intervention. Four studies compared TUG between the 2 treatment groups and no significant differences were found between the rTMS and control group (SMD -0.45; 95% CI, -1.32 to 0.41; P =.30). During the off-state, there were no significant differences in estimated effect sizes (SMD=-0.29; 95% CI, -0.79 to 0.21; P =.25), which is significantly different in on-state (SMD=-0.98; 95% CI, -1.78 to -0.18; P =.02) evaluation. The results of the meta-analysis propose the favorable effect of rTMS on walking performance in the short term but not over the long term in individuals with PD.

**Database:** CINAHL

5. 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.

**Source:** Physiotherapy Research International; Jan 2020; vol. 25 (no. 1)
Abstract: 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.

Database: CINAHL


Author(s): Choi, Ji-Hyun; Kim, Han-Joon; Lee, Jee-Young; Yoo, Dallah; Im, Jin Hee; Paek, Sun Ha; Jeon, Beomseok

Source: PloS one; 2019; vol. 14 (no. 8); p. e0221219

Abstract: OBJECTIVES Deep brain stimulation (DBS) of the subthalamic nucleus (STN) has been reported to have a positive effect on sleep-wake disturbance in Parkinson's disease (PD). We aimed to investigate the long-term effects of STN DBS on sleep in patients with PD. METHODS Sixty-one patients with PD who had undergone bilateral STN DBS were followed for 3 years with assessments including the Parkinson's disease sleep scale (PDSS), Epworth sleepiness scale (ESS), total sleep hours per day, Unified PD Rating Scale part I-III, Hoehn & Yahr stage, levodopa equivalent dose, quality of life measure, and depression scale measured preoperatively and at 6 months after postoperatively, and annually thereafter. RESULTS Among the 61 patients at baseline, 46 patients completed the last follow-up assessment. The total PDSS score significantly improved after STN DBS from baseline up to 3 years after STN DBS (79.0±30, 100.0±23.3, 98.8±23.0, 97.1±29.6, and 93.3±28.0 at baseline, 6, 12, 24, and 36 months, respectively, p = 0.006 for the change over time). Among the eight PDSS domains, the domains for overall quality of a night's sleep, sleep onset and maintenance insomnia, and nocturnal motor symptoms showed significant improvement after STN DBS (p = 0.036, 0.029, and < 0.001, respectively, for the change over time). The total sleep hours per day were increased, but the total ESS score did not show significant change after STN DBS (p = 0.001 and 0.055,
respectively, for the change over time). Changes in the total PDSS were associated with changes in the depression and motivation items in the Unified PD Rating Scale part I, depression scale, and quality of life measure, but those variables at baseline were not predictive of changes in the total PDSS after STN DBS. CONCLUSION In the largest systematic long-term follow-up study, the improvement in subjective sleep quality after bilateral STN DBS was sustained in PD patients. Improved nocturnal sleep and nocturnal motor symptoms were correlated with an improved mood and quality of life. However, STN DBS did not reduce excessive daytime sleepiness despite reductions in antiparkinsonian medications.

**Database**: Medline

7. **Personalized transcranial alternating current stimulation (tACS) and physical therapy to treat motor and cognitive symptoms in Parkinson's disease: A randomized cross-over trial.**

**Author(s)**: Del Felice, Alessandra; Castiglia, Leonora; Formaggio, Emanuela; Cattelan, Manuela; Scarpa, Bruno; Manganotti, Paolo; Tenconi, Elena; Masiero, Stefano

**Source**: NeuroImage. Clinical; 2019; vol. 22 ; p. 101768

**Publication Date**: 2019

**Publication Type(s)**: Randomized Controlled Trial Journal Article

**PubMedID**: 30921609

**Abstract**: Abnormal cortical oscillations are markers of Parkinson's Disease (PD). Transcranial alternating current stimulation (tACS) can modulate brain oscillations and possibly impact on behaviour. Mapping of cortical activity (prevalent oscillatory frequency and topographic scalp distribution) may provide a personalized neurotherapeutic target and guide non-invasive brain stimulation. This is a cross-over, double blinded, randomized trial. Electroencephalogram (EEG) from participants with PD referred to Specialist Clinic, University Hospital, were recorded. TACS frequency and electrode position were individually defined based on statistical comparison of EEG power spectra maps with normative data from our laboratory. Stimulation frequency was set according to the EEG band displaying higher power spectra (with beta excess on EEG map, tACS was set at 4 Hz; with theta excess, tACS was set at 30 Hz). Participants were randomized to tACS or random noise stimulation (RNS), 5 days/week for 2-weeks followed by ad hoc physical therapy. EEG, motor (Unified Parkinson's Disease Rating Scale-motor: UPDRS III), neuropsychological (frontal, executive and memory tests) performance and mood were measured before (T0), after (T1) and 4-weeks after treatment (T2). A linear model with random effects and Wilcoxon test were used to detect differences. Main results include a reduction of beta rhythm in theta-tACS vs. RNS group at T1 over right sensorimotor area (p = .014) and left parietal area (p = .010) and at T2 over right sensorimotor area (p = .004) and left frontal area (p = .039). Bradykinesia items improved at T1 (p = .002) and T2 (p = .047) compared to T0 in the tACS group. In the tACS group the Montréal Cognitive Assessment (MoCA) improved at T2 compared with T1 (p = .049). Individualized tACS in PD improves motor and cognitive performance. These changes are associated with a reduction of excessive fast EEG oscillations.

**Database**: Medline

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

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

**Source**: Australian Occupational Therapy Journal; Dec 2019; vol. 66 (no. 6); p. 731-738
Abstract: Introduction: Occupational therapists commonly provide intervention that promotes quality of life in people with Parkinson's disease. Existing research supports the effects of multidisciplinary and motor intervention for people with Parkinson's disease. However, few studies have identified the effectiveness of occupational therapy intervention alone. The aim of this review was to examine the efficacy of interventions provided by occupational therapists for people with Parkinson's disease. Methods: A comprehensive database search of the literature was performed using Medline, EMBASE, PsycInfo and CINAHL between 2003 and January 2018. There were no restrictions on study design and studies with or without a control group were selected for review. Studies were included if intervention consisted of at least 50% of occupational therapy intervention for Parkinson's disease. Two independent reviewers extracted and synthesised data from relevant articles. Results: In all, 10 studies representing data from 1343 people with Parkinson's disease and 180 caregivers were included in this review. Occupational therapy interventions focusing on meaningful activities were shown to improve perceived occupational performance. Upper limb therapy programmes were shown to improve upper limb function in the short term though longer-term effects are unclear. Conclusion: Current research supports interventions which are intermittent, short term and intensive, and involve tailored therapy plans working towards an individual's goals. Occupational therapists should implement goal-oriented intervention programmes in conjunction with following the guidance of existing best practice guidelines.

Database: CINAHL

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

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

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

Abstract: Objectives: Falls are common in Parkinson's disease (PD). Exercise interventions can prevent falls. This review aims to (1) explore the existing evidence regarding the cost-effectiveness of exercise-based fall prevention programs for people with PD and (2) discuss the implications of the review findings for future research and clinical practice. Design: Databases AMED Allied and Complementary Medicine, CINAHL, CRD, EBSCO, EMBASE, MEDLINE, PubMed, Scopus, and Web of Science were searched from their inception until June 2019. Randomized and nonrandomized trials that included an economic evaluation of fall prevention programs for people with PD were considered. Quality of the economic evaluation was assessed using the Consensus on Health Economic Criteria list (CHEC-list), and the methodological quality was assessed using the Physiotherapy Evidence Database (PEDro) and Cochrane risk of bias tool. Results: Nine hundred and sixty-five studies were screened to include three studies involving 556 participants. Quality of economic evaluation assessed using CHEC-list was high. The methodological quality was high for two studies and low for one study. Tested interventions included Tai Ji Quan, physiotherapist-led, supervised, weekly and monthly balance, and strengthening exercises. The duration of the interventions ranged from 10 weeks to 6 months, while the intervention frequency ranged from two sessions per week to one session per month. Treatment sessions lasted for 60 min in all three studies. One high economic and methodological quality study comparing Tai Ji Quan with resistance and stretching exercises reported least cost resource use among Tai Ji Quan group (USD 80,441) and greater incremental number of falls prevented. All three tested interventions had an 80% probability
of being cost-effective with the corresponding country-specific threshold incremental cost-effectiveness ratio values. Conclusions: The findings provide some evidence for exercise-based intervention as a cost-effective treatment option for preventing falls in PD; however, due to the limited number of available studies, heterogeneity of the interventions, and diversity of assessment settings, a firm conclusion cannot be established. Additional studies evaluating the cost-effectiveness of fall prevention programs involving larger samples and using different treatment parameters in various settings are warranted.

Database: CINAHL

10. Merging Yoga and Occupational Therapy for Parkinson's Disease: Program Adaptation and Development.

Author(s): Swink, Laura A.; Atler, Karen E.; Klinedinst, Tara C.; Fling, Brett W.; Fruhauf, Christine A.; Schmid, Arlene A.

Source: Physical & Occupational Therapy in Geriatrics; Dec 2019; vol. 37 (no. 4); p. 260-281

Publication Date: Dec 2019

Publication Type(s): Academic Journal

Abstract: Purpose: To adapt the Merging Yoga and Occupational Therapy program and develop the Merging Yoga and Occupational Therapy for Parkinson's disease (MY-OT for PD) program, designed to target fall risk management. Creating a new program involved the targeted development of Stage 1 manuals. Methods: Researchers employed a pragmatic qualitative design to focus on meeting the purpose of the study. Stage 1 manuals were created following a literature review, a focus group of participants with PD, and individual interviews with experts in practice or research. Visual familiarization with data, generation of conclusions, and results verification were used to translate participant feedback into manual revisions. Results: Themes included revisions to model, content, and delivery. Revisions were incorporated into Stage 1 manuals to create a PD-specific program to improve fall risk management. Conclusion: A structured process is necessary to create Stage 1 manuals in a novel population prior to feasibility and pilot testing.

Database: CINAHL

11. Transcutaneous vagal nerve stimulation improves gastroenteric complaints in Parkinson's disease patients.

Author(s): Kaut, Oliver; Janocha, Laura; Weismüller, Tobias J; Wüllner, Ullrich

Source: NeuroRehabilitation; Dec 2019; vol. 45 (no. 4); p. 449-451

Publication Date: Dec 2019

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 31868695

Abstract: BACKGROUND Gastrointestinal dysfunctions are common in Parkinson's disease. Their management is still challenging and new treatment options are needed. OBJECTIVE To test whether transcutaneous vagal nerve stimulation can improve gastrointestinal dysfunction in patients with Parkinson's disease. METHODS We performed a randomized double-blind pilot study enrolling patients suffering from Parkinson's disease with gastroenteric complaints. Patients were randomized to use either a sham-device or to stimulate the vagal nerve with an electric device over the course of four weeks with four stimulations per day. Ten patients (aged 69.6±4.6 years) were randomized for the intervention group, and nine patients (aged 67.2±6.3 years) used a sham-device. Clinical outcome was evaluated using the Gastrointestinal Symptom Rating Scale whereas gastrointestinal
motility was measured with the 13C-octanoic acid breath test.

**RESULTS**

In the treatment group, vagal nerve stimulation improved the Gastrointestinal Symptom Rating Scale comparing before and after stimulation (before, 8.7±6.09; after, 5.67±3.08; p-value 0.48). This improvement was not observed in the sham group (before, 7.44±4.85; after, 5.67±3.08; p-value 0.16). In the 13C-octanoic acid breath test no significant changes were detectable.

**CONCLUSIONS**

Vagal nerve stimulation is well tolerated with no side effects and may be a promising non-invasive therapy option to improve gastroenteric symptoms in Parkinson's disease.

**Database:** Medline

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12. **Resistance training reduces depressive symptoms in elderly people with Parkinson disease: A controlled randomized study.**

**Author(s):** de Lima, Tiago Alencar; Ferreira-Moraes, Renilson; Alves, Wilson Mateus Gomes da Costa; Alves, Thiago Gonçalves Gibson; Pimentel, Clebson Pantoja; Sousa, Evitom Corrêa; Abrahim, Odilon; Cortinhas-Alves, Erik Artur

**Source:** Scandinavian journal of medicine & science in sports; Dec 2019; vol. 29 (no. 12); p. 1957-1967

**Publication Date:** Dec 2019

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 31357229

**Abstract:**

**BACKGROUND**

Depression affects up to 40% of individuals with Parkinson's disease (PD).

**PURPOSE**

To assess resistance training effects on the depressive symptoms of elderly PD patients.

**STUDY DESIGN**

A randomized control study.

**METHODS**

Thirty-three patients (aged ≥ 60 years) were randomly divided into two groups: (a) control group: n = 16 and (b) resistance training group (RTG): n = 17. All patients with Parkinson's disease (stage 1-3 on the Hoehn and Yahr scale). The RTG, in addition to maintaining their pharmacological treatments, performed 20 weeks of resistance training. The control group maintained their pharmacological treatments. Depressive symptoms, quality of life, unified Parkinson's Disease scale, and functional capacity were evaluated in both groups.

**RESULTS**

The RTG presented a significant reduction (P < .05) of depressive symptoms (pre = 17.9 ± 8 score; post = 10.3 ± 6 score; effect size: -0.48), improved quality of life (pre = 40.3 ± 21.1 score; post = 30.2 ± 16.8 score; effect size: -0.26), and improved UPDRS (pre = 64 ± 34.6 score; post = 49.1 ± 24.1 score; effect size: -0.24). No significant changes in the control group regarding depressive symptoms (pre = 18.7 ± 5.4 score; post = 19.4 ± 5.2 score; effect size: 0.07), quality of life (pre = 39 ± 16.1 score; post = 40.6 ± 15.6 score; effect size: 0.05), and UPDRS (pre = 61.1 ± 24.3 score; post = 64.9 ± 23.4 score; effect size: 0.08) after 20 weeks.

**CONCLUSION:** Resistance training reduces depressive symptoms and improves the quality of life and functionality of elderly with PD.

**Database:** Medline

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13. **Measures of balance and falls risk prediction in people with Parkinson's disease: a systematic review of psychometric properties.**

**Author(s):** Winser, Stanley J; Kannan, Priya; Bello, Umar Muhamad; Whitney, Susan L

**Source:** Clinical rehabilitation; Dec 2019; vol. 33 (no. 12); p. 1949-1962

**Publication Date:** Dec 2019

**Publication Type(s):** Journal Article Systematic Review

**PubMedID:** 31571503
Available at Clinical rehabilitation - from Unpaywall

**Abstract:**

**OBJECTIVE**

To investigate the psychometric properties of measures of balance and falls risk prediction in people with Parkinson's disease (PD).

**DATA SOURCES**

PubMed, Embase, CINAHL, Ovid Medline, Scopus, and Web of Science were searched from inception to August 2019.

**REVIEW METHODS**

Studies testing psychometric properties of measures of balance and falls risk prediction in PD were included. The four-point Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) assessed quality.

**RESULT**

Eighty studies testing 68 outcome measures were reviewed; 43 measures assessed balance, 9 assessed falls risk prediction, and 16 assessed both. The measures with robust psychometric estimation with acceptable properties were the (1) Mini-Balance Evaluation Systems Test (Mini-BEST), (2) Berg Balance Scale, (3) Timed Up and Go test, (4) Falls Efficacy Scale International, and (5) Activities-Specific Balance Confidence scale. These measures assess balance and falls risk prediction at the body, structure and function level, falls risk and balance, and falls risk at the activity level. The motor examination of the Unified Parkinson's Disease Rating Scale (UPDRS-ME) with robust psychometric analysis is a condition-specific measure with acceptable properties. Except the UPDRS-ME and Mini-BESTest, the responsiveness of the other four measures has yet to be established.

**CONCLUSION**

Six of the 68 outcome measures have strong psychometric properties for the assessment of balance and falls risk prediction in PD. Measures assessing balance and falls risk prediction at the participatory level are limited in number with a lack of psychometric validation.

**Database:** Medline

14. **Occupational Therapy for Parkinsonian Patients: A Retrospective Study.**

**Author(s):** Franciotta, Michele; Maestri, Roberto; Ortelli, Paola; Ferrazzoli, Davide; Mastalli, Federica; Frazzitta, Giuseppe

**Source:** Parkinson’s Disease (20420080); Nov 2019 ; p. 1-7

**Publication Date:** Nov 2019

**Publication Type(s):** Academic Journal

Available at Parkinson’s disease - from Europe PubMed Central - Open Access

**Abstract:**

Background. Hand functionality and finger dexterity are impaired in patients with Parkinson’s disease (PD). These disturbances lead to a dependency in activities of daily living (ADL) and poor quality of life (QoL). Objective. We aimed to evaluate whether a specific occupational therapy (OT) program is effective in improving finger and hand dexterity and its impact on ADL in PD patients. Methods. We retrospectively studied PD patients, hospitalized for a 4-week multidisciplinary intensive rehabilitation treatment (MIRT) between January 2015 and June 2018. All patients underwent 1 h/day OT treatment, 5 days a week. The primary outcome measure was the O’Connor finger dexterity test; secondary outcome measures were the Minnesota dexterity test, UPDRS II, and Self-Assessment Parkinson’s Disease Disability Scale (SPDDS). These measures were assessed at admission (T0) and discharge (T1). Results. Based on the Hoehn and Yahr scale (H&Y), patients were divided into two groups: 262 subjects in H&Y stage <3 (early-stage PD patients) and 220 in H&Y stage ≥3 (medium-advanced stage PD patients). As expected, at baseline, all measures were worse in higher H&Y stages. After treatment, both groups experienced significant improvements in all outcomes. Significant differences between early-stage and medium-advanced stage PD patients were observed only for the changes in UPDRS II, with a better improvement in patients in H&Y stage ≥3. Conclusions. We showed that PD patients who underwent a rehabilitation protocol including OT experienced improvements in finger dexterity and hand functionality. Our results underline the relevance of OT in improving autonomy and QoL in PD patients.

**Database:** CINAHL
15. **A physical therapy decision-making tool for stratifying persons with Parkinson’s disease into community exercise classes.**

**Author(s):** Borchers, Emily E; McIsaac, Tara L; Bazan-Wigle, Jennifer K; Elkins, Aaron J; Bay, Ralph C; Farley, Becky G

**Source:** Neurodegenerative Disease Management; Nov 2019; vol. 9 (no. 6); p. 331-346

**Publication Date:** Nov 2019

**Publication Type(s):** Academic Journal

**Available at** Neurodegenerative Disease Management - from ProQuest (Health Research Premium) - NHS Version

**Abstract:**
Aim: Physical therapy and exercise are considered essential components in the management of Parkinson’s disease (PD). Using our retrospective data and years of experience in assigning persons with PD to multilevel group classes we propose a two-part physical therapy decision-making tool consisting of participant and exercise program considerations. Methods: Retrospective medical record review and therapist consensus identified evaluation considerations determined to aide clinical decision making. The ability of these variables (i.e., demographics, clinical characteristics, clinical measures cut-offs) to predict the class assignment decision of PD-specialized physical therapists was evaluated using discriminant function analysis. Results: Therapist-assigned groups differed significantly on all clinical measures (p < 0.001) which provided the categorical data required for discriminant analysis. Using all variables, the discriminant function analysis predicted class assignment of the therapists with 79% agreement. Conclusion: This proposed tool provides a framework that may guide the process for increasing access to multilevel group classes.

**Database:** CINAHL

16. **Changes in Nonmotor Symptoms Following an 8-Week Yoga Intervention for People with Parkinson’s Disease.**

**Author(s):** Walter, Alysha A; Adams, Em V; Van Puyymbroek, Marieke; Crowe, Brandi M; Urrea-Mendoza, Enrique; Hawkins, Brent L; Sharp, Julia; Woschkolup, Kathleen; Revilla, Freddy J; Schmid, Arlene A

**Source:** International journal of yoga therapy; Nov 2019; vol. 29 (no. 1); p. 91-99

**Publication Date:** Nov 2019

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 30901529

**Abstract:**
Parkinson’s disease (PD) is a neurodegenerative disorder marked by progressive degenerative motor symptoms (e.g., tremors, impaired balance and gait) and nonmotor symptoms (e.g., fatigue, sleep disturbances, pain) that can negatively influence health-related quality of life (HRQoL). Previous studies have shown that yoga for individuals with PD improves balance, strength, and mobility. However, little research has been conducted to determine the effect of yoga on nonmotor symptoms of PD. The purpose of this study was to examine changes in nonmotor symptoms among individuals with PD following an 8-week yoga intervention. Data used for analyses were part of a larger study that researched improvements in motor function for individuals with PD. Participants (N = 27) were randomly assigned to experimental (n = 15) and control (n = 12) groups and completed pre- and postintervention quantitative measures. Within-group improvements were statistically significant for fatigue measured by the Parkinson’s Fatigue Scale, balance confidence measured by the Activities Balance Confidence Scale, the belief in one’s ability to manage falls measured by the Falls Management Scale, activity constraints measured by the Activities Constraint
Questionnaire, and PD-specific quality of life measured by the Parkinson's Disease Questionnaire-8. Across-group changes were statistically significant for activity constraints. Findings indicate yoga may be an efficacious intervention for improving nonmotor symptoms as well as HRQoL for individuals with PD.

**Database**: Medline

17. **Home-based prescribed exercise improves balance-related activities in people with Parkinson's disease and has benefits similar to centre-based exercise: a systematic review.**

**Author(s)**: Flynn, Allyson; Allen, Natalie E; Dennis, Sarah; Canning, Colleen G; Preston, Elisabeth

**Source**: Journal of Physiotherapy (Elsevier); Oct 2019; vol. 65 (no. 4); p. 189-199

**Publication Date**: Oct 2019

**Publication Type(s)**: Academic Journal

**Abstract**: In people with Parkinson’s disease, does home-based prescribed exercise improve balance-related activities and quality of life compared with no intervention? Are the effects of home-based exercise similar to those of equivalent centre-based exercise? Systematic review and meta-analysis of randomised and quasi-randomised controlled trials. Adults diagnosed with idiopathic Parkinson’s disease. Predominantly home-based prescribed exercise (defined as a minimum of two-thirds of the exercise being completed at home). The intervention had to primarily involve physical practice of exercises targeting gait and/or standing balance compared with either control (ie, usual care only, a sham intervention or no physiotherapy) or equivalent predominantly centre-based exercise. The primary outcome was balance-related activities and the secondary outcomes were gait speed, Berg Balance Scale, Functional Reach test, and quality of life. Sixteen trials met the inclusion criteria and all contributed to the meta-analyses. Twelve trials compared home-based prescribed exercise with control, and four trials compared home-based prescribed exercise with equivalent centre-based exercise. Home-based prescribed exercise improved balance-related activities (SMD 0.21, 95% CI 0.10 to 0.32) and gait speed (SMD 0.30, 95% CI 0.12 to 0.49), but not quality of life (SMD 0.11, 95% CI −0.01 to 0.23) compared with control. Home-based and centre-based exercise had similar effects on balance-related activities (SMD −0.04, 95% CI −0.36 to 0.27) and quality of life (SMD −0.08, 95% CI −0.41 to 0.24). Home-based prescribed exercise improves balance-related activities and gait speed in people with Parkinson’s disease, and these improvements are similar to improvements with equivalent centre-based exercise. PROSPERO CRD 42018107331.

**Database**: CINAHL

18. **Strength training improves the respiratory muscle strength and quality of life of elderly with Parkinson disease.**

**Author(s)**: Alves, Wilson M; Alves, Thiago G; Ferreira, Renilson M; Lima, Tiago A; Pimentel, Clebson P; Sousa, Evitom C; Abrahin, Odilon; Alves, Erik A

**Source**: The Journal of sports medicine and physical fitness; Oct 2019; vol. 59 (no. 10); p. 1756-1762

**Publication Date**: Oct 2019

**Publication Type(s)**: Randomized Controlled Trial Journal Article

**PubMedID**: 31113177

**Abstract**: BACKGROUND The progression of Parkinson disease can lead to respiratory muscle weakness, reduced peak expiratory flow and quality of life (QoL). The aim was to evaluate the effects of strength training on levels of respiratory muscle strength, peak expiratory flow and QoL of elderly
with Parkinson disease. METHODS A total of 28 patients were randomized into one of two groups: the control group (CG) comprised 16 participants, and the strength training group (STG) comprised 12 participants. All subjects maintained the standard pharmacological treatment for Parkinson disease, and the intervention group participated in a 16-week strength training program. The primary outcome was the measurement of respiratory muscle strength. RESULTS The STG showed improved values of maximum inspiratory pressures (36.11±11.82 to 52.94±24.17; P=0.01), maximum expiratory pressures (56.67±22.08 to 71.04±33.71; P=0.03) and QoL (41.75±20.33 to 34±20.92; P=0.0054); there was no significant difference in the peak expiratory flow (336.11±198.04 to 380±229.57; P=0.09). The CG showed significantly decreased values of peak expiratory flow (336.88±183.40 to 279.37±125.12, P=0.02) and non-significant changes in the other variables. CONCLUSIONS: Sixteen weeks of strength training improves the inspiratory and expiratory muscle strength and QoL of elderly with Parkinson disease. These findings suggest that strength training could be considered an adjunct therapeutic intervention for elderly with Parkinson disease.

Database: Medline

19. Tai Chi and Parkinson's disease (PD): A systematic overview of the scientific quality of the past systematic reviews.

Author(s): Kedzior, Karina Karolina; Kaplan, Ilkay

Source: Complementary therapies in medicine; Oct 2019; vol. 46 ; p. 144-152

Publication Date: Oct 2019

Publication Type(s): Meta-analysis Journal Article Systematic Review

PubMedID: 31519271

Abstract: OBJECTIVES The aim of the current study was to assess the scientific quality of the past systematic reviews regarding the application of Tai Chi in the management of Parkinson’s disease (PD) using a systematic overview. METHODS The search of PubMed and PsycInfo in February 2018 identified k=10 relevant systematic reviews published in 2008-2017 with terms PD, Tai Chi, and review in titles or abstracts. The quality of reviews was assessed using A Measurement Tool to Assess Systematic Reviews (AMSTAR2) and the quality of meta-analytic procedures was assessed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. RESULTS The k=10 systematic reviews assessed various outcomes of Tai Chi in PD using a qualitative (k = 4) or a quantitative synthesis (meta-analysis; k = 6) of data from up to 14 primary studies published in English. The review strengths were the comprehensive search for literature, data coding, and data quality assessment. The review limitations were the high overlap in the primary data and the lack of either the review protocol, the list of excluded studies or the conflict of interest statement in the primary studies. The critical problems were that the qualitative data synthesis relied on the statistical significance of results in the primary studies with small sample sizes and that the computational details of meta-analysis were inadequately reported. CONCLUSIONS The past systematic reviews suggest that Tai Chi is a promising complementary treatment for PD. However, the quality of such past reviews is limited. Future systematic reviews can be improved by adequately reporting the methodological details and adhering to the guidelines for conducting such reviews. The clinical relevance of Tai Chi in terms of the magnitude and the longer-term durability of its outcomes should be tested in future RCTs with larger sample sizes.

Database: Medline

**Author(s):** Capecci, Marianna; Pournajaf, Sanaz; Galafate, Daniele; Sale, Patrizio; Le Pera, Domenica; Goffredo, Michela; De Pandis, Maria Francesca; Andrenelli, Elisa; Pennacchioni, Mauro; Ceravolo, Maria Gabriella; Franceschini, Marco

**Source:** Annals of physical and rehabilitation medicine; Sep 2019; vol. 62 (no. 5); p. 303-312

**Publication Date:** Sep 2019

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 31377382

**Abstract:** BACKGROUND Although gait disorders strongly contribute to perceived disability in people with Parkinson's disease, clinical trials have failed to identify which task-oriented gait training method can provide the best benefit. Freezing of gait remains one of the least investigated and most troublesome symptoms. OBJECTIVE We aimed to compare the effects of robot-assisted gait training and treadmill training on endurance and gait capacity in people with Parkinson disease; the secondary aim was to compare the effect of the treatments in people with freezing and/or severe gait disability and assess changes in overall disease-related disability and quality of life. METHODS Outpatients with Parkinson disease (Hoehn and Yahr stage≥2) were randomly assigned to receive 20 sessions of 45-min gait training assisted by an end-effector robotic device (G-EO System) or treadmill training. Outcome assessments were the 6-min walk test, Timed Up and Go test, Freezing of Gait Questionnaire, Unified Parkinson's Disease Rating Scales and Parkinson's Disease Quality of Life Questionnaire-39 administered before (T0) and after treatment (T1). RESULTS We included 96 individuals with Parkinson disease: 48 with robot-assisted gait training and 48 treadmill training. Both groups showed significant improvement in all outcomes. As compared with baseline, with robot-assisted gait training and treadmill training, endurance and gait capacity were enhanced by 18% and 12%, respectively, and motor symptoms and quality of life were improved by 17% and 15%. The maximum advantage was observed with the Freezing of Gait Questionnaire score, which decreased by 20% after either treatment. On post-hoc analysis, dependent walkers benefited more than independent walkers from any gait training, whereas freezers gained more from robot-assisted than treadmill training in terms of freezing reduction. CONCLUSIONS: Repetitive intensive gait training is an effective treatment for people with Parkinson disease and can increase endurance and gait velocity, especially for those with severe walking disability. Advantages are greater with robot-assisted gait training than treadmill training for individuals with freezing of gait - related disability.

**Database:** Medline

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**Author(s):** Suárez-Iglesias, David; Miller, Kyle J; Seijo-Martínez, Manuel; Ayán, Carlos

**Source:** Medicina (Kaunas, Lithuania); Aug 2019; vol. 55 (no. 8)

**Publication Date:** Aug 2019

**Publication Type(s):** Meta-analysis Journal Article Systematic Review

**PubMedID:** 31412676

Available at Medicina (Kaunas, Lithuania) - from Unpaywall

**Abstract:** Pilates may be a beneficial method of exercise for people with Parkinson's disease (PD). However, no studies have critically reviewed the scientific evidence in this regard. The purpose of this study was to conduct a systematic review and meta-analysis on the effectiveness of Pilates as a rehabilitation strategy for PD. A systematic search of the electronic databases PubMed, PEDro, Scopus, and SPORTDiscus was conducted to identify studies related to the effect of Pilates on PD. The search timeframe ranged from the inception of each database to March 2019. The search
resulted in the identification of four randomized controlled trials (RCTs) and four non-RCT studies. The methodological quality of the investigations ranged from poor to fair. The descriptive analysis of the eight investigations showed that Pilates resulted in beneficial effects on fitness, balance and functional autonomy. A subsequent meta-analysis on the four RCTs indicated that Pilates was more effective than traditional training programmes in improving lower limb function. Pilates can be safely prescribed for people with mild-to-moderate PD. Preliminary evidence indicates that its practice could have a positive impact on fitness, balance and physical function. Its benefits on lower-body function appear to be superior to those of other conventional exercises. Future randomized studies with greater samples are needed to confirm these observations.

Database: Medline

22. Effects of different percentages of body weight-supported treadmill training in Parkinson’s disease: a double-blind randomized controlled trial

**Author(s):** Atan, Tuğba; Özyemişci Taşkıran, Özden; Bora Tokçaer, Ayşe; Kaymak Karataş, Gülçin; Karakuş Çalışkan, Aslı; Karaoğlan, Belgin

**Source:** Turkish journal of medical sciences; Aug 2019; vol. 49 (no. 4); p. 999-1007

**Publication Date:** Aug 2019

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 31292107

**Abstract:** Background/aim Body weight-supported treadmill training (BWSTT) might have greater effects than conventional treadmill training (TT) in neurological diseases such as Parkinson’s disease (PD). The aim of this study was to evaluate the effects of different percentages of BWSTT on gait, balance, quality of life, and fatigue in PD. Materials and methods Thirty-five patients with moderate to advanced PD were randomized into three BWSTT groups according to the supported percentage of body weight: 0% BWSTT (control group; unsupported TT), 10% BWSTT, or 20% BWSTT. Five patients were excluded due to early discharge and 30 patients completed BWSTT sessions lasting 30 min, 5 days a week, for 6 weeks during their inpatient rehabilitation stay. The primary outcome was 6-min walk distance (6MWD). Secondary outcomes were Unified Parkinson’s Disease Rating Scale (UPDRS), Berg Balance Scale (BBS), Nottingham Health Profile (NHP), Fatigue Impact Scale, and Fatigue Severity Scale scores. Measurements were performed before and after the training. Results The unsupported TT group demonstrated no significant improvement in the outcome measures after a 6-week training except for BBS and NHP emotional subscores. Moreover, the NHP pain subscore increased in the unsupported TT group after training. The 10% and 20% supported BWSTT groups demonstrated significant improvements in 6MWD (P = 0.004 and P < 0.001, respectively), UPDRS - motor score (P = 0.012 and P = 0.005, respectively), NHP pain subscore (P = 0.003 and P = 0.002, respectively), and fatigue (P = 0.005 for both) after training. The 20% BWSTT provided the highest improvement in balance among the three groups (P < 0.001) and greater relief of fatigue than 10% BWSTT (P = 0.002). Conclusion Six weeks of BWSTT improved walking distance and balance ability, relieved fatigue, and additionally reduced pain in patients with moderate to advanced PD.

Database: Medline

23. Effects of dance therapy on cognitive and mood symptoms in people with Parkinson's disease: A systematic review and meta-analysis.

**Author(s):** Zhang, Qi; Hu, Jianan; Wei, Lijiao; Jia, Yibo; Jin, Yi
OBJECTIVETo investigate whether the dance therapy was more beneficial than non-dance therapy on cognitive and mood symptoms in patients with Parkinson’s disease (PD).

METHODS Classic databases (MEDLINE, CINAHL, Embase and the Cochrane Central Register of Controlled Trials) were searched from inception to December 11, 2018. Risk of bias for the included trials was assessed using criteria in the Cochrane Handbook for Systematic Reviews of Interventions.

RESULTS Seven randomized controlled trials were identified on cognitive and mood symptoms in patients with PD. There were significant differences in favor of dance in executive function (WMD = 1.17, 95% CI:0.39 to 1.95, P = 0.003; I² = 0%, P = 0.45), but not in outcomes of global cognitive function, depression and apathy.

CONCLUSIONS Dance therapy is beneficial in improving executive function for adults with PD. However, there are no positive effects were founded on global cognitive function, depression and apathy for PD.

Database: Medline


OBJECTIVES We aimed to study the effect of deep brain stimulation (DBS) in the subthalamic nucleus (STN) and caudal zona incerta (cZi) on level of perceived voice tremor in patients with Parkinson disease (PD).

STUDY DESIGN This is a prospective nonrandomized design with consecutive patients.

METHODS Perceived voice tremor was assessed in patients with PD having received either STN-DBS (8 patients, 5 bilateral and 3 unilateral, aged 43.1-73.6 years; median = 61.2 years) or cZi-DBS (14 bilateral patients, aged 39.0-71.9 years; median = 56.6 years) 12 months before the assessment. Sustained vowels that were produced OFF and ON stimulation (with simultaneous L-DOPA medication) were assessed perceptually in terms of voice tremor by two raters on a four-point rating scale. The assessments were repeated five times per sample and rated in a blinded and randomized procedure.

RESULTS Three out of the 22 patients (13%) were concluded to have voice tremor OFF stimulation. Patients with PD with STN-DBS showed mild levels of perceived voice tremor OFF stimulation and a group level improvement. Patients with moderate/severe perceived voice tremor and cZi-DBS showed marked improvements, but there was no overall group effect. Six patients with cZi-DBS showed small increases in perceived voice tremor severity.

CONCLUSIONS STN-DBS decreased perceived voice tremor on a group level. cZi-DBS decreased perceived voice tremor in patients with PD with moderate to severe preoperative levels of the symptom.

Database: Medline

25. Multicentre, randomised controlled trial of PDSAFE, a physiotherapist-delivered fall prevention programme for people with Parkinson’s.
**Author(s):** Chivers Seymour, Kim; Pickering, Ruth; Rochester, Lynn; Roberts, Helen C; Ballinger, Claire; Hultber, Sophia; Kunkel, Dorit; Marian, Ioana R; Fitton, Carolyn; McIntosh, Emma; Goodwin, Victoria A; Nieuwboer, Alice; Lamb, Sarah E; Ashburn, Ann

**Source:** Journal of neurology, neurosurgery, and psychiatry; Jul 2019; vol. 90 (no. 7); p. 774-782

**Publication Date:** Jul 2019

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Pragmatic Clinical Trial Multicenter Study Journal Article

**PubMedID:** 30944149

Available at Journal of neurology, neurosurgery, and psychiatry - from BMJ Journals - NHS

Available at Journal of neurology, neurosurgery, and psychiatry - from ProQuest (Health Research Premium) - NHS Version

Available at Journal of neurology, neurosurgery, and psychiatry - from Unpaywall

**Abstract:**

**OBJECTIVE** To estimate the effect of a physiotherapist-delivered fall prevention programme for people with Parkinson’s (PwP).

**METHODS** People at risk of falls with confirmed Parkinson’s were recruited to this multicentre, pragmatic, investigator blind, individually randomised controlled trial with prespecified subgroup analyses. 474 PwP (Hoehn and Yahr 1-4) were randomised: 238 allocated to a physiotherapy programme and 236 to control. All participants had routine care; the control group received a DVD about Parkinson’s and single advice session at trial completion. The intervention group (PDSAFE) had an individually tailored, progressive home-based fall avoidance strategy training programme with balance and strengthening exercises. The primary outcome was risk of repeat falling, collected by self-report monthly diaries, 0-6 months after randomisation.

**Secondary outcomes** included Mini-BESTest for balance, chair stand test, falls efficacy, freezing of gait, health-related quality of life (EuroQol EQ-5D), Geriatric Depression Scale, Physical Activity Scale for the Elderly and Parkinson’s Disease Questionnaire, fractures and rate of near falling.

**RESULTS** Average age is 72 years and 266 (56%) were men. By 6 months, 116 (55%) of the control group and 125 (61.5%) of the intervention group reported repeat falls (controlled OR 1.21, 95% CI 0.74 to 1.98, p=0.447). Secondary subgroup analyses suggested a different response to the intervention between moderate and severe disease severity groups. Balance, falls efficacy and chair stand time improved with near falls reduced in the intervention arm.

**CONCLUSION:** PDSAFE did not reduce falling in this pragmatic trial of PwP. Other functional tasks improved and reduced fall rates were apparent among those with moderate disease.

**TRIAL REGISTRATION NUMBER:** ISRCTN48152791.

**Database:** Medline

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26. Physiotherapy Versus Physiotherapy Plus Cognitive Training on Cognition and Quality of Life in Parkinson Disease: Randomized Clinical Trial.

**Author(s):** Mariano Barboza, Natália; Brandão Terra, Marcelle; Brandão Bueno, Maria Eduarda; Christofoletti, Gustavo; Smaili, Suhaila Mahmoud

**Source:** American Journal of Physical Medicine & Rehabilitation; Jun 2019; vol. 98 (no. 6); p. 460-468

**Publication Date:** Jun 2019

**Publication Type(s):** Academic Journal

**Abstract:**

**Objective:** The aim of the study was to verify the effectiveness of physiotherapy associated with cognitive training to improve cognition and quality of life in individuals with Parkinson disease.

**Design:** This is a randomized clinical trial involving 58 individuals with mild to moderate Parkinson disease, randomly distributed into two groups: motor group and cognitive-motor group. Both groups were assessed for cognition and quality of life at the beginning of the study, at the end of the intervention protocols, and 3 mos after the end of the intervention. The following instruments were
used to assess cognition and quality of life: Mini-Mental State Examination, Montreal Cognitive Assessment, Verbal fluency test, Rey Auditory Verbal Learning Test, Cognitive and perceptual assessment by pictures, Trail Making Test, Clock Drawing Executive Test, and Parkinson Disease Quality of Life Questionnaire. The motor group engaged in motor physiotherapy, whereas the cognitive-motor group underwent combined motor physiotherapy with cognitive training. Results: The intragroup analysis revealed that both groups presented improved cognition (memory and visuospatial function domains) and quality of life after execution of the protocols, but without statistically significant intergroup differences. Conclusions: When comparing the intervention moments, the two treatment approaches used were effective for the outcomes: memory, visuospatial function, and quality of life in both groups.

Database: CINAHL

27. Treadmill training may be an effective form of task-specific training for improving mobility in people with Parkinson's disease and multiple sclerosis: a systematic review and meta-analysis.

Author(s): Robinson, Alexandra G.; Dennett, Amy M.; Snowdon, David A.

Source: Physiotherapy; Jun 2019; vol. 105 (no. 2); p. 174-186

Publication Date: Jun 2019

Publication Type(s): Academic Journal

Abstract: Task-specific training is an effective form of rehabilitation for improving mobility in neurological conditions. However, it remains unclear if task-specific training is effective in people with progressive disease. To establish the efficacy of task-specific training on the mobility of individuals with progressive neurological conditions. Electronic databases MEDLINE, EMBASE, CINAHL and Cochrane Database of Systematic Reviews. Randomised controlled trials investigating the effect of task-specific training on mobility and falls rate in individuals with progressive neurological conditions. Risk of bias of individual studies was assessed using the Physiotherapy Evidence Database (PEDro) Scale. Mean differences (MD) and 95% confidence intervals were calculated and combined in meta-analysis. Analysis of 16 trials found treadmill training improved comfortable walking velocity (m/second) in people with Parkinson's disease (MD 0.21 m/second, 95%CI 0.15 to 0.27) and multiple sclerosis (MD 0.36 m/second, 95%CI 0.20 to 0.52). Treadmill training improved stride length (m) (MD 0.12 m, 95%CI 0.02 to 0.23) and step length (m) (MD 0.12 m, 95%CI 0.01 to 0.23) in people with Parkinson's disease and walking endurance in people with multiple sclerosis (MD 26.53 m, 95%CI 12.23 to 40.84). Treadmill training had no effect on cadence and did not improve walking endurance in Parkinson's disease. Over-ground walking did not improve mobility in Parkinson's disease or multiple sclerosis. Study sample sizes were small and findings must be interpreted with caution. Treadmill training may be effective for improving mobility in people with Parkinson's disease and multiple sclerosis. The effectiveness of over-ground walking is uncertain. CRD42016047334.

Database: CINAHL


Author(s): Harper, Sara A; Dowdell, Bryan T; Kim, Jin Hyun; Pollock, Brandon S; Ridgel, Angela L

Source: International journal of environmental research and public health; Jun 2019; vol. 16 (no. 12)

Publication Date: Jun 2019

Publication Type(s): Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Controlled Clinical Trial Journal Article

PubMedID: 31197095
Abstract: The objective was to investigate if high cadence cycling altered non-motor cognition and depression symptoms in individuals with Parkinson’s disease (PD) and whether exercise responses were influenced by brain-derived neurotrophic factor (BDNF) Val66Met polymorphism. Individuals with idiopathic PD who were ≥50 years old and free of surgical procedures for PD were recruited. Participants were assigned to either a cycling (n = 20) or control (n = 15) group. The cycling group completed three sessions of high cadence cycling on a custom motorized stationary ergometer. The primary outcome was cognition (attention, executive function, and emotion recognition were assessed via WebNeuro® and global cognition via Montreal Cognitive Assessment). Depression symptoms were assessed via Beck Depression Inventory-II. There was a main effect of time for emotional recognition (p = 0.048), but there were no other changes in cognition or depression symptoms. Regardless of intervention or Val66Met polymorphism, high cadence cycling does not alter cognition or depression symptoms after three sessions in one week.

Database: Medline

29. Walking to your right music: a randomized controlled trial on the novel use of treadmill plus music in Parkinson's disease.

Author(s): Calabrò, Rocco Salvatore; Naro, Antonino; Filoni, Serena; Pullia, Massimo; Billeri, Luana; Tomasellos, Provvidenza; Portaro, Simona; Di Lorenzo, Giuseppe; Tomaino, Concetta; Bramanti, Placid

Source: Journal of neuroengineering and rehabilitation; Jun 2019; vol. 16 (no. 1); p. 68

Publication Date: Jun 2019

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 31174570

Abstract: BACKGROUND Rhythmic Auditory Stimulation (RAS) can compensate for the loss of automatic and rhythmic movements in patients with idiopathic Parkinson’s disease (PD). However, the neurophysiological mechanisms underlying the effects of RAS are still poorly understood. We aimed at identifying which mechanisms sustain gait improvement in a cohort of patients with PD who practiced RAS gait training. METHODS We enrolled 50 patients with PD who were randomly assigned to two different modalities of treadmill gait training using GaitTrainer3 with and without RAS (non_RAS) during an 8-week training program. We measured clinical, kinematic, and electrophysiological effects of both the gait trainings. RESULTS We found a greater improvement in Functional Gait Assessment (p < 0.001), Tinetti Falls Efficacy Scale (p < 0.001), Unified Parkinson Disease Rating Scale (p = 0.001), and overall gait quality index (p < 0.001) following RAS than non_RAS training. In addition, the RAS gait training induced a stronger EEG power increase within the sensorimotor rhythms related to specific periods of the gait cycle, and a greater improvement of fronto-centroparietal/temporal electrode connectivity than the non_RAS gait training. CONCLUSIONS The findings of our study suggest that the usefulness of cueing strategies during gait training consists of a reshape of sensorimotor rhythms and fronto-centroparietal/temporal connectivity. Restoring the internal timing mechanisms that generate and control motor rhythmicity, thus improving gait performance, likely depends on a contribution of the cerebellum. Finally, identifying these mechanisms is crucial to create patient-tailored, RAS-based rehabilitative approaches in PD. TRIAL REGISTRATION NCT03434496. Registered 15 February 2018, retrospectively registered.

Author(s): Feng, Hao; Li, Cuiyun; Liu, Jiayu; Wang, Liang; Ma, Jing; Li, Guanglei; Gan, Lu; Shang, Xiaoying; Wu, Zhixuan

Source: Medical science monitor : international medical journal of experimental and clinical research; Jun 2019; vol. 25; p. 4186-4192

Publication Date: Jun 2019

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 31165721

Abstract: BACKGROUND The aim of this study was to investigate the effect of virtual reality (VR) technology on balance and gait in patients with Parkinson's disease (PD). MATERIAL AND METHODS The study design was a single-blinded, randomized, controlled study. Twenty-eight patients with PD were randomly divided into the experimental group (n=14) and the control group (n=14). The experimental group received VR training, and the control group received conventional physical therapy. Patients performed 45 minutes per session, 5 days a week, for 12 weeks. Individuals were assessed pre- and post-rehabilitation with the Berg Balance Scale (BBS), Timed Up and Go Test (TUGT), Third Part of Unified Parkinson's Disease Rating Scale (UPDRS3), and Functional Gait Assessment (FGA). RESULTS After treatment, BBS, TUGT, and FGA scores had improved significantly in both groups (P<0.05). VR training resulted in significantly better performance compared with the conventional physical therapy group (P<0.05). CONCLUSIONS The results of this study indicate that 12 weeks of VR rehabilitation resulted in a greater improvement in the balance and gait of individuals with PD when compared to conventional physical therapy.

Database: Medline


Author(s): Olivares, Adriana; Comini, Laura; Orfano, Jacopo; Froldi, Marcello; Vezzadini, Giuliana

Source: NeuroRehabilitation; May 2019; vol. 45 (no. 1); p. 125-134

Publication Date: May 2019

Publication Type(s): Academic Journal

Abstract: BACKGROUND: Physical exercise combined with occupational therapy (OT) can lead to a global improvement in personal well-being. OBJECTIVE: To assess in PD patients: 1) if a rehabilitation program involving OT, Nordic walking (NW) and therapeutic touch (TT) yields motor/non-motor benefits; 2) if the time collocation of OT within the program influences results. METHODS: This is a pilot study on 17 PD patients undergoing a 10-week rehabilitation program consisting of OT, NW and TT. Patients were randomized to receive OT in the first [Group 1, n = 8] vs. last five weeks [Group 2, n = 9] of the program. Scales (MMSE, FAB, BDI, UPDRS II and III, PDQ39 and AES-S) and 6MWT, Gait speed and length were assessed at three time-points. RESULTS: Thirteen out of 17 patients were analyzed. 6MWT, Gait speed and length improved in time without between-group differences (p < 0.05) as did UPDRII, UPDRSIII, FAB and PDQ39 (p < 0.05). Baseline UPDRS II and III significantly determined Δ6MWT (adjusted R2 = 0.6738) and ΔGAIT speed (R2 = 0.6746) at multiple regression,
while ΔGAIT length showed the best regression (adjusted R² = 0.8247) with impact of age, gender and baseline PDQ39 (ADL and cognition dimensions). CONCLUSIONS: Multidisciplinary rehabilitation including OT can improve motor and non-motor conditions in PD patients. The OT time-collocation at beginning or end of the rehabilitation program does not significantly affect results.

Database: CINAHL

32. Land Plus Aquatic Therapy Versus Land-Based Rehabilitation Alone for the Treatment of Freezing of Gait in Parkinson Disease: A Randomized Controlled Trial.

Author(s): Clerici, Ilaria; Maestri, Roberto; Bonetti, Francesca; Ortelli, Paola; Volpe, Daniele; Ferrazzoli, Davide; Frazzitta, Giuseppe
Source: Physical Therapy; May 2019; vol. 99 (no. 5); p. 591-600
Publication Date: May 2019
Publication Type(s): Academic Journal
Available at Physical Therapy - from HighWire - Free Full Text

Abstract: Background Freezing of gait (FOG) is one of the most disabling symptoms of Parkinson disease (PD). Different land-based rehabilitation approaches based on motor and cognitive strategies can be effective in treating FOG. Although there are data about the efficacy of aquatic therapy in ameliorating this phenomenon, no study has explored the combined effect of land-based therapies plus aquatic therapy in patients with PD who have FOG. Objective The objective was to investigate the effectiveness of a multidisciplinary, intensive, motor-cognitive rehabilitation treatment (MIRT) in improving FOG and whether implementation with aquatic therapy (MIRT-AT) adds further benefits. Design The design consisted of a single-blind, parallel-group, 1:1 allocation ratio, randomized trial. Setting The Department of Parkinson Disease, Movement Disorders and Brain Injury Rehabilitation at "Moriggia-Pelascini" Hospital (Gravedona ed Uniti, Como, Italy) was used as the setting. Participants Sixty hospitalized patients with PD who had FOG in Hoehn and Yahr stage 2 or 5-3 were included. Intervention Sixty patients with PD + FOG were randomly assigned to 2 groups: 30 underwent a 4-week MIRT and 30 underwent a 4-week MIRT-AT. Measurements The primary outcome measure was the Freezing of Gait Questionnaire; secondary outcome measures were total Unified Parkinson Disease Rating Scale (UPDRS), UPDRS II, UPDRS III, Berg Balance Scale, Timed Up and Go Test, and 6-Minute Walk Test. These measures were assessed both at admission and discharge. Results Participants in the 2 groups had similar age, sex distribution, Hoehn and Yahr stage, and most-affected side. At baseline, no difference in outcome measures was observed between the 2 groups. After treatment, a significant time effect was observed for all variables in both groups. No significant time × group interaction was observed. A between-group analysis showed nonsignificant differences between values at T1 and values at T0 for all variables. Limitations The limitations were the lack of a control group and follow-up. Conclusions We showed that a multidisciplinary, intensive, and goal-based rehabilitation treatment, such as MIRT, improves FOG in patients with PD. Although aquatic therapy could be considered a useful approach for treating FOG, it does not add further benefits to this kind of motor-cognitive rehabilitation.

Database: CINAHL


Author(s): Abeyesekera, Anita; Adams, Scott; Mancinelli, Cynthia; Knowles, Thea; Gilmore, Greydon; Delrobaei, Mehdi; Jog, Mandar
OBJECTIVE: To systematically evaluate how different deep brain stimulation (DBS) amplitude, frequency, and pulse-width electrical parameter settings impact speech intensity, voice quality, and prosody of speech in Parkinson's disease (PD).

METHODS: Ten individuals with PD receiving bilateral STN-DBS treatments were seen for three baseline and five treatment visits. The five treatment visits involved an examination of the standard clinical settings as well as manipulation of different combinations of frequency (low, mid, and high), pulse width (low, mid, and high), and voltage (low, mid, and high) of stimulation. Measures of speech intensity, jitter, shimmer, harmonics-noise ratio, semitone standard deviation, and listener ratings of voice quality and prosody were obtained for each STN-DBS manipulation.

RESULTS: The combinations of lower frequency, lower pulse width, and higher voltage settings were associated with improved speech outcomes compared to the current standard clinical settings. In addition, decreased total electrical energy delivered to the STN appears to be associated with speech improvements.

CONCLUSION: This study provides preliminary evidence that STN-DBS may be optimized for Parkinson-related problems with voice quality, speech intensity, and prosody of speech.

Database: Medline
35. Versatile guideline-based physiotherapy intervention in groups to improve gait speed in Parkinson’s disease patients.

**Author(s):** Medijainen, Kadri; Pääsuke, Mati; Lukmann, Aet; Taba, Pille

**Source:** NeuroRehabilitation; Apr 2019; vol. 44 (no. 4); p. 579-586

**Publication Date:** Apr 2019

**Publication Type(s):** Academic Journal

Available at [NeuroRehabilitation](#) from Unpaywall

**Abstract:**

**BACKGROUND:** Gait function is known to be impaired by Parkinson’s disease (PD). The effect of exercise to improve gait has been widely examined, often with special intervention. However, in clinical settings, physiotherapy rarely consists only of gait training. **OBJECTIVE:** To examine whether versatile physiotherapy intervention conducted in accordance with European Physiotherapy Guideline for Parkinson’s Disease (EPGPD) is sufficient to increase gait speed (GS).

**METHODS:** Participants (24) with idiopathic PD were randomly enrolled into intervention (IG) and control groups (CG) (n = 12, 7 females and 5 males in each group). Sixteen one-hour therapy sessions (twice per week) were conducted for IG. Each session focused on core areas recommended in EPGPD. Participants were assessed twice with 10 weeks between assessments. GS was calculated based on a gait test of Short Physical Performance Battery. Dominant side hip flexion and abduction range of motion (HFLEX & HABD) were measured and Freezing of Gait questionnaire (FOG) was administered. **RESULTS:** Versatile intervention in groups resulted in increase of GS (ES –0.9 [CI{0.1} –0.4] m/s) and HFLEX (ES –0.6 [CI{5.9} –16.6°]). FOG was reduced (ES –0.41 [CI {–2.8} –5.5]). Re-evaluation HABD differed between groups and indicated large ES (r = –0.5). **CONCLUSIONS:** Versatile physiotherapy is sufficient to improve GS, range of motion and reduce FOG.

**Database:** CINAHL

36. Reproducibility and responsiveness of gait initiation in Parkinson’s disease.

**Author(s):** Papa, Evan V; Addison, Odessa; Foreman, K Bo; Dibble, Leland E

**Source:** Journal of biomechanics; Apr 2019; vol. 87 ; p. 197-201

**Publication Date:** Apr 2019

**Publication Type(s):** Research Support, N.i.h., Extramural Journal Article

**PubMedID:** 30910362

**Abstract:** Persons with Parkinson's disease (PD) have significant impairments in functional mobility, including the ability to initiate gait. Three-dimensional analysis of kinetic and kinematic outcomes has become one of the most powerful tools in evaluating abnormalities in gait initiation for persons with PD. Surprisingly however, the psychometric properties of spatial and temporal measures of gait initiation for persons with PD have not been established using force-platforms. The purposes of this study were to determine the reliability of kinetic and kinematic measures of gait initiation and to identify the minimal detectable change of these measures in persons with PD during On and Off medication conditions. Sixteen participants with idiopathic PD performed a series of 3 repeated trials of gait initiation by starting from a quiet stance position on 2 AMTI OR-6 force platforms, and walking forward across the floor following a signal from the investigators. Testing was performed first in the Off medication condition, after which participants took their medication and waited 60 min before repeating the gait initiation assessments. Relative test-retest reliability was good-to-excellent for most outcome measures (range 0.417-0.960). Bland-Altman analysis revealed no
systematic variance in the majority of outcome measures when tested in distinct medication conditions (On vs. Off medication). Most outcome measures required low-to-moderate amounts of change (<50%) to indicate true change in individual participants. These results suggest that spatial and temporal measures of gait initiation using force-platforms are highly reliable and responsive to changes in performance for persons with PD, regardless of whether individuals are optimally medicated.

Database: Medline

37. **High-Cadence Cycling Promotes Sustained Improvement in Bradykinesia, Rigidity, and Mobility in Individuals with Mild-Moderate Parkinson’s Disease.**

**Author(s):** Ridgel, Angela L.; Ault, Dana L.

**Source:** Parkinson’s Disease (20420080); Mar 2019 ; p. 1-7

**Publication Date:** Mar 2019

**Publication Type(s):** Academic Journal

Available at Parkinson's disease - from Europe PubMed Central - Open Access

**Abstract:** Introduction. Exercise has been shown to be an important adjunct therapy to medication in Parkinson's disease (PD). However, the optimal type, frequency, and intensity of exercise or physiotherapy are still being debated. An important part of understanding the optimal frequency is to examine how acute bouts of exercise affect motor function and mobility in this population. The purpose of this study is to assess if six bouts of high-cadence cycling improves motor function and mobility in individuals with PD. Methods. Sixteen subjects with mild-moderate idiopathic PD were randomized into either a high-cadence cycling or a control (stretching) group. High-cadence cycling was completed on a custom motorized recumbent bicycle at a high cadence between 75 and 85 rpm. Cycling and stretching sessions were separated by 1 day of rest and took place over a 15-day period. Motor function and mobility were assessed after every cycling/stretching bout using the UPDRS Motor III scale, Kinesia ONE, and Timed up and Go (TUG). Results. Six bouts of high-cadence cycling improved UPDRS scores (2.5 pts, P=0.002), hand movement amplitude (P=0.013), rapid alternating hand movement speed (P=0.003), gait (P=0.012), and TUG time (1.17 s, P=0.002) from baseline testing to end of treatment. The control group showed no improvements. Conclusions. These findings suggest that they are both acute and sustained improvements in motor function and mobility after high-cadence cycling. Future research should examine how exercise type, frequency, and intensity can be optimized for each individual.

Database: CINAHL

38. **Vastly Different Exercise Programs Similarly Improve Parkinsonian Symptoms: A Randomized Clinical Trial.**

**Author(s):** Tollár, József; Nagy, Ferenc; Hortobágyi, Tibor

**Source:** Gerontology; Mar 2019; vol. 65 (no. 2); p. 120-127

**Publication Date:** Mar 2019

**Publication Type(s):** Academic Journal

**PubMedID:** NLM30368495

**Abstract:** Objectives: To directly compare the effects of agility exergaming (EXE) and stationary cycling (CYC) exercise training on Parkinson’s disease (PD) patients’ mobility and clinical symptoms. Design: Randomized clinical trial. Setting: Outpatient physiotherapy clinic in a hospital. Participants: Seventy-four stage 2-3, nondemented PD patients were included in this
study. Intervention: The groups were as follows: EXE (n = 25), CYC (n = 25), and a wait-listed control group (CON; n = 24). The EXE and CYC groups exercised 5×/week for 5 weeks, matched at 80% of the age-predicted maximal heart rate. Main Outcomes: The primary outcome was the Movement Disorders Society Unified Parkinson's Disease Rating Scale (UPDRS-II) score. Secondary outcomes were Parkinson's Disease Questionnaire-39 (PDQ-39), the Beck Depression Inventory (BDI), the Schwab and England Activities of Daily Living (SE-ADL) scale, Euro-Quality of Life-5 Dimensions (EQ-5D) questionnaire, the Berg Balance Scale (BBS), the Balance Evaluation Systems Test (BESTest), the Tinetti Assessment Tool (TAT), the Dynamic Gait Index, the 6-min walk test (6MWT), and standing posturography. Results: After treatment, UPDRS-II scores improved (mean change: EXE, -4.5 points; CYC, -3.2 points). The results for the other outcomes (EXE and CYC, respectively) were: PDQ, 13 and 17%; BDI, -2.5 and -2.1 points; 6MWT, 129.6 and 141.6 m; and EQ-5D, 12 and 9% (all p < 0.05, but there was no difference between groups). EXE vs. CYC resulted in improved SE-ADL (8.4 and 4.0 points, effect size [ES]: 0.12), BBS (8.8 and 4.2 points, ES: 0.44), and 2 measures of posturography (ES: 0.11 and 0.21) (p < 0.05). Conclusion: Two highly different exercise programs resulted in similar improvement of most motor and clinical symptoms in PD patients.

Database: CINAHL


Author(s): Schuepbach, W M Michael; Tonder, Lisa; Schnitzler, Alfons; Krack, Paul; Rau, Joern; Hartmann, Andreas; Hälibig, Thomas D; Pineau, Fanny; Falk, Andrea; Paschen, Laura; Paschen, Stephen; Volkmann, Jens; Dafsari, Haidar S; Barbe, Michael T; Fink, Gereon R; Kühn, Andrea; Kupisch, Andreas; Schneider, Gerd-H; Seigneuret, Eric; Fraix, Valerie; Kistner, Andrea; Chaynes, P Patrick; Ormy-Magne, Fabienne; Brefel-Courbon, Christine; Vesper, Jan; Wojtecki, Lars; Derrey, Stéphane; Maltête, David; Damier, Philippe; Derkinderen, Pascal; Sixel-Döring, Friederike; Trenkwalder, Claudia; Gharabaghi, Alireza; Wächter, Tobias; Weiss, Daniel; Pinsker, Marcus O; Regis, Jean-Marie; Witjas, Tatiana; Thobois, Stephane; Mertens, Patrick; Knudsen, Karina; Schade-Brittinger, Carmen; Houeto, Jean-Luc; Agid, Yves; Vidailhet, Marie; Timmermann, Lars; Deuschl, Günther; EARLYSTIM study group

Source: Neurology; Mar 2019; vol. 92 (no. 10); p. e1109

Publication Date: Mar 2019

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 30737338

Available at Neurology - from Unpaywall

Abstract: OBJECTIVE: To investigate predictors for improvement of disease-specific quality of life (QOL) after deep brain stimulation (DBS) of the subthalamic nucleus (STN) for Parkinson disease (PD) with early motor complications. METHODS: We performed a secondary analysis of data from the previously published EARLYSTIM study, a prospective randomized trial comparing STN-DBS (n = 124) to best medical treatment (n = 127) after 2 years follow-up with disease-specific QOL (39-item Parkinson’s Disease Questionnaire summary index [PDQ-39-SI]) as the primary endpoint. Linear regression analyses of the baseline characteristics age, disease duration, duration of motor complications, and disease severity measured at baseline with the Unified Parkinson’s Disease Rating Scale (UPDRS) (UPDRS-III “off” and “on” medications, UPDRS-IV) were conducted to determine predictors of change in PDQ-39-SI. RESULTSPDQ-39-SI at baseline was correlated to the change in PDQ-39-SI after 24 months in both treatment groups (p < 0.05). The higher the baseline score (worse QOL) the larger the improvement in QOL after 24 months. No correlation was found for any of the other baseline characteristics analyzed in either treatment group. CONCLUSION: Impaired QOL as subjectively evaluated by the patient is the most important predictor of benefit in patients with PD and early motor complications, fulfilling objective gold standard inclusion criteria for STN-DBS. Our
results prompt systematically including evaluation of disease-specific QOL when selecting patients with PD for STN-DBS.CLINICALTRIALSGOV IDENTIFIERNCT00354133.

**Database:** Medline

**40. Split-belt treadmill walking in patients with Parkinson’s disease: A systematic review.**

**Author(s):** Seuthe, Jana; D’Cruz, Nicholas; Ginis, Pieter; Weisser, Burkhard; Berg, Daniela; Deuschl, Günther; Nieuwboer, Alice; Schlenstedt, Christian

**Source:** Gait & posture; Mar 2019; vol. 69 ; p. 187-194

**Publication Date:** Mar 2019

**Publication Type(s):** Research Support, Non-u.s. Gov’t Journal Article Systematic Review

**PubMedID:** 30771729

**Abstract:** BACKGROUND Walking on a split-belt treadmill (SBT) can help to modulate an asymmetric gait, particularly for people with neurological conditions, such as Parkinson’s disease (PD), where asymmetry plays a role due to the laterality of the disease. RESEARCH QUESTION This systematic review critically evaluates the literature on SBT in PD. First, different SBT paradigms and methodological approaches were evaluated. Second, the review explored how people with PD adapt their gait to different SBT conditions compared to healthy controls (HC). METHODS We conducted a systematic search of the PubMed, PsychINFO, and Web of Knowledge databases. Original research articles, published in English and investigating SBT walking in people with PD, were included. RESULTS From the 925 studies originally identified, seven met the inclusion criteria and were selected for evaluation (n = 118 individuals with PD of whom 44 had freezing of gait (FOG)). The SBT paradigms varied across studies regarding the SBT settings, definitions of gait variables, and criteria for determining dominance of body side. Gait variability and bilateral coordination were found to adapt to the SBT condition similarly in people with PD and healthy controls (HC). Inconsistent results were found with respect to the adaptation of gait asymmetry, for the differences between PD and HC participants. The subgroup of people with PD and FOG showed reduced accuracy in detecting belt speed differences and slower adaptation to SBT conditions. CONCLUSION: Individuals with mild to moderately severe PD adapted similarly to HCs to SBT walking for gait variability and bilateral gait coordination. However, those with FOG had impaired perception of belt speed differences and did not adapt their gait so readily. Although SBT can be useful for modulating gait asymmetry in some people with PD, it was not beneficial for all. We recommend standardization of SBT protocols for clinical practice in future studies.

**Database:** Medline

**41. The effect of functional-task training on activities of daily living for people with Parkinson’s disease, a systematic review with meta-analysis.**

**Author(s):** Perry, S.I.B.; Nelissen, P.M.; Siemonsma, P.; Lucas, C.

**Source:** Complementary Therapies in Medicine; Feb 2019; vol. 42 ; p. 312-321

**Publication Date:** Feb 2019

**Publication Type(s):** Academic Journal

**PubMedID:** NLM30670260

**Abstract:** Objective: To evaluate the effect of functional-task training on activities of daily living (ADL) in people with Parkinson’s Disease. Methods: We searched five databases (Cinahl, Embase, Medline, Pedro and CENTRAL). The included studies were assessed on therapeutic validity and risk of bias. We classified the quality of evidence according to the principles of the GRADE approach. All assessments
were executed independently by two researchers. The results of included studies were pooled in a meta-analyses and heterogeneity was explored by meta-regression analysis.

**Results:** Out of 2546 identified studies, 69 full text articles were checked for eligibility, of which ten were included in the systematic review. Moderate quality of evidence indicated that exercise interventions containing functional-task training had a positive effect on ADL performance scores on the Unified Parkinson's Disease Rating Scale (UPDRS) in people with Parkinson (pwp) directly after intervention (UPDRS=−2.62(−5.34;0.10)). This effect improved, in favor of functional-task interventions, at the first follow-up (UPDRS=−4.0(−7.56;−0.4)). A post-hoc meta-regression analysis yielded a significant relationship between intensity rate (minutes/week) and the size of the (average) effect on ADL score.

**Conclusion:** Exercise interventions containing functional-task training have a clinically important positive effect on ADL performance in pwp directly after intervention and at first follow-up, compared to no intervention or placebo. The intensity rate of the functional-task training should be as intense as possible, within the capabilities of the person with PD. Future research is necessary to determine the exact amount of effect that can be contributed to functional-task training.

**Database:** CINAHL

42. **Comparative Effectiveness of mHealth-Supported Exercise Compared With Exercise Alone for People With Parkinson Disease: Randomized Controlled Pilot Study.**

**Author(s):** Ellis, Terry D; Cavanaugh, James T; DeAngelis, Tamara; Hendron, Kathryn; Thomas, Cathi A; Saint-Hilaire, Marie; Pencina, Karol; Latham, Nancy K

**Source:** Physical therapy; Feb 2019; vol. 99 (no. 2); p. 203-216

**Publication Date:** Feb 2019

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 30715489

**Available at Physical therapy - from HighWire - Free Full Text**

**Abstract:** Background Declining physical activity commonly occurs in people with Parkinson disease (PD) and contributes to reduced functional capacity and quality of life. Objective The purpose of this study was to explore the preliminary effectiveness, safety, and acceptability of a mobile health (mHealth)-mediated exercise program designed to promote sustained physical activity in people with PD. Design This was a 12-month single-blind (assessor), pilot, comparative-effectiveness, randomized controlled study. Methods An mHealth-mediated exercise program (walking with a pedometer plus engagement in planned exercise supported by a mobile health application) was compared over 1 year with an active control condition (walking with a pedometer and exercise only). There were 51 participants in a community setting with mild-to-moderately severe (Hoehn and Yahr stages 1-3) idiopathic PD. Daily steps and moderate-intensity minutes were measured using a step activity monitor for 1 week at baseline and again at 12 months. Secondary outcomes included the 6-Minute Walk Test, Parkinson Disease Questionnaire 39 mobility domain, safety, acceptability, and adherence. Results Both groups increased daily steps, moderate-intensity minutes, and 6-Minute Walk Test, with no statistically significant between-group differences observed. In the less active subgroup, changes in daily steps and moderate-intensity minutes were clinically meaningful. An improvement in the Parkinson Disease Questionnaire 39 mobility score favored mHealth in the overall comparison and was statistically and clinically meaningful in the less active subgroup. Limitations The limitation of the current study was the small sample size. Conclusions Both groups improved physical activity compared with expected activity decline over 1 year. The addition of the mHealth app to the exercise intervention appeared to differentially benefit the more sedentary participants. Further study in a larger group of people with low activity at baseline is needed.

**Database:** Medline
43. Two-Year Agility Maintenance Training Slows the Progression of Parkinsonian Symptoms.

Author(s): Tollár, József; Nagy, Ferenc; Kovács, Norbert; Hortobágyi, Tibor

Source: Medicine and science in sports and exercise; Feb 2019; vol. 51 (no. 2); p. 237-245

Publication Date: Feb 2019

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 30303934

Available at Medicine and science in sports and exercise - from Unpaywall

Abstract: INTRODUCTION Parkinson’s disease (PD) is a progressive neurodegenerative condition and it is unclear if long-term nonpharmaceutical interventions can slow the progression of motor and nonmotor symptoms and lower drug dose. METHODS In a randomized trial, after an initial 3-wk-long, 15-session supervised high-intensity sensorimotor agility exercise (E) program designed to improve postural instability, the exercise+maintenance (E + M, n = 19) group continued to exercise three times per week for 2 yr, whereas E (n = 16), and the no exercise and no maintenance control (C, n = 20) continued habitual living. Eight outcomes were measured before and after the 3-wk initial exercise program and then at 3, 6, 9, 12, 18, and 24 months in all patients. RESULTS The group-time interactions (all P < 0.005) revealed robust and favorable effects of the initial 3-wk agility program on all six nonmotor (e.g., primary outcome Movement Disorder Society Unified Parkinson Disease Rating Scale, Motor Experiences of Daily Living, ~7 points; EuroQoL, ~9 points) and on each of the two motor outcomes (timed up and go test: ~6 s; posturography: up to 7 mm improvements in center of pressure path). E + M maintained but did not further improve the benefits produced by the initial 3-wk program. In E, the favorable effects of the 3-wk agility program lasted for 3 to 12 months. In C, patients declined steadily in all outcomes over 2 yr. By year 2, Leva-dopa equivalents increased by 99.4 mg·d (time main effect, P = 0.008). CONCLUSIONS: A high-intensity sensorimotor agility program with but not without a 2-yr maintenance program slowed the progression of parkinsonian symptoms.

Database: Medline


Author(s): Artusi, Carlo Alberto; Dwivedi, Alok K; Romagnolo, Alberto; Pal, Gian; Kauffman, Marcelo; Mata, Ignacio; Patel, Dhiren; Vizcarra, Joaquin A; Duker, Andrew; Marsili, Luca; Cheeran, Binith; Woo, Daniel; Contarino, Maria Fiorella; Verhagen, Leonard; Lopiano, Leonardo; Espay, Alberto J; Fasano, Alfonso; Merola, Aristide

Source: JAMA network open; Feb 2019; vol. 2 (no. 2); p. e187800

Publication Date: Feb 2019

Publication Type(s): Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Meta-analysis Journal Article Systematic Review

PubMedID: 30707228

Available at JAMA network open - from Unpaywall

Abstract: Importance Comparative outcomes among different monogenic forms of Parkinson disease after subthalamic nucleus deep brain stimulation (STN DBS) remain unclear. Objective To compare clinical outcomes in patients with the most common monogenic forms of Parkinson disease treated with STN DBS. Design, Setting, and Participants Systematic review and meta-analysis in which a PubMed search of interventional and noninterventional studies of Parkinson disease with LRRK2,
GBA, or PRKN gene mutations published between January 1, 1990, and May 1, 2018, was conducted. Among the inclusion criteria were articles that reported the Motor subscale of the Unified Parkinson’s Disease Rating Scale Part III (UPDRS-III) before and after STN DBS treatment, that involved human participants, and that were published in the English language. Studies that used aggregated data from patients with different genetic mutations were excluded, and so were studies with assumed but not confirmed genetic data or incomplete follow-up data.

Main Outcomes and Measures
Changes in UPDRS-III scores and levodopa equivalent daily dose (LEDD) were analyzed for each monogenic form of Parkinson disease. Additional end points included activities of daily living (UPDRS-II), motor complications (UPDRS-IV), and cognitive function.

Results
Of the 611 eligible studies, 17 (2.8%) met the full inclusion criteria; these 17 studies consisted of 8 cohort studies (47.1%), 3 case series (17.6%), and 6 case reports (35.3%), and they involved a total of 518 patients. The UPDRS-III score improved by 46% in LRRK2 (mean change, 23.0 points; 95% CI, 15.2-30.8; P < .001), 49% in GBA (20.0 points; 95% CI, 4.5-35.5; P = .01), 43% in PRKN (24.1 points; 95% CI, 12.4-35.9; P < .001), and 53% in idiopathic Parkinson disease (25.2 points; 95% CI, 21.3-29.2; P < .001). The LEDD was reduced by 61% in LRRK2 (mean change, 711.9 mg/d; 95% CI, 491.8-932.0; P < .001), 22% in GBA (269.2 mg/d; 95% CI, 226.8-311.5; P < .001), 61% in PRKN (494.8 mg/d; 95% CI, 18.1 to 1007.8; P = .06), and 55% in idiopathic Parkinson disease (681.8 mg/d; 95% CI, 544.4-819.1; P < .001). Carriers of the PRKN mutations showed sustained improvements in UPDRS-II and UPDRS-IV, whereas LRRK2 mutation carriers sustained improvements only in UPDRS-IV. Carriers of the GBA mutation showed worse postsurgical cognitive and functional performance.

Conclusions and Relevance
Treatment with STN DBS for patients with Parkinson disease with LRRK2, GBA, or PRKN mutations appears to be associated with similar motor outcomes but different changes in dopaminergic dose, activities of daily living, motor complications, and cognitive functions.

Database: Medline

45. Effects of dual-task aquatic exercises on functional mobility, balance and gait of individuals with Parkinson's disease: A randomized clinical trial with a 3-month follow-up.

Author(s): Silva, Adriano Zanardi da; Israel, Vera Lúcia
Source: Complementary therapies in medicine; Feb 2019; vol. 42 ; p. 119-124
Publication Date: Feb 2019
Publication Type(s): Randomized Controlled Trial Clinical Trial Journal Article
PubMedID: 30670228

Abstract: OBJECTIVE To evaluate the effects of dual-task aquatic exercises on functional mobility, balance and gait of individuals with Parkinson's disease (PD). DESIGN A randomized, single-blind trial was used. Twenty-eight (28) individuals met the inclusion criteria and were randomized in the Experimental Group (EG) and Control Group (CG). EG was subjected to a dual-task aquatic exercise program, twice a week for 10 weeks. Each session lasted 40 min, in a heated pool (33 °C). The individuals were assessed at the beginning (AS1), after an exercise program (AS2), and after a three-month follow-up (AS3). Functional mobility ("Timed Up & Go" Test, and "Five Times Sit to Stand" Test), balance (Berg Balance Scale) and gait (Dynamic Gait Index) were verified. RESULTS 25 individuals were analyzed (14 EG and 11 CG). There was a time-group effect of the EG when compared to the CG: TUG (p = 0.03 and p = 0.015 to AS2 and AS3), FTST (p = 0.001 and p = 0.004, for AS2 and AS3), BBS (p = 0.002 and p = 0.002, for AS2 and AS3), DGI (p = 0.001 and p = 0.003, for AS2 and AS3). CONCLUSIONS The suggested dual-task aquatic exercise program was able to improve functional mobility, balance and gait of individuals with PD, which shows that such type of exercise is a promising possibility of therapy.

Database: Medline
46. Cost-effectiveness of the HiBalance training program for elderly with Parkinson's disease: analysis of data from a randomized controlled trial.

**Author(s):** Joseph, Conran; Brodin, Nina; Leavy, Breiffni; Hagströmer, Maria; Löfgren, Niklas; Franzén, Erika

**Source:** Clinical rehabilitation; Feb 2019; vol. 33 (no. 2); p. 222-232

**Publication Date:** Feb 2019

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 30246557

Available at Clinical rehabilitation - from Unpaywall

**Abstract:** OBJECTIVE: To determine the cost-effectiveness of the HiBalance training program for managing Parkinson's disease (PD)-related balance and gait disorders. DESIGN: Cost comparison design following the randomized controlled trial comparing a novel balance training intervention with care as usual. SUBJECTS: A total of 100 participants with mild-moderate PD were randomized to either the intervention (n = 51) or the control group (n = 49). INTERVENTION: A 10-week (three times per week), group-based, progressive balance training program, led by two physical therapists. MAIN OUTCOMES: All program costs were collected for both groups. Cost-utility was evaluated using quality-adjusted life years (QALYs) and cost-effectiveness measures were the Mini Balance Evaluation Systems Test (Mini-BESTest; assessing balance performance) and gait velocity. Incremental cost-effectiveness ratios were calculated and a probabilistic sensitivity analysis was conducted. RESULTS: The between-group difference in QALYs was 0.043 (95% confidence interval (CI): 0.011-0.075), favoring the intervention group. Between-group differences in balance performance and gait velocity were 2.16 points (95% CI: 1.19-3.13) and 8.2 cm/second (95% CI: 2.9-13.6), respectively, favoring the intervention group. The mean cost per participant in the intervention group was 16,222 SEK (€1649) compared to 2696 SEK (€274) for controls. The estimated incremental cost-effectiveness ratios were 314,558 SEK (€31,969) for an additional QALY, 6262 SEK (€631) for one point improvement in balance performance, and 1650 SEK (€166) for 1 cm/second increase in gait velocity. Sensitivity analyses indicated a high probability (85%) of program success. CONCLUSION: In terms of QALYs, the HiBalance program demonstrated a high probability of cost-effectiveness in the short-term perspective when considering the willingness-to-pay thresholds used in Europe.

**Database:** Medline

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47. Systematic Review of Yoga and Balance: Effect on Adults With Neuromuscular Impairment.

**Author(s):** Green, Ellen; Huynh, Annette; Broussard, Lori; Zunker, Brady; Matthews, Jerril; Hilton, Claudia L.; Aranha, Karen

**Source:** American Journal of Occupational Therapy; Jan 2019; vol. 73 (no. 1); p. 1-11

**Publication Date:** Jan 2019

**Publication Type(s):** Academic Journal

Available at The American journal of occupational therapy : official publication of the American Occupational Therapy Association - from Ovid (Journals @ Ovid) - Remote Access

**Abstract:** This systematic review examines the efficacy of yoga as a neuromuscular intervention for community-dwelling populations at risk for falls to determine its utility for use in occupational therapy intervention. Populations included older adults and adults with traumatic brain injury (TBI), cerebrovascular accident (CVA), dementia and Alzheimer's disease (AD)--type dementia, multiple sclerosis (MS), and Parkinson's disease (PD). Benefits of yoga include improved posture control, improved flexibility of mind and body, relaxation, and decreased anxiety and stress. A systematic review of the literature was conducted to understand the salutary benefits of yoga for clients who
are at risk for falls because of neuromuscular issues. Moderate evidence supports the use of yoga to decrease the risk for falls for community-dwelling older adults and people with CVA, dementia and AD-type dementia, and MS. Studies involving people with TBI and PD did not include strong enough evidence to be able to make a clear classification.

Database: CINAHL

48. Treadmill training and kinesiotherapy versus conventional physiotherapy in Parkinson’s disease: a pragmatic study.

Author(s): da Silva Rocha Paz, Thiago; Guimarães, Fernando; Santos de Britto, Vera Lúcia; Correa, Clynton Lourenço

Source: Fisioterapia em Movimento; Jan 2019; vol. 32 (no. 1); p. 1-8

Publication Date: Jan 2019

Publication Type(s): Academic Journal

Abstract: Introduction: Physiotherapy has been identified in the literature as an important treatment for individuals with Parkinson’s disease (PD) to improve functional capacity. Little is discussed about the physiotherapy practice environment for this population. Objective: To assess pragmatically the effects of two physiotherapy protocols: Conventional Physiotherapy (CP) and Treadmill Training and Kinesiotherapy (TTK) in PD patients. Method: Twenty-four PD patients classified from 1 to 3 on the Hoehn and Yahr scale were randomly distributed into two groups. In CP group (12 patients), exercises aimed to improve range of motion, bradykinesia, postural adjustments and gait. In TTK group (12 patients), exercises aimed to improve physical fitness, mobility and functional independence. The treatments were performed for 50 minutes, twice a week for 14 weeks. The following evaluations were performed before and after the interventions: Unified Parkinson’s Disease Rating Scale (UPDRS); gait speed (GS); up stairs (US) and down stairs (DS) tests; timed get-up-and-go test (TUG) and 6-Minute Walk Distance Test (6-MWDT). Sociodemographic and clinical data were presented as descriptive analysis. Variables with normal and non-normal distributions were analyzed by specific statistical tests. Results: Intragroup analysis showed significant results for the TTK group (TUG, US, DS, GS, UPDRS total and UPDRS II) and for the CP group only UPDRS total. Intergroup analysis was favorable for the TTK group (TUG, US, DS, 6-MWDT). Conclusion: CP group improved the patients’ general clinical status, while treadmill and kinesiotherapy improved the physical-functional and clinical aspects.

Database: CINAHL

49. Recent advances in rehabilitation for Parkinson’s Disease with Exergames: A Systematic Review.

Author(s): Garcia-Agundez, Augusto; Folkerts, Ann-Kristin; Konrad, Robert; Caserman, Polona; Tregel, Thomas; Goosses, Mareike; Göbel, Stefan; Kalbe, Elke

Source: Journal of neuroengineering and rehabilitation; Jan 2019; vol. 16 (no. 1); p. 17

Publication Date: Jan 2019

Publication Type(s): Research Support, Non-u.s. Gov’t Journal Article Systematic Review

PubMedID: 30696453

Available at Journal of neuroengineering and rehabilitation - from Europe PubMed Central - Open Access
Abstract: OBJECTIVE: The goal of this contribution is to gather and to critically analyze recent evidence regarding the potential of exergaming for Parkinson's disease (PD) rehabilitation and to provide an up-to-date analysis of the current state of studies on exergame-based therapy in PD patients. METHODS: We performed our search based on the conclusions of a previous systematic review published in 2014. Inclusion criteria were articles published in the indexed databases Pubmed, Scopus, Sciencedirect, IEEE and Cochrane published since January 1, 2014. Exclusion criteria were papers with a target group other than PD patients exclusively, or contributions not based on exergames. Sixty-four publications out of 525 matches were selected. RESULTS: The analysis of the 64 selected publications confirmed the putative improvement in motor skills suggested by the results of the previous review. The reliability and safety of both Microsoft Kinect and Wii Balance Board in the proposed scenarios was further confirmed by several recent studies. Clinical trials present better (n = 5) or similar (n = 3) results than control groups (traditional rehabilitation or regular exercise) in motor (TUG, BBS) and cognitive (attention, alertness, working memory, executive function), thus emphasizing the potential of exergames in PD. Pilot studies (n = 11) stated the safety and feasibility of both Microsoft Kinect and Wii Balance Board, potentially in home scenarios as well. Technical papers (n = 30) stated the reliability of balance and gait data captured by both devices. Related meta-analyses and systematic reviews (n = 15) further support these statements, generally citing the need for adaptation to patient’s skills and new input devices and sensors as identified gaps. CONCLUSION: Recent evidence indicates exergame-based therapy has been widely proven to be feasible, safe, and at least as effective as traditional PD rehabilitation. Further insight into new sensors, best practices and different cognitive stadiums of PD (such as PD with Mild Cognitive Impairment), as well as task specificity, are required. Also, studies linking game parameters and results with traditional assessment methods, such as UPDRS scores, are required. Outcomes for randomized controlled trials (RCTs) should be standardized, and follow-up studies are required, particularly for motor outcomes.

Database: Medline

50. STN vs. GPI deep brain stimulation for tremor suppression in Parkinson disease: A systematic review and meta-analysis.

Author(s): Wong, Joshua K; Cauraugh, James H; Ho, Kwo Wei David; Broderick, Matthew; Ramirez-Zamora, Adolfo; Almeida, Leonardo; Wagle Shukla, Aparna; Wilson, Christina A; de Bie, Rob Ma; Weaver, Frances M; Kang, Nyeonju; Okun, Michael S

Source: Parkinsonism & related disorders; Jan 2019; vol. 58 ; p. 56-62

Publication Date: Jan 2019

Publication Type(s): Research Support, Non-u.s. Gov't Meta-analysis Comparative Study Journal Article Systematic Review

PubMedID: 30177491

Abstract: OBJECTIVE: To compare subthalamic nucleus (STN) deep brain stimulation (DBS) with globus pallidus interna (GPI) DBS for tremor suppression in Parkinson disease (PD). BACKGROUND: DBS is an effective surgical therapy that has been shown to provide significant benefit for motor symptoms in PD. Currently, two main structures targeted to treat motor complications in PD are the STN and GPi. Although some groups traditionally favor STN over GPI for tremor suppression, evidence demonstrating superiority in long-term tremor control is limited. METHODS: We performed a systematic review for all randomized trials comparing STN vs GPI DBS in PD that were published before March 2017. Five studies were examined in a random effects model meta-analysis. We conducted moderator variable analysis to determine if there was a treatment effect difference for STN versus GPI. RESULTS: We compared DBS ON versus OFF and found a significant overall standardized difference mean effect: Effect Size = 0.36; 95% CI = 0.316-0.395; P < 0.0001. These
findings indicate that DBS reduced tremor symptoms in PD patients with a medium effect size. Moderator variable analysis of STN vs GPI revealed two significant standardized effect sizes: STN effect size = 0.38 and GPI effect size = 0.35. A Z-test showed that effect sizes between the STN and GPI were not significantly different (P = 0.56). CONCLUSIONS DBS is effective in reducing tremor in PD patients regardless of stimulation target. However, the degree of tremor suppression in STN DBS versus GPI DBS was equivalent.

**Database:** Medline

51. Is the aquatic thermal environment a suitable place for providing rehabilitative treatment for person with Parkinson's disease? A retrospective study.

**Author(s):** Masiero, Stefano; Maghini, Irene; Mantovani, Maria Eleonora; Bakdounes, Leila; Koutsikos, Kostas; Del Felice, Alessandra; Sale, Patrizio

**Source:** International journal of biometeorology; Jan 2019; vol. 63 (no. 1); p. 13-18

**Publication Date:** Jan 2019

**Publication Type(s):** Journal Article

**PubMedID:** 30397861

**Abstract:** Many authors showed that aquatic physiotherapy could improve quality of life and reduce postural instability and risk of falling in elderly subjects. The aim of this research was to explore if the thermal aquatic environment is a suitable place for rehabilitative training in person with Parkinson disease (PwP) with results comparable to the standard physiotherapy. A retrospective study was conducted on a database of 14 persons with Parkinson who were admitted to a thermal aquatic rehabilitation to undergo treatments made to improve gait and balance impairments. The rehabilitation training consisted of 45-min sessions conducted twice a week, on non-consecutive days, over 4 weeks of functional re-education and kinesitherapy in the thermal pool. Educational and prevention instructions were also given to the patients during each session. Additionally, nutrition (diet), health education, and cognitive behavioral advice were given to our patients by therapists. The clinical characteristics of the sample were age 66 ± 9, disease duration 7 ± 5, and Hoehn and Yahr 1.5 ± 0.5. The statistical analysis showed a statistically significant improvement for the UPDRS p = 0.0005, for The Berg Balance Scale p = 0.0078, for the PDQ8 p = 0.0039, Tinetti p = 0.0068, and for Mini BESTest p = 0.0002. Our data suggest that this intervention could become a useful strategy in the rehabilitation program of PwP. The simplicity of treatment and the lack of side effects endorse the use of thermal aquatic environment for the gait and balance recovery in PwP.

**Database:** Medline

52. Rhythmic auditory stimulation for reduction of falls in Parkinson's disease: a randomized controlled study.

**Author(s):** Thaut, Michael H; Rice, Ruth R; Braun Janzen, Thenille; Hurt-Thaut, Corene P; McIntosh, Gerald C

**Source:** Clinical rehabilitation; Jan 2019; vol. 33 (no. 1); p. 34-43

**Publication Date:** Jan 2019

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 30033755
Abstract: OBJECTIVE: To test whether rhythmic auditory stimulation (RAS) training reduces the number of falls in Parkinson’s disease patients with a history of frequent falls. DESIGN: Randomized withdrawal study design. SUBJECTS: A total of 60 participants (aged 62-82 years) diagnosed with idiopathic Parkinson’s disease (Hoehn and Yahr stages III or IV) with at least two falls in the past 12 months. INTERVENTION: Participants were randomly allocated to two groups and completed 30 minutes of daily home-based gait training with metronome click-embedded music. The experimental group completed 24 weeks of RAS training, whereas the control group discontinued RAS training between weeks 8 and 16. MAIN MEASURES: Changes in clinical and kinematic parameters were assessed at baseline, weeks 8, 16, and 24. RESULTS: Both groups improved significantly at week 8. At week 16 after the control group had discontinued training, significant differences between groups emerged including a rise in the fall index for the control group (M = 10, SD = 6). Resumption of training reduced the number of falls so that group differences were no longer significant at week 24 (Mexperimental = 3, SD = 2.6; Mcontrol = 5, SD = 4.4; P > 0.05). Bilateral ankle dorsiflexion was significantly correlated with changes in gait, fear of falling, and the fall index, indicating ankle flexion as a potential kinematic mechanism RAS addresses to reduce falls. CONCLUSION: RAS training significantly reduced the number of falls in Parkinson’s disease and modified key gait parameters, such as velocity and stride length.

Database: Medline
54. Turo (Qi Dance) Program for Parkinson's Disease Patients: Randomized, Assessor Blind, Waiting-List Control, Partial Crossover Study.

**Author(s):** Lee, Hwa-Jin; Kim, Song-Yi; Chae, Younbyoung; Kim, Mi-Young; Yin, Changshik; Jung, Woo-Sang; Cho, Ki-Ho; Kim, Seung-Nam; Park, Hi-Joon; Lee, Hyejung

**Source:** Explore (New York, N.Y.); 2018; vol. 14 (no. 3); p. 216-223

**Publication Date:** 2018

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 29650371

**Abstract:** Qigong, Tai-chi and dancing have all been proven effective for Parkinson's disease (PD); however, no study has yet assessed the efficacy of Turo, a hybrid qigong dancing program developed to relieve symptoms in PD patients. OBJECTIVE To determine whether Turo may provide benefit in addressing the symptoms of PD patients. DESIGN Randomized, assessor blind, waiting-list control, partial crossover study. SETTING Kyung Hee University Korean Medicine Hospital, Seoul, Republic of Korea. PARTICIPANTS A total of 32 PD patients (mean age 65.7 ± 6.8). INTERVENTION Participants were assigned to the Turo group or the waiting-list control group. The Turo group participated in an 8-week Turo training program (60-minute sessions twice a week). The waiting-list control group received no additional treatment during the same period; then underwent the same 8-week Turo training. OUTCOME MEASURES The primary outcome was a score on the Unified Parkinson's Disease Rating Scale (UPDRS), and the secondary outcomes included the perceived health status assessed using the Parkinson's disease Quality of Life questionnaire (PDQL), balance function as assessed by the Berg Balance Scale (BBS) and the results of the Beck Depression Inventory (BDI). RESULTS The Turo group showed statistically significant improvements in the UPDRS (P < 0.01) and PDQL (P < 0.05) as compared to the control group. The changes in BBS scores displayed a tendency toward improvement, but was not statistically significant (P = 0.051). CONCLUSION These findings suggest that Turo PD training might improve the symptoms of PD patients.

**Database:** Medline


**Author(s):** Malling, Anne Sofie Bøgh; Morberg, Bo Mohr; Wermuth, Lene; Gredal, Ole; Bech, Per; Jensen, Bente Rona

**Source:** PloS one; 2018; vol. 13 (no. 9); p. e0204478

**Publication Date:** 2018

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 30252895

**Available at:** PloS one - from Europe PubMed Central - Open Access

**Abstract:** BACKGROUND Parkinson's disease is caused by dopaminergic neurodegeneration resulting in motor impairments as slow movement speed and impaired balance and coordination. Pulsed electromagnetic fields are suggested to have neuroprotective effects, and could alleviate symptoms. OBJECTIVE To study 1) effects of 8-week daily transcranial pulsed electromagnetic field treatment on functional rate of force development and movement speed during two motor tasks with different levels of complexity, 2) if treatment effects depend on motor performance at baseline. METHODS Ninety-seven persons with Parkinson's disease were randomized to active transcranial pulsed electromagnetic field (squared bipolar 3 ms pulses, 50 Hz) or placebo treatment
with homebased treatment 30 min/day for 8 weeks. Functional rate of force development and completion time of a sit-to-stand and a dynamic postural balance task were assessed pre and post intervention. Participants were sub-grouped in high- and low-performers according to their baseline motor performance level. Repeated measure ANOVAs were used.RESULTSActive treatment tended to improve rate of force development during chair rise more than placebo (P = 0.064). High-performers receiving active treatment improved rate of force development during chair rise more than high-performers receiving placebo treatment (P = 0.049, active/placebo: 11.9±1.1 to 12.5±1.9 BW/s ≈ 5% / 12.4±1.3 to 12.2±1.3 BW/s, no change). No other between-treatment-group or between-treatment-subgroup differences were found. Data on rate of force development of the dynamic balance task and completion times of both motor tasks improved but did not allow for between-treatment differentiation.CONCLUSION:Treatment with transcranial pulsed electromagnetic fields was superior to placebo regarding functional rate of force development during chair rise among high-performers. Active treatment tended to increase functional rate of force development while placebo did not. Our results suggest that mildly affected persons with Parkinson's disease have a larger potential for neural rehabilitation than more severely affected persons and indicate that early treatment initiation may be beneficial.

Database: Medline

56. Effects of physical exercise programs on cognitive function in Parkinson's disease patients: A systematic review of randomized controlled trials of the last 10 years.

Author(s): da Silva, Franciele Cascaes; Iop, Rodrigo da Rosa; de Oliveira, Laiana Cândido; Boll, Alice Matheia; de Alvarenga, José Gustavo Souza; Gutierres Filho, Paulo José Barbosa; de Melo, Lídia Mara Aguiar Bezerra; Xavier, André Junqueira; da Silva, Rudney

Source: PloS one; 2018; vol. 13 (no. 2); p. e0193113

Publication Date: 2018

Publication Type(s): Journal Article Review Systematic Review

PubMedID: 29486000

Available at PloS one - from Europe PubMed Central - Open Access

Abstract: BACKGROUND Given the relative importance of cognitive impairment, there was considerable interest in identifying the cognitive profile of PD patients, in order to ensure specific and appropriate therapeutic interventions. PURPOSE To determine the effects of physical exercise programs on cognitive function in PD patients, compared with the control group. DATA SOURCES Medline, Cochrane, Scopus, PEDro and Web of Science (last searched in September 2016). STUDY SELECTION Randomized clinical trials examining the effects of physical exercise programs and cognitive function in PD patients. Nine studies fulfilled the selection criteria and were included in this review. DATA EXTRACTION Characteristics of the publication, characteristics of the participants, test used for cognitive screening, cognitive domain assessed, tools used to assess cognitive function, characteristics of the experimental intervention, characteristics of the control group, mean results and standard deviation of function cognitive. The PEDro score was used to evaluate methodological quality. DATA SYNTHESIS Most eligible studies showed good methodological quality based on the PEDro scale. Studies have shown that adapted tango for PD patients, cognitive training combined with motor training, and treadmill training promote the preservation or improvement of cognitive function in PD patients. LIMITATIONS The diversity of cognitive tests used to assess cognitive function and the high heterogeneity identified between the physical exercise programs. CONCLUSION Physical exercise programs promote positive and significant effects on global cognitive function, processing speed, sustained attention and mental flexibility in PD patients, at a mild to moderate stage for patients with a 6-year clinical diagnosis of PD. However, treadmill
training performed 3 times a week for about 60 minutes and for a period of 24 weeks produced larger improvements in cognition.

**Database:** Medline


**Author(s):** Park, Ji-Su; Oh, Dong-Hwan; Hwang, Na-Kyoung; Lee, Jung-Hoon

**Source:** NeuroRehabilitation; 2018; vol. 42 (no. 4); p. 457-463

**Publication Date:** 2018

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 29660951

**Abstract:**

**BACKGROUND**

Neuromuscular electrical stimulation has been used to improve swallowing function in neurologic patients with dysphagia, but its effect on patients with dysphagia and Parkinson's disease remains unclear. **OBJECTIVES**

This study aimed to identify the effect of effortful swallowing combined with neuromuscular electrical stimulation as a novel treatment approach in dysphagic patients with Parkinson's disease. **METHODS**

Participants were randomly allocated to an experimental group (n = 9) or a placebo group (n = 9). The experimental group simultaneously received neuromuscular electrical stimulation with effortful swallowing, while the placebo group received sham neuromuscular electrical stimulation with effortful swallowing. All participants received the treatment for 30 min/day at five sessions per week for 4 weeks. Both groups also received the same conventional dysphagia therapy. **RESULTS**

The experimental group showed significant differences in horizontal movement (p = 0.038) and vertical movement (p = 0.042) compared to the placebo group, but showed no significant differences in the oral (p = 0.648) or pharyngeal phase (p = 0.329) of the Videofluoroscopic Dysphagia Scale compared to the placebo group, except for the Penetration-Aspiration Scale (p = 0.039). **CONCLUSIONS**

We demonstrated that neuromuscular electrical stimulation applied to the infrahyoid region combined with effortful swallowing effectively increased hyoid bone movement and reduced aspiration in dysphagic patients with Parkinson's disease.

**Database:** Medline


**Author(s):** Momin, Sheikh; Mahlknecht, Philipp; Georgiev, Dejan; Foltynie, Thomas; Zrinzo, Ludvic; Hariz, Marwan; Zacharia, Andre; Limousin, Patricia

**Source:** Journal of Parkinson's disease; 2018; vol. 8 (no. 2); p. 267-271

**Publication Date:** 2018

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 29614696

**Available at Journal of Parkinson's disease - from Unpaywall**

**Abstract:**

**BACKGROUND**

Whilst changes in the frequency of subthalamic deep brain stimulation (STN-DBS) have been proposed to improve control of tremor or axial motor features in Parkinson's disease (PD), little is known about the effects of frequency changes on upper limb motor function, particularly bradykinesia. **OBJECTIVES**

To investigate the acute effects of various STN-DBS frequencies (40-160 Hz, 40 Hz intervals) on upper limb motor function. **METHODS**

We carried out a randomised, double-blind study on 20 PD patients with chronic STN-DBS using the Simple and Assembly
components of the Purdue Pegboard (PP) test and a modified upper limb version of the UPDRS-III (UL-UPDRS-III). RESULTS There was no significant effect of frequency on bradykinesia on the Simple PP task or the UL-UPDRS-III. There was an effect of frequency on the Assembly PP score when comparing all frequencies ($p = 0.019$) and between 80 Hz and 130 Hz ($p = 0.007$), with lower frequencies yielding a better performance. Rigidity and Tremor scores were significantly reduced with higher (>80 Hz) compared to lower (40 Hz) frequencies. CONCLUSIONS Our findings suggest that a wide range of frequencies are efficacious in improving acute upper-limb motor function. Reducing the frequency of stimulation down to 80 Hz is safe and has a similar clinical effect to higher frequencies. Therefore, a wider range of frequencies are available when it comes adjusting patients' acute settings without the risk of worsening bradykinesia.

Database: Medline


Author(s): Bryant, Mon S; Workman, Craig D; Jamal, Fariha; Meng, Hao; Jackson, George R

Source: Journal of hand therapy : official journal of the American Society of Hand Therapists; 2018; vol. 31 (no. 1); p. 29-34

Publication Date: 2018

Publication Type(s): Clinical Trial Journal Article

PubMedID: 28389133

Available at Journal of hand therapy : official journal of the American Society of Hand Therapists - from ProQuest (Health Research Premium) - NHS Version

Available at Journal of hand therapy : official journal of the American Society of Hand Therapists - from Unpaywall

Abstract: STUDY DESIGN A single group, repeated measures design was used. INTRODUCTION Tremor can lead to impaired hand function in patients with Parkinson's disease (PD) and essential tremor (ET). Difficulty with handwriting is a common complaint in these patients suffering from hand tremors. The effect of hand resistance exercise on handwriting is unknown. PURPOSE OF THE STUDY To explore the influence of 6 weeks of home-based hand resistance exercise on handwriting in individuals with PD and ET. METHODS Nine individuals with PD and 9 with ET participated in the study. The average age was 65.3 (6.0) years with an average disease duration of 7.8 years. Participants were instructed to perform a home-based, hand and arm resistance exercise program 3 times a week for 6 weeks. Samples of the area of handwriting and maximal grip strength were measured at baseline and after 6 weeks of exercise. The area of the handwriting sample and maximal grip strength measured before and after 6 weeks were compared. RESULTS Mean grip strength of the participants with PD improved after 6 weeks of hand resistance exercise ($P = .031$), but grip strength did not change in ET ($P = .091$). The size of the handwriting samples (words and sentences) did not change after exercise in either participants with PD or ET. DISCUSSION Micrographia in patients with PD and macrographia in patients with ET represent complex fine motor skills. More research is needed to understand what therapies could be effective in modifying the size and quality of handwriting. CONCLUSION The purpose of this feasibility study was to explore the influence of home-based wrist resistance exercise on handwriting in individuals with PD and ET. Despite small gains in grip strength, the size of the handwriting samples (words and sentences) did not change for patients with PD or ET following a 6-week home-based hand resistance exercise program.

Database: Medline

Author(s): Tollár, József; Nagy, Ferenc; Kovács, Norbert; Hortobágyi, Tibor

Source: Archives of Physical Medicine & Rehabilitation; Dec 2018; vol. 99 (no. 12); p. 2478-2478

Publication Date: Dec 2018

Publication Type(s): Academic Journal

Abstract: Objective To determine the effects of a high-intensity exercise therapy using sensorimotor and visual stimuli on nondemented Parkinson disease (PD) patients' clinical symptoms, mobility, and standing balance. Design Randomized clinical intervention, using a before-after trial design. Setting University hospital setting. Participants A total of 72 PD patients with Hoehn and Yahr stage of 2-3, of whom 64 were randomized, and 55 completed the study. Intervention PD patients were randomly assigned to a no physical intervention control (n=20 of 29 completed, 9 withdrew before baseline testing) or to a high-intensity agility program (15 sessions, 3 weeks, n=35 completed). Main Outcome Measures Primary outcome was the Movement Disorders Society-Unified Parkinson Disease Rating Scale (MDS-UPDRS) motor experiences of daily living (M-EDL). Secondary outcomes were Beck Depression score, Parkinson Disease Questionnaire-39 (PDQ-39), EuroQoL Five-Dimension (EQ5D) Questionnaire visual analog scale, Schwab and England Activities of Daily Living (SE ADL) Scale, timed Up and Go (TUG) test, and 12 measures of static posturography. Results The agility program improved MDS-UPDRS M-EDL by 38% compared with the 2% change in control (group by time interaction, P =.001). Only the intervention group improved in PDQ-39 (6.6 points), depression (18%), EQ5D visual analog scale score (15%), the SE ADL Scale score (15%), the TUG test (39%), and in 8 of 12 posturography measures by 42%-55% (all P <.001). The levodopa equivalent dosage did not change. Conclusion A high-intensity agility program improved nondemented, stage 2-3 PD patients' clinical symptoms, mobility, and standing balance by functionally meaningful margins at short-term follow-up.

Database: CINAHL

61. Challenges and strategies among women and men with Parkinson's disease: Striving toward joie de vivre in daily life.

Author(s): Sperens, Maria; Hamberg, Katarina; Hariz, Gun-Marie

Source: British Journal of Occupational Therapy; Dec 2018; vol. 81 (no. 12); p. 700-708

Publication Date: Dec 2018

Publication Type(s): Academic Journal

Abstract: Introduction To offer people with Parkinson's disease optimal occupational therapy, it is important to have a detailed understanding of how they manage everyday life. The aims of this study were to explore how people with Parkinson's disease manage the effect of the disease on everyday life and to investigate gender similarities and differences concerning this issue. Method We interviewed 24 people with Parkinson's disease (14 men), at a mean of 8 years after diagnosis. The interviews were analysed according to Grounded Theory. Findings 'Striving to maintain a good everyday life' was established as a core category. To overcome obstacles caused by the disease, the interviewees struggled with perpetual adaptation to the medication regime and ongoing changes in their abilities. To achieve best possible everyday life, it was essential to keep their own spirit up; for example, by prioritising valued occupations. Women and men contributed to all categories and used the same strategies. Conclusion Men and women with Parkinson's disease used the same strategies to manage daily life challenges. Our findings support the relevance of disease-specific occupational therapy interventions focusing on the individual fit between person, environment and occupation, and highlight the need for joyful occupations to attain a satisfactory daily life.
62. The efficacy and feasibility of aquatic physiotherapy for people with Parkinson's disease: a systematic review.

**Author(s):** Terrens, Aan Fleur; Soh, Sze-Ee; Morgan, Prue Elizabeth

**Source:** Disability & Rehabilitation; Dec 2018; vol. 40 (no. 24); p. 2847-2856

**Publication Date:** Dec 2018

**Publication Type(s):** Academic Journal

**Abstract:** Purpose: To critically evaluate the literature regarding the efficacy and feasibility of aquatic physiotherapy in people with Parkinson’s disease. Method: Relevant studies were identified through searches in nine health-related databases. Two independent reviewers assessed study quality using either the PEDro scale or a customised tool for safety and feasibility. Results: Database searches yielded 88 articles, of which 10 met the inclusion criteria. Studies varied greatly in methodology, quality, interventions and outcome measures. Study quality was generally low in items reporting on safety precautions, adverse events, attrition, and adherence. Results suggest that aquatic physiotherapy may have a positive effect on motor symptoms, quality of life and balance. Conclusions: Aquatic physiotherapy may improve aspects of motor performance, quality of life and balance in people with Parkinson’s disease, however, it remains unclear whether it is a safe and feasible treatment modality. The development of standardised outcome measures for people with Parkinson’s disease (unified Parkinson’s disease rating scale and Parkinson’s disease questionnaire-39) would aid study comparability and validate study outcomes. As safety criteria was grossly underreported, guidelines for mandatory reporting of safety criteria are essential to make conclusions regarding the feasibility of aquatic physiotherapy for people with Parkinson’s disease. Implications for Rehabilitation: Aquatic physiotherapy may be a beneficial treatment modality for people with Parkinson’s disease. A minimum data set that includes the unified Parkinson’s disease rating scale and Parkinson’s disease questionnaire 39 is required to aid future meta-analysis and to allow more definitive conclusions to be made regarding aquatic physiotherapy for people with Parkinson’s disease. People with Parkinson’s disease are a vulnerable population, where safety within an aquatic physiotherapy program needs to be well documented and addressed.

**Database:** CINAHL

63. Effectiveness of robot-assisted gait training on motor impairments in people with Parkinson's disease: a systematic review and meta-analysis.

**Author(s):** Alwardat, Mohammad; Etoom, Mohammad; Al Dajah, Salameh; Schirinzi, Tommaso; Di Lazzaro, Giulia; Sinibaldi Salimei, Paola; Biagio Mercuri, Nicola; Pisani, Antonio

**Source:** International journal of rehabilitation research. Internationale Zeitschrift fur Rehabilitationsforschung. Revue internationale de recherches de readaptation; Dec 2018; vol. 41 (no. 4); p. 287-296

**Publication Date:** Dec 2018

**Publication Type(s):** Meta-analysis Journal Article Systematic Review

**PubMedID:** 30119060

**Abstract:** The aim of this systematic review and meta-analysis was to evaluate the effectiveness of robot-assisted gait training (RAGT) on motor impairments in people with Parkinson's disease (PD). A computer-based systematic literature search was performed in six databases according to PRISMA guidelines. Randomized controlled trials (RCTs) that assessed the effects of RAGT on motor impairments in people with PD were included. GRADE approach and PEDro scale were used to
determine the studies' quality of evidence. Meta-analyses were performed by calculating the weighted mean difference (WMD) at 95% confidence interval. Seven RCTs (PEDro: 5-8) met the inclusion criteria for systematic review and meta-analyses. The meta-analysis showed significant improvement on Unified Parkinson Disease Rating Scale Part III after intervention [WMD=3.292; 95% confidence interval (CI)=1.378-5.207; P=0.000], and after 1-month follow-up (WMD=5.512; 95% CI=2.396-8.629; P=0.001). Stride length (WMD=9.283; 95% CI=7.153-11.414; P=0.00) and gait speed (WMD=0.166; 95% CI=-0.090 to 0.243; P=0.000) showed significant improvements after RAGT. Balance as measured by Berg Balance Scale was improved significantly after intervention (WMD=3.87; 95% CI=0.374-6.735; P=0.029) and at 1-month follow-up (WMD=3.87; 95% CI=1.324-6.413; P=0.002). The pooled analysis did not detect any significant changes regarding stride time, cadence and functional balance scales. GRADE level of evidence ranged between high and low. The RAGT showed better outcomes than conventional interventions on some motor aspects in PD. However, RAGT did not seem superior to control interventions. Further RCTs that examine the effect of RAGT on more specific outcomes and at different medication statuses are required.

**Database:** Medline

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**64. Peripheral neurostimulation breaks the shuffling steps patterns in Parkinsonian gait: a double blind randomized longitudinal study with automated mechanical peripheral stimulation.**

**Author(s):** Galli, Manuela; Vicidomini, Caterina; Rozin Kleiner, Ana F; Vacca, Laura; Cimolin, Veronica; Condoluci, Claudia; Stocchi, Fabrizio; De Pandis, Maria F

**Source:** European journal of physical and rehabilitation medicine; Dec 2018; vol. 54 (no. 6); p. 860-865

**Publication Date:** Dec 2018

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 29457707

**Abstract:** BACKGROUND The shuffling steps pattern is a typical feature of gait in patients affected by Parkinson’s disease (PD), which progressively reduces their quality of life, being related to the risk of falls in this population. Recently, Automated Mechanical Peripheral Stimulation (AMPS) was presented as an integrative rehabilitative treatment based on peripheral stimulation able to improve the gait spatiotemporal parameters in PD patients. AIM The aim of this study was to evaluate the effects of AMPS on shuffling steps pattern by analyzing the kinematic and spatio-temporal gait parameters. DESIGN Double blind randomized longitudinal study. SETTING Outpatients. POPULATION PD patients. METHODS In this double blind randomized longitudinal study, 14 patients with PD were treated with effective-AMPS (AMPS group), while 14 PD patients were treated with placebo-AMPS (SHAM group); 32 healthy subjects were deemed the control group (CG). A dedicated medical device (Gondola™ Medical Technologies, Stabio, Switzerland) was used to deliver both stimulations. Each treatment session lasted about 15 minutes, including preparation (approx. 10 to 13 minutes) and stimulation (approx. 2 minutes). All PD patients were given six AMPS/SHAM treatments sessions, twice a week, delivered during the off-levodopa phase, having withdrawn from dopaminergic medication overnight. We evaluated spatio-temporal and kinematic variables of gait with quantitative 3D-gait analysis as follows: before and after the first intervention (acute phase), then after the sixth session (long term phase). RESULTS We detected differences in all gait variables immediately after the first session of AMPS treatment and again after the sixth stimulation session. CONCLUSIONS AMPS treatment changes the shuffling steps pattern that is typical of PD subjects, increasing the ROM of hip, knee and ankle joints during the gait cycle. CLINICAL REHABILITATION IMPACT This data presents further evidence that a rehabilitative approach based on the AMPS treatment can induce improvements in the gait pattern of patients affected by PD.
65. **What makes a group fitness program for people with Parkinson’s disease endure? A mixed-methods study of multiple stakeholders.**

**Author(s):** Rossi, Amerigo; Torres-Panchame, Rosa; Gallo, Paul M; Marcus, Adam R; States, Rebecca A

**Source:** Complementary therapies in medicine; Dec 2018; vol. 41; p. 320-327

**Publication Date:** Dec 2018

**Publication Type(s):** Journal Article

**PubMedID:** 30477861

**Abstract:**

**OBJECTIVE** Identify key features of an enduring group exercise program for people with Parkinson's disease (PD) by exploring experiences of participants, student assistants and the exercise instructor through a convergent mixed methods design. **METHODS** Fourteen people with PD (modified Hoehn & Yahr: 1-3.5) who regularly participated in a group exercise program (≥ 50% of classes for ≥ 1 year) were interviewed to explore their perceptions of the program. The exercise instructor was also interviewed and weekly written reflections were collected from 18 undergraduate student assistants. Using a grounded theory approach, interviews and written reflections were thematically analyzed via qualitative content analysis. Quantitative data from the Physical Fitness and Exercise Activity Levels of Older Adults Scale were used as part of a convergent mixed-methods design to move towards theory formation. **RESULT** Thematic analysis of the PD participant interviews revealed 4 themes: 1) Quality of the program, 2) Social interactions, 3) Facilitators to exercise, 4) Barriers to exercise. The exercise instructor interview revealed 2 themes: individualization and functionality of exercises, and creating a nurturing atmosphere. Themes from students' data included student learning, and positive in-class experiences. Means (sd) were 1.6 (0.5) for facilitators and 3.0 (0.5) for barriers subscales (1=strongly agree to 4=strongly disagree). **CONCLUSION** These varied sources of data converge to identify and characterize key features of an enduring group exercise program for people with PD: a positive and nurturing environment, varied and individually tailored exercise content, and the importance of social cohesion. These findings also highlight the critical role of multiple stakeholders in fostering an environment that facilitates long-term adherence to group exercise.

**Database:** Medline

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66. **Sleep Quality, Depression, and Quality of Life After Bilateral Anodal Transcranial Direct Current Stimulation in Patients with Parkinson’s Disease.**

**Author(s):** Hadoush, Hikmat; Al-Sharman, Alham; Khalil, Hanan; Banihani, Saleem A; Al-Jarrah, Muhammed

**Source:** Medical science monitor basic research; Nov 2018; vol. 24; p. 198-205

**Publication Date:** Nov 2018

**Publication Type(s):** Journal Article

**PubMedID:** 30449881

**Abstract:** **BACKGROUND** Sleep dysfunctions impose a large burden on quality of life for patients with Parkinson's disease (PD). Several studies on PD reported potential therapeutic effects of transcranial direct current stimulation (tDCS) on motor and non-motor functions, but not related to sleep quality. Therefore, the present study examined sleep quality, depression perception, and quality of life...
changes after bilateral anodal tDCS in patients with PD. MATERIAL AND METHODS Twenty-one patients (n=21) with PD underwent 10 sessions (20 min each, 5 per week) of bilateral anodal tDCS stimulation applied simultaneously over the left and right prefrontal and motor areas. The Pittsburgh Sleep Quality Index (PSQI) total score and sub-scores, Geriatric Depression Scale (GDS), and Health-related quality of life questionnaire (SF-36) were measured pre/post bilateral tDCS anodal stimulation. RESULTS PSQI total score (P=0.045), sleep latency sub-score (P=0.02), and GDS total score (P=0.016) significantly decreased, and physical and mental components scores of SF-36 (P=0.018 and P=0.001, respectively) significantly increased after bilateral anodal tDCS stimulation. The GDS score decrease was directly correlated with decrease in PSQI total score (P=0.01), sleep latency sub-score (P=0.002), and sleep disturbance sub-score (P=0.003). In addition, the GDS score decrease was inversely correlated with increasing mental component score of SF-36 (P=0.001), which was directly correlated with an increase in sleep efficiency sub-score (P=0.03) and the physical component score of SF-36 (P=0.0001). CONCLUSIONS Bilateral anodal tDCS stimulation showed potential therapeutic effects in patients with PD in terms of sleep quality and depression level improvement, which together improved mental and physical quality of life in patients with PD.

Database: Medline


Author(s): Justice, Catherine; Cheung, Corjena; Samson-Burke, Amy

Source: International journal of yoga therapy; Nov 2018; vol. 28 (no. 1); p. 113-122

Publication Date: Nov 2018

Publication Type(s): Journal Article

PubMedID: 29350580

Abstract: Preliminary research indicates that yoga could be a valuable tool for people suffering from Parkinson's disease (PD). However, little has been published about the process by which the yoga interventions were designed and evaluated. This study elaborates on the process of developing and testing a bi-weekly, 12-week yoga program to determine its safety and feasibility for people with PD. The lead yoga teacher used input from a focused literature review to design an initial draft of the intervention program. This draft was reviewed by a group of yoga experts (n = 6) to develop the final intervention program. This 12-week intervention was implemented in 19 participants with PD (mean age 63 ± 8, range 49-75) via twice-weekly yoga classes. Through this comprehensive development process, a series of 24 individual 1-hour yoga sequences was created. These sequences included yoga postures (asana), breathing techniques (pranayama), and mindfulness meditation principles specifically chosen to address concerns unique to the PD population. The feasibility of the program was supported with excellent attendance: 90% of participants attended > 75% of the classes, with four participants attending 100%. No adverse events were reported. This development process produced a safe and enjoyable yoga program specific for the needs of people with PD. However, this methodology could serve as a template for future studies on how to develop safe and effective yoga interventions for other populations.

Database: Medline

68. Perceived Activities and Participation Outcomes of a Yoga Intervention for Individuals with Parkinson’s Disease: A Mixed Methods Study.

Author(s): Hawkins, Brent L; Van Puymbroeck, Marieke; Walter, Alysha; Sharp, Julia; Woshkolup, Kathleen; Urrea-Mendoza, Enrique; Revilla, Fredy; Schmid, Arlene A

Source: International journal of yoga therapy; Nov 2018; vol. 28 (no. 1); p. 51-61
Parkinson's disease (PD) often leads to poor balance, increased falls, and fear of falling, all of which can reduce participation in life activities. Yoga, which usually includes physical exercise, can improve functioning and life participation; however, limited research has been conducted on the effects of yoga on life participation of individuals with PD. This study had two purposes: (1) to identify and understand the perceived activities and participation outcomes associated with a therapeutic yoga intervention for individuals with PD; and (2) to compare the perceived activities and participation outcomes with the outcomes measured in the clinical trial. A single-blind, randomized, waitlist-controlled, phase II exploratory pilot study using an after-trial embedded mixed methods design (clinical trial Pro00041068) evaluated the effect of an 8-week Hatha Yoga intervention on individuals with PD. Directed content analysis was used to analyze focus group interviews with participants who completed the yoga intervention. Quantitative and qualitative data were merged and compared using a data comparison matrix. Qualitative analysis indicated many activities and participation outcomes. Comparison of qualitative and quantitative data indicated the yoga intervention led to improved balance, mobility, and functional gait, and fewer falls. These outcomes reached beyond the intervention and into participants' daily lives. Results support the use of Hatha Yoga as a community-based rehabilitation intervention for individuals with PD. Yoga, as part of an interdisciplinary approach to treatment, can improve many types of activities and participation outcomes (e.g., mobility, social relationships, self-care, handling stress, recreation).

Database: Medline


Author(s): Cash, Megan F; Ulanowski, Elizabeth; Danzl, Megan

Source: Complementary therapies in clinical practice; Nov 2018; vol. 33; p. 149-155

Abstract: Individuals with Parkinson's disease (PD) typically display symptoms of rigidity, bradykinesia, and postural instability that can limit participation in recreational activities. The purpose of this clinical report is to describe the development, implementation, and outcomes of a novel and innovative community-based golf and exercise program for individuals with PD. In response to community interest, the program was developed through a unique partnership that blended the expertise of physical therapists and golf professionals. The 6-week program consisted of golf instruction and task-specific exercises. Improvements were noted in seven of eight participants for golf performance (driving distance and club head speed) and quality of life (PD Questionnaire-39) outcome measures. This report describes the design and implementation of a golf and exercise program for people with PD based on community need, evidence, and clinical expertise. Considerations and recommendations for future programs are discussed, such as program length, staffing, volunteers, funding, location, and resources.

Database: Medline

70. Long-term effects of highly challenging balance training in Parkinson's disease—a randomized controlled trial.
OBJECTIVES: To determine long-term effects of a highly challenging training program in people with Parkinson's disease, as well as describe how initially observed improvements of the program deteriorated over time. DESIGN: Long-term follow-up of previously reported outcomes at 10 weeks of a randomized controlled trial. SETTING: University hospital setting. PARTICIPANTS: One-hundred elderly with mild-to-moderate (Hoehn and Yahr 2-3) Parkinson's disease. INTERVENTIONS: Participants in the training group (n = 51) received 10 weeks (three times/week) of balance and gait exercises, incorporating dual-tasks, while the control group (n = 49) received care as usual. MAIN OUTCOME MEASURES: Balance control (Mini-Balance Evaluation System Test (Mini-BESTest)) and gait velocity. Mixed-design analyses of variance were used to determine potential training effects at 6- and 12-month follow-up, and piecewise regression models predicted the rate of deterioration. RESULTS: Seventy-six participants were included at final follow-up. No significant (P > .05) between-group differences remained at either 6 or 12 months following the intervention. The mean Mini-BESTest scores of the training and control group were 19.9 (SD 4.4) and 18.6 (SD 4.3), respectively, at the 12-month follow-up. Gait speed was 1.2 (SD 0.2) m/s in both groups at 12 months. The training group showed a larger deterioration rate per month in balance performance (0.21 point) and gait velocity (0.65 cm/s) than controls (P < .05). CONCLUSION: These results suggest that training effects diminish within 6 months after balance training, implying that the program may need to be repeated regularly.

Database: Medline

71. Decreasing subthalamic deep brain stimulation frequency reverses cognitive interference during gait initiation in Parkinson's disease.

OBJECTIVE: Freezing of gait (FOG) represents a major burden for Parkinson's disease (PD) patients. High-frequency (130-Hz) subthalamic deep-brain-stimulation (STN-DBS) has been reported to aggravate FOG whereas lowering the frequency to 60-80 Hz improves FOG. To further understand the effects of STN-DBS on FOG, we assessed the effects of 80-Hz and 130-Hz STN-DBS on gait initiation performance, in relation to motor and executive function processing.

METHODS: Gait initiation was recorded in 19 PD patients and 20 controls, combined or not with a cognitive interference task with a modified Stroop paradigm. PD patients were recorded before surgery with and without dopaminergic treatment, and after surgery with 80-Hz and 130-Hz STN-DBS in a randomised double-blind crossover study.

RESULTS: In the absence of cognitive interference, PD patients exhibited significant gait initiation improvement with dopaminergic treatment, 80-Hz and 130-Hz STN-DBS. Nine patients performed the cognitive interference task. With 130-Hz STN-DBS, all...
gait initiation parameters were significantly degraded, whereas the cognitive interference task induced no major changes before surgery and with 80-Hz STN-DBS, as in controls. **CONCLUSIONS:** High-frequency STN-DBS leads to an inability to simultaneously process motor and cognitive information while this ability seems preserved with low-frequency STN-DBS. **SIGNIFICANCE:** This study supports the potential benefit of 80-Hz STN-DBS on FOG.

**Database:** Medline

### 72. Role of physical activity in Parkinson’s disease.

**Author(s):** Bhalsing, Ketaki; Abbas, Masoom; S. Tan, Louis

**Source:** Annals of Indian Academy of Neurology; Oct 2018; vol. 21 (no. 4); p. 242-249

**Publication Date:** Oct 2018

**Publication Type(s):** Academic Journal

**Abstract:** Parkinson’s disease (PD) is common, age-dependent neurodegenerative disorder caused by a severe loss of the nigrostriatal dopaminergic neurons. Given the projected increase in the number of people with PD over the coming decades, interventions aimed at minimizing morbidity and improve quality of life are crucial. There is currently no fully proven pharmacological therapy that can modify or slow the disease progression. Physical activity (PA) can complement pharmacological therapy to manage the inherent decline associated with the disease. The evidence indicates that upregulation of neurotrophins and nerve growth factors are potentially critical mediators of the beneficial effects associated with PA. Accumulating evidence suggests that patients with PD might benefit from PA in a number of ways, from general improvements in health to disease-specific effects and potentially, disease-modifying effects. Various forms of PA that have shown beneficial effects in PD include – aerobic exercises, treadmill training, dancing, traditional Chinese exercise, yoga, and resistance training. In this review, we explored available research that addresses the impact of exercise and PA on PD. The original articles with randomized control trials, prospective cohort studies, longitudinal studies, meta-analysis, and relevant review articles from 2005 to 2017 were selected for the present review. Many gaps remain in our understanding of the most effective exercise intervention for PD symptoms, the mechanisms underlying exercise-induced changes and the best way to monitor response to therapy. However, available research suggests that exercise is a promising, cost-effective, and low-risk intervention to improve both motor and nonmotor symptoms in patients with PD. Thus, PA should be prescribed and encouraged in all PD patients.

**Database:** CINAHL

### 73. Does dual-task training improve spatiotemporal gait parameters in Parkinson’s disease?

**Author(s):** Geroin, Christian; Nonnekes, Jorik; de Vries, Nienke M.; Strouwen, Carolien; Smania, Nicola; Tinazzi, Michele; Nieuwboer, Alice; Bloem, Bastiaan R.

**Source:** Parkinsonism & Related Disorders; Oct 2018; vol. 55 ; p. 86-91

**Publication Date:** Oct 2018

**Publication Type(s):** Academic Journal

**PubMedID:** NLM29802080

**Abstract:** Introduction: The DUALITY trial recently showed that both integrated and consecutive dual-task training improve dual-task gait velocity, without increasing fall risks in patients with Parkinson’s disease (PD). Gait velocity was the primary outcome; not reported, however, were important gait measures related to the risk of falling such as gait variability. In this secondary analysis, we
compared the efficacy of the two training programs with respect to spatiotemporal outcome parameters. Methods: 121 PD patients (Hoehn and Yahr stage II-III while ON medication) were randomly assigned to either a consecutive group (n = 65) in which cognitive and gait tasks were trained separately, or an integrated group (n = 56) in which cognitive and gait tasks were trained simultaneously. Both groups received 24 in-home physiotherapy sessions for six consecutive weeks. Two baseline measurements were performed during a six-week control period prior to the interventions. Gait was evaluated under three different (and untrained) dual-task conditions immediately after the treatment period and at 12-week follow-up. Results: Both training modalities had a comparable effect on spatiotemporal gait parameters. A significant post-training increase in stride length (P < .001) and cadence (P < .001) was found under both the single and the dual-task conditions. These improvements were maintained at follow-up, although the effect was slightly reduced. No significant changes were found for gait variability under single and dual-task conditions. Conclusion: We found both integrated and consecutive dual-task training to be safe and effective in improving several spatiotemporal gait parameters under trained and untrained dual-task conditions.

Database: CINAHL

74. Persistent adverse effects following different targets and periods after bilateral deep brain stimulation in patients with Parkinson's disease.

Author(s): Yin, Zixiao; Cao, Yuan; Zheng, Suyue; Duan, Jian; Zhou, Dongwei; Xu, Renxu; Hong, Tao; Lu, Guohui

Source: Journal of the neurological sciences; Oct 2018; vol. 393 ; p. 116-127

Publication Date: Oct 2018

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article Systematic Review

PubMedID: 30153572

Abstract: BACKGROUND Performed as one of the major treatments for advanced Parkinson's disease (PD), deep brain stimulation (DBS) surgery can induce adverse effects (AEs) on cognition, gait, mood, speech and swallowing, which are frequently reported and seriously affect the patient's daily life. OBJECTIVE To comprehensively analysis the adverse effect rates (AERs) of cognition, mood, gait, speech and swallowing after bilateral DBS in patients with PD. METHOD We performed a systematic search in PubMed, EMBASE and the Cochrane Library to collect all the articles reporting AEs after DBS in sufferers of PD. The cited articles were also manually searched. RESULTSA total of 31 articles were quantitatively analyzed. Random-effects models were used to calculate the AERs and 95% confidence intervals. Of all patients, the pooled AER of the five types of events was 24.0%. Specifically, the risks of cognition, mood and speech disturbance were higher after subthalamic nucleus (STN) -DBS than after globus pallidus interna (GPI) -DBS: 25.1% versus 14.6%, 26.3% versus 22.2% and 29.0% versus 19.6%, respectively. However, the AER of dysphagia was slightly lower after STN-DBS: 8.6% versus 10.1%. The risk of gait disorders was similar between two target groups in sub-analysis of random control trials (RCTs): 38.3% in STN group and 37.3% in GPI group. In three follow-up intervals, short-term follow-up (STF), mid-term follow-up (MTF) and long-term follow-up (LTF), gait (17.6%~19.9%~28.0%), speech (7.8%~26.9%~31.5%) and mood (7.4%~24.9%~30.7%) disorders worsened progressively. While cognitive disturbance (22.5%~27.1%~16.7%) reached its highest rate at MTF. CONCLUSION STN-DBS was 10% more likely to cause cognitive and speech disturbance than GPI-DBS, while STN-DBS had a lower risk of dysphagia. Two target groups had similar effects on gait. The pooled AER increased over time, while cognitive disturbance reached its highest rate at the 6- to 18-month follow-up. Additionally, speech and mood disturbance deteriorated rapidly from STF to MTF. Further investigation of the pathophysiology will help alleviate those AEs after DBS.

Database: Medline
Effect of a Mat Pilates Program with TheraBand on Dynamic Balance in Patients with Parkinson's Disease: Feasibility Study and Randomized Controlled Trial.

Author(s): Mollinedo-Cardalda, Irinia; Cancela-Carral, José María; Vila-Suárez, María Helena

Source: Rejuvenation research; Oct 2018; vol. 21 (no. 5); p. 423-430

Publication Date: Oct 2018

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 29207899

Abstract: The aim of this study was to assess the effect of a physical exercise program based on Mat Pilates (MP) with TheraBand® on the dynamic balance of a sample population diagnosed with Parkinson's disease (PD). After random selection, 26 participants were allocated to a MP group or a control group where they performed calisthenics exercises. Both interventions lasted 12 weeks and involved 2 weekly sessions of 60 minutes. Assessments took place at baseline, 12 weeks after the intervention started and 4 weeks after the intervention was completed using the body mass index (BMI), the Timed Up and Go (TUG) test with Wiva® sensors, the 30 Second Chair Stand test, and the Five Times Sit to Stand test. The group that completed the MP program presented significant improvements in BMI ($F_{1,21} = 3.986; p = 0.038$), the 30 Second Chair Stand test ($F_{1,21} = 6.716; p = 0.014$), the Five Times Sit to Stand test ($F_{1,21} = 5.213; p = 0.032$), and the time required to complete the TUG dynamic balance test ($F_{1,21} = 5.035; p = 0.035$). The MP program performed by a sample population with PD led to improvements in dynamic balance, and participants in the MP group showed increased strength in the lower limbs, but such improvements were not permanent after the activity ceased.

Database: Medline

Anodic versus cathodic neurostimulation of the subthalamic nucleus: A randomized-controlled study of acute clinical effects.

Author(s): Kirsch, Anna Dalal; Hassin-Baer, Sharon; Matthies, Cordula; Volkmann, Jens; Steigerwald, Frank

Source: Parkinsonism & related disorders; Oct 2018; vol. 55 ; p. 61-67

Publication Date: Oct 2018

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 29784559

Available at Parkinsonism & related disorders - from Unpaywall

Abstract: INTRODUCTION Stimulation settings of deep brain stimulation (DBS) have evolved empirically within a limited parameter space dictated by first generation devices. There is a need for controlled clinical studies, which evaluate efficacy and safety of established programming practice against novel programming options provided by modern neurostimulation devices. METHODS Here, we tested a polarity reversal from conventional monopolar cathodic to anodic stimulation in an acute double-blind, randomized, cross-over study in patients with PD implanted with bilateral STN DBS. The primary outcome measure was the difference between efficacy and side-effect thresholds (current amplitude, mA) in a monopolar review and the severity of motor symptoms (as assessed by MDS-UPDRS III ratings) after 30 min of continuous stimulation in the medication off-state. RESULTS Effect and side effect thresholds were significantly higher with anodic compared to cathodic stimulation ($3.36 \pm 1.58$ mA vs. $1.99 \pm 1.37$ mA; $6.05 \pm 1.52$ mA vs. $4.15 \pm 1.13$ mA; both $p < 0.0001$). However, using a predefined amplitude of 0.5 mA below the respective adverse effect
threshold, blinded MDS-UPDRS-III-ratings were significantly lower with anodic stimulation (anodic: median 17 [min: 12, max: 25]; cathodic: 23 [12, 37]; p < 0.005). CONCLUSION Effective anodic stimulation requires a higher charge injection into the tissue, but may provide a better reduction of off-period motor symptoms within the individual therapeutic window. Therefore, a programming change to anodic stimulation may be considered in patients suffering from residual off-period motor symptoms of PD despite reaching the adverse effect threshold of cathodic stimulation in the subthalamic nucleus.

Database: Medline

77. The effects of respiratory muscle training on peak cough flow in patients with Parkinson's disease: a randomized controlled study.

Author(s): Reyes, Alvaro; Castillo, Adrián; Castillo, Javiera; Cornejo, Isabel

Source: Clinical rehabilitation; Oct 2018; vol. 32 (no. 10); p. 1317-1327

Publication Date: Oct 2018

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 29756459

Abstract: OBJECTIVE To compare the effects of an inspiratory versus and expiratory muscle-training program on voluntary and reflex peak cough flow in patients with Parkinson disease. DESIGN A randomized controlled study. SETTING Home-based training program. PARTICIPANTS In all, 40 participants with diagnosis of Parkinson’s disease were initially recruited in the study and randomly allocated to three study groups. Of them, 31 participants completed the study protocol (control group, n = 10; inspiratory training group, n = 11; and expiratory training group, n = 10) Intervention: The inspiratory and expiratory group performed a home-based inspiratory and expiratory muscle-training program, respectively (five sets of five repetitions). Both groups trained six times a week for two months using a progressively increased resistance. The control group performed expiratory muscle training using the same protocol and a fixed resistance. MAIN MEASURES Spirometric indices, maximum inspiratory pressure, maximum expiratory pressure, and peak cough flow during voluntary and reflex cough were assessed before and at two months after training. RESULTS The magnitude of increase in maximum expiratory pressure ( \( d = 1.40 \) ) and voluntary peak cough flow ( \( d = 0.89 \) ) was greater for the expiratory muscle-training group in comparison to the control group. Reflex peak cough flow had a moderate effect ( \( d = 0.27 \) ) in the expiratory group in comparison to the control group. Slow vital capacity ( \( d = 0.13 \) ) and forced vital capacity ( \( d = 0.02 \) ) had trivial effects in the expiratory versus the control group. CONCLUSIONS: Two months of expiratory muscle-training program was more beneficial than inspiratory muscle-training program for improving maximum expiratory pressure and voluntary peak cough flow in patients with Parkinson's disease.

Database: Medline

78. Can telerehabilitation games lead to functional improvement of upper extremities in individuals with Parkinson's disease?

Author(s): Cikajlo, Imre; Hukić, Alma; Dolinšek, Irena; Zajc, Dejana; Vesel, Mateja; Krizmanič, Tatjana; Blažica, Bojan; Biasizzo, Anton; Novak, Franc; Peterlin Potisk, Karmen

Source: International Journal of Rehabilitation Research; Sep 2018; vol. 41 (no. 3); p. 230-238

Publication Date: Sep 2018

Publication Type(s): Academic Journal
Abstract: Parkinson’s disease (PD) is treated by medication, less with deep brain stimulation and physiotherapy. Different opinions on the clinical meaningfulness of the physiotherapy or recommended intensive physiotherapy were found. Our objectives were to design intensive target-based physiotherapy for upper extremities suitable for telerehabilitation services and examine the clinical meaningfulness of the exergaming at an unchanged medication plan. A telerehabilitation exergaming system using the Kinect sensor was developed; 28 patients with PD participated in the study. The system followed the participants’ movements and adapted the difficulty level of the game in real time. The outcomes of the study showed that seven out of 26 participants could set up the equipment at home alone. Clinical outcomes of Box and Blocks Test (mean: 47 vs. 52, P =0.002, Cohen’s d =0.40), UPDRS III (mean: 27 vs. 29, P =0.001, d =0.22), and daily activity Jebsen’s test; writing a letter (mean: 24.0 vs. 20.6, P =0.003, d =0.23); and moving light objects (mean: 4.4 vs. 3.9, P =0.006, d =0.46) were statistically significant (P <0.05) and considered clinically meaningful. The Nine-Hole Peg Test showed a statistically nonsignificant improvement (mean: 28.0 vs. 26.5, P =0.089, d =0.22). The participants claimed problems with mobility but less with activities of daily living and emotional well-being (PDQ-39). The findings lead to preliminary conclusions that exergaming is feasible, but may require technical assistance, whereas clinically meaningful results could be achieved according to validated instruments and an unchanged medication plan in individuals with PD.

Database: CINAHL

79. Breath-stacking and incentive spirometry in Parkinson’s disease: Randomized crossover clinical trial.

Author(s): Ribeiro, Rhayssa; Brandão, Daniella; Noronha, Jéssica; Lima, Cibelle; Fregonezi, Guilherme; Resqueti, Vanessa; Dornelas de Andrade, Arméle

Source: Respiratory physiology & neurobiology; Sep 2018; vol. 255; p. 11-16

Publication Date: Sep 2018

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 29727719

Abstract: Patients with Parkinson's disease often exhibit respiratory disorders and there are no Respiratory Therapy protocols which are suggested as interventions in Parkinson's patients. The aim of this study is to evaluate the effects of Breathing-Stacking (BS) and incentive spirometer (IS) techniques in volume variations of the chest wall in patients with Parkinson’s Disease (PD). 14 patients with mild-moderate PD were included in this randomized cross-over study. Volume variations of the chest wall were assessed before, immediately after, then 15 and 30 min after BS and IS performance by optoelectronic plethysmography. Tidal volume (VT) and minute ventilation (MV) significantly increased after BS and IS techniques (p < 0.05). There was greater involvement of pulmonary and abdominal compartments after IS. The results suggest that these re-expansion techniques can be performed to immediately improve volume.

Database: Medline

80. Long-term effect of low frequency stimulation of STN on dysphagia, freezing of gait and other motor symptoms in PD.
**Abstract:**

OBJECTIVE: To evaluate the long-term effect of 60 Hz stimulation of the subthalamic nucleus (STN) on dysphagia, freezing of gait (FOG) and other motor symptoms in patients with Parkinson's disease (PD) who have FOG at the usual 130 Hz stimulation.

METHOD: This is a prospective, sequence randomised, crossover, double-blind study. PD patients with medication refractory FOG at 130 Hz stimulation of the STN were randomised to the sequences of 130 Hz, 60 Hz or deep brain stimulation off to assess swallowing function (videofluoroscopic evaluation and swallowing questionnaire), FOG severity (stand-walk-sit test and FOG questionnaire) and motor function (Unified PD Rating Scale, Part III motor examination (UPDRS-III)) at initial visit (V1) and follow-up visit (V2, after being on 60 Hz stimulation for an average of 14.5 months), in their usual medications on state. The frequency of aspiration events, perceived swallowing difficulty and FOG severity at 60 Hz compared with 130 Hz stimulation at V2, and their corresponding changes at V2 compared with V1 at 60 Hz were set as primary outcomes, with similar comparisons in UPDRS-III and its subscores as secondary outcomes.

RESULTS: All 11 enrolled participants completed V1 and 10 completed V2. We found the benefits of 60 Hz stimulation compared with 130 Hz in reducing aspiration frequency, perceived swallowing difficulty, FOG severity, bradykinesia and overall axial and motor symptoms at V1 and persistent benefits on all of them except dysphagia at V2, with overall decreasing efficacy when comparing V2 to V1.

CONCLUSIONS: The 60 Hz stimulation, when compared with 130 Hz, has long-term benefits on reducing FOG, bradykinesia and overall axial and motor symptoms except dysphagia, although the overall benefits decrease with long-term use.

**CLINICAL TRIAL REGISTRATION:** NCT02549859; Pre-results.

**Database:** Medline

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**Author(s):** Winser, Stanley John; Tsang, William Wn; Krishnamurthy, Karthikeyan; Kannan, Priya

**Source:** Clinical rehabilitation; Sep 2018; vol. 32 (no. 9); p. 1157-1168

**Publication Date:** Sep 2018

**Publication Type(s):** Meta-analysis Journal Article Systematic Review

**PubMedID:** 29737198

**Abstract:**

OBJECTIVE: To evaluate the effect of Tai Chi on balance and reducing falls incidence in neurological disorders.

DATA SOURCES: AMED, Embase, Web of Science, SCOPUS, EBSCO and Medline from inception until February 2018.

REVIEW METHODS: Randomized controlled trials of Tai Chi compared with active or no treatment control, measuring balance with the Berg Balance Scale or the Timed Up and Go Test and number of falls in neurological disorders were included. Methodological quality was assessed using PEDro and quality of evidence using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system.

RESULTS: A total of 10 studies involving 720 participants were reviewed. Seven studies were in Parkinson's disease and three in stroke. Seven studies were of high methodological quality and three were low. Meta-analyses of balance...
measured with the Timed Up and Go Test in Parkinson's disease revealed a statistically significant effect of Tai Chi compared to no treatment (weighted mean difference (WMD), -2.13; 95% confidence interval (CI), -3.26 to -1.00; P < 0.001) and was insignificant (WMD, -0.19; 95% CI, -1.74 to 1.35; P = 0.81) when compared with active treatment. Tai Chi significantly reduced falls incidence in Parkinson's disease (odds ratio (OR), 0.47; 95% CI, 0.29 to 0.77; P = 0.003) and stroke (OR, 0.21; 95% CI, 0.09 to 0.48; P < 0.001). Balance measured with the Timed Up and Go Test comparing Tai Chi and active treatment was insignificant (WMD, 0.45; 95% CI, -3.43 to 2.54; P = 0.77) in stroke.

CONCLUSION Tai Chi is effective in reducing falls incidence in Parkinson's disease and stroke. This systematic review did not find high-quality studies among other neurological disorders.

Database: Medline

82. Long term follow-up study of non-invasive brain stimulation (NBS) (rTMS and tDCS) in Parkinson’s disease (PD). Strong age-dependency in the effect of NBS.

Author(s): Málly, Judit; Stone, Trevor W; Sinkó, Gabriella; Geisz, Noémi; Dinya, Elek

Source: Brain research bulletin; Sep 2018; vol. 142 ; p. 78-87

Publication Date: Sep 2018

Publication Type(s): Journal Article

PubMedID: 29958911

Available at Brain research bulletin - from Unpaywall

Abstract: BACKGROUND Transcranial magnetic stimulation (rTMS) may influence the progression of PD compared with levodopa. The long term mind modification effect of repeated rTMS and tDCS is not known, nor are the predictors for the effect of NBS. OBJECTIVE/HYPOTHESIS We hypothesized that the regularly repeated rTMS would decrease the development of PD. Later, the treatment protocol was completed with transcranial direct current stimulation (tDCS), supposing that there is an add-on effect. NBS may differently influence motor and mental aspects of the disease. METHOD Thirty patients with PD were followed for 3.5 years in an open study. They were stimulated with 1 Hz rTMS every half year for 1.5 years. After that the tDCS was added to the stimulation over both sides of the cerebellum for the next 2 years. UPDRS, Trail Making Test and dual tests were used. The linear regression lines of score systems and percentage of yearly increase were counted, analyzed by ANOVA. RESULTS The yearly progression rate for UPDRS total was 2% for 3.5 years, 0.6% ≤65 years, 3.6% >65 years. The increment was around zero during the rTMS + tDCS stimulations in patients ≤65 years. The slope of the equation showed the same tendency. The individual sensitivity to the NBS was high. tTMS and tDCS >65 yrs improved pathological executive function (p 65 years. The cognitive function of patients >65 yrs was favorable influenced by rTMS and tDCS. Age is the main predictor of the effect of NBS. rTMS and tDCS can slow the progression of PD without any side effects but in an age-dependent way.

Database: Medline

83. Subthalamic Stimulation Improves Quality of Life of Patients Aged 61 Years or Older With Short Duration of Parkinson’s Disease.

Author(s): Dafsari, Haidar Salimi; Reker, Paul; Silverdale, Monty; Reddy, Prashanth; Pilleri, Manuela; Martinez-Martin, Pablo; Rizos, Alexandra; Perrier, Estelle; Weiß, Luisa; Ashkan, Keyoumars; Samuel, Michael; Evans, Julian; Visser-Vandewalle, Veerle; Antonini, Angelo; Ray-Chaudhuri, Kallo; Timmermann, Lars; EUROPAR and the IPMDS Non-Motor PD Study Group

Source: Neuromodulation : journal of the International Neuromodulation Society; Aug 2018; vol. 21 (no. 6); p. 532-540
Abstract: OBJECTIVE The optimal timing of subthalamic nucleus (STN) deep brain stimulation (DBS) in Parkinson's disease (PD) is a topic of ongoing debate. In patients with short disease duration an improvement of quality of life (QoL) has been demonstrated for patients aged younger than 61 years. However, this has not been systematically investigated in older patients yet. We hypothesized that patients aged 61 years or older experience a significant QoL improvement after STN-DBS with no difference in effect sizes for groups of patients with short and longer disease duration.

MATERIALS AND METHODS From four centers (Cologne, London, Manchester, Venice) we identified "older patients" aged 61 years or older with short (<8 years) or longer disease duration and compared QoL, motor impairment, complications, medication requirements, and Mini-Mental State Examination (MMSE) on baseline and five months after surgery.

RESULTS Mean age/disease duration in 21 subjects with short disease duration were 65.5/6.3 years compared to 66.8/14.6 in 33 subjects with longer disease duration. The short disease duration group was affected by less baseline motor complications (p = 0.002). QoL in the short/longer disease duration group improved by 35/20% (p = 0.010/p = 0.006), motor complications by 40/44% (p = 0.018/p < 0.001), and medication requirements by 51/49% (both p ≤ 8 years) disease duration. Our results contribute to the debate about DBS selection criteria and timing and call for prospective confirmation in a larger cohort.

Database: Medline

84. Subthalamic stimulation and neuropsychiatric symptoms in Parkinson's disease: results from a long-term follow-up cohort study.

Author(s): Abbes, Marie; Lhommée, Eugénie; Thobois, Stéphane; Klinger, Hélène; Schmitt, Emmanuelle; Bichon, Amélie; Castrioto, Anna; Xie, Jing; Fraix, Valérie; Kistner, Andrea; Pélissier, Pierre; Seigneuret, Éric; Chabardès, Stéphan; Mertens, Patrick; Broussolle, Emmanuel; Moro, Elena; Krack, Paul

Source: Journal of neurology, neurosurgery, and psychiatry; Aug 2018; vol. 89 (no. 8); p. 836-843

Abstract: BACKGROUND Reports on behavioural outcomes after subthalamic nucleus deep brain stimulation in Parkinson's disease are controversial and limited to short-term data. Long-term observation in a large cohort allows a better counselling and management. METHODSTo determine whether a long-term treatment with subthalamic stimulation induces or reduces impulse control behaviours, neuropsychiatric fluctuations and apathy, 69 patients treated with subthalamic stimulation are prospectively and retrospectively assessed using Arduin Scale of Behavior in Parkinson's Disease before and after 3-10 years of stimulation. RESULTS At a mean follow-up of 6 years, all impulse control disorders and dopaminergic addiction were significantly decreased, apart from eating behaviour and hypersexuality. Neuropsychiatric fluctuations also significantly improved (ON euphoria: 38% of the patients before surgery and 1% after surgery, P<0.01; OFF dysphoria: 39% of the patients before surgery and 10% after surgery, P<0.01). However, apathy increased (25% of the patients after surgery and 3% before, P<0.01). With the retrospective analysis, several transient episodes of depression, apathy, anxiety and impulse control disorders
occurred. CONCLUSIONS Bilateral subthalamic nucleus stimulation was overall very effective in improving impulse control disorders and neuropsychiatric fluctuations in parkinsonian patients in the long term despite a counteracting frequent apathy. Transient episodes of impulse control disorders still occurred within the follow-up. These findings recommend a close follow-up in parkinsonian patients presenting with neuropsychiatric symptoms before deep brain stimulation surgery. CLINICAL TRIAL REGISTRATION NCT01705418; Post-results.

Database: Medline

85. Efficacy of intensive multidisciplinary rehabilitation in Parkinson's disease: a randomised controlled study.
Author(s): Ferrazzoli, Davide; Ortelli, Paola; Zivi, Ilaria; Cian, Veronica; Urso, Elisa; Ghilardi, Maria Felice; Maestri, Roberto; Frazzitta, Giuseppe
Source: Journal of neurology, neurosurgery, and psychiatry; Aug 2018; vol. 89 (no. 8); p. 828-835
Publication Date: Aug 2018
Publication Type(s): Randomized Controlled Trial Journal Article
PubMedID: 29321141
Available at Journal of neurology, neurosurgery, and psychiatry - from BMJ Journals - NHS
Available at Journal of neurology, neurosurgery, and psychiatry - from ProQuest (Health Research Premium) - NHS Version
Available at Journal of neurology, neurosurgery, and psychiatry - from Unpaywall
Abstract: OBJECTIVE To evaluate whether a 4-week multidisciplinary, aerobic, motor-cognitive and intensive rehabilitation treatment (MIRT) improves the quality of life (QoL) of patients with Parkinson's disease (PD), in the short-term and long-term period. METHOD This is a prospective, parallel-group, single-centre, single-blind, randomised clinical trial (ClinicalTrials.gov NCT02756676). 186 patients with PD, assigned to experimental group, underwent MIRT; conversely, 48 patients, assigned to control group, did not receive rehabilitation. Parkinson's Disease Questionnaire-39 was assessed 2 (T0), 10 (T1) and 18 (T2, only experimental group) weeks after the enrolment. We compared T1 versus T0 scores within subjects and delta scores (T1 - T0) between subjects. To investigate the long-term effects, we compared T2 and T0 scores in the experimental group. RESULTS At T0, no between-group differences in the Global Index Score (GBI) were observed (experimental group: 43.6±21.4, controls: 41.6±22.9, P=0.50). At T1, we did not find significant changes in controls (delta score: 1.2±9.9, P=0.23), and we found an improvement in GBI in the experimental group (delta score: -8.3±18.0, P<0.0001), significant also between subjects (P<0.0001). Comparing T2 versus T0 in the experimental group, the GBI maintained a significant improvement (delta score: -4.8±17.5, P<0.0001). CONCLUSIONS: A rehabilitation treatment such as MIRT could improve QoL in patients with PD in the short-term and long-term period. Even though the single-blind design and the possible role of the placebo effect on the conclusive results must be considered as limitations of this study, the improvement in outcome measure, also maintained after a 3-month follow-up period, suggests the effectiveness of MIRT on the QoL. CLINICAL TRIAL REGISTRATION NCT02756676: Pre-results.
Database: Medline

Author(s): Joseph, Conran; Leavy, Breifnni; Mattsson, Sara; Falk, Lynn; Franzén, Erika
BACKGROUND Translating evidence into practice requires adaptation to facilitate the implementation of efficacious interventions. A novel highly challenging balance training program (HiBalance) was found to improve gait, balance, and physical activity in persons with Parkinson's disease (PD) in an earlier randomized controlled trial. This study aimed to describe the adaptation process and feasibility of implementing the HiBalance program for PD within primary healthcare settings.

METHOD Feasibility was assessed in terms of study processes and scientific evaluation. Nine persons with mild-moderate PD were enrolled in this pre-post feasibility study. The dose of the original program was adapted by reducing therapist-led training sessions from three to two times weekly. Outcome measures were substituted with ones more clinically feasible. One group (n = 5) received HiBalance training three times weekly for 10 weeks while another (n = 4) trained twice weekly plus a once weekly home exercise program (HEP). Balance performance was the primary outcome, while secondary outcomes (e.g., gait speed, physical activity level, concerns of falling, and health-related quality of life) were also evaluated.

RESULTS Regarding process feasibility, attendance was high (approximately 90%) in both groups, and experiences of the group and home training were positive. Newly selected outcome measures were feasible. The scientific evaluation revealed few adverse events and no serious injuries occurred. Concerning outcomes per group, the average change in balance performance and gait speed was equal to, or exceeded, the minimally worthwhile treatment effect commonly used in PD.

CONCLUSION The findings support the feasibility, in terms of process and scientific evaluation, of the adapted HiBalance program for implementation within clinical settings. A sufficiently powered study is required to ascertain whether the newly proposed program offers similar short and long-term effects as the original program.

Database: Medline

87. Effects of deep brain stimulation on rest tremor progression in early stage Parkinson disease.

Author(s): Hacker, Mallory L; DeLong, Mahlon R; Turchan, Maxim; Heusinkveld, Lauren E; Ostrem, Jill L; Molinari, Anna L; Currie, Amanda D; Konrad, Peter E; Davis, Thomas L; Phibbs, Fenna T; Hedera, Peter; Cannard, Kevin R; Drye, Lea T; Sternberg, Alice L; Shade, David M; Tonascia, James; Charles, David

Source: Neurology; Jul 2018; vol. 91 (no. 5); p. e463

Publication Date: Jul 2018

Publication Type(s): Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Randomized Controlled Trial Journal Article

PubMedID: 29959266

Available at Neurology - from Unpaywall

Abstract: OBJECTIVE To evaluate whether the progression of individual motor features was influenced by early deep brain stimulation (DBS), a post hoc analysis of Unified Parkinson's Disease Rating Scale-III (UPDRS-III) score (after a 7-day washout) was conducted from the 2-year DBS in early Parkinson disease (PD) pilot trial dataset.

METHODS The prospective pilot trial enrolled patients with PD aged 50-75 years, treated with PD medications for 6 months-4 years, and no history of dyskinesia or other motor fluctuations, who were randomized to receive optimal drug therapy (ODT) or DBS plus ODT (DBS + ODT). At baseline and 6, 12, 18, and 24 months, all patients stopped all PD therapy
for 1 week (medication and stimulation, if applicable). UPDRS-III "off" item scores were compared between the ODT and DBS + ODT groups (n = 28); items with significant between-group differences were analyzed further. RESULTS UPDRS-III "off" rest tremor score change from baseline to 24 months was worse in patients receiving ODT vs DBS + ODT (p = 0.002). Rest tremor slopes from baseline to 24 months favored DBS + ODT both "off" and "on" therapy (p < 0.001, p = 0.003, respectively). More ODT patients developed new rest tremor in previously unaffected limbs than those receiving DBS + ODT (p = 0.001). CONCLUSION These results suggest the possibility that DBS in early PD may slow rest tremor progression. Future investigation in a larger cohort is needed, and these findings will be tested in the Food and Drug Administration-approved, phase III, pivotal, multicenter clinical trial evaluating DBS in early PD. CLASSIFICATION OF EVIDENCE This study provides Class II evidence that for patients with early PD, DBS may slow the progression of rest tremor.

Database: Medline

88. Sensorimotor integration training in Parkinson’s disease.

Author(s): Fil-Balkan, Ayla; Salci, Yeliz; Keklice, Hilal; Armutlu, Kadriye; Aksoy, Songul; Kayihan, Hulya; Elibol, Bulent

Source: Neurosciences (Riyadh, Saudi Arabia); Jul 2018; vol. 23 (no. 4); p. 208-215

Publication Date: Jul 2018

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 30007996

Available at Neurosciences (Riyadh, Saudi Arabia) - from Unpaywall

Abstract: OBJECTIVE To determine the effects of sensorimotor integration training on postural control in Parkinson’s disease. METHODS This prospective, randomized controlled trial was conducted at Hacettepe University (Ankara, Turkey). The study was carried out from August 2012 until March 2015 and included 24 Parkinson’s patients with stage 2-3 according to the Modified Hoehn&Yahr Rating Scale. The patients were divided into 2 groups (control and study). The control group received conventional physiotherapy; the study group received sensorimotor integration training combined with conventional physiotherapy, 2 times per week for 6 weeks. We assessed the patients with clinical balance tests and computerized dynamic posturography. Assessments were performed at baseline, 7- and 12-weeks follow-up. RESULTS Computerized dynamic posturography posturography values (5th and 6th positions, composite balance, and vestibular system scores) were higher in the study group than in the control group. The improvements were maintained at the 12-week follow-up except 6th positions scores (p<0.05). CONCLUSION: Sensorimotor integration training combined with conventional physiotherapy approach ameliorated postural control by improving vestibular system in patients with Parkinson’s disease by improving sensory processes.

Database: Medline


Author(s): Blomstedt, Patric; Stenmark Persson, Rasmus; Hariz, Gun-Marie; Linder, Jan; Fredricks, Anna; Hägström, Björn; Philipsson, Johanna; Forsgren, Lars; Hariz, Marwan

Source: Journal of neurology, neurosurgery, and psychiatry; Jul 2018; vol. 89 (no. 7); p. 710-716

Publication Date: Jul 2018

Publication Type(s): Research Support, Non-u.s. Gov't Comparative Study Randomized Controlled Trial Journal Article
Abstract: BACKGROUND Several open-label studies have shown good effect of deep brain stimulation (DBS) in the caudal zona incerta (cZi) on tremor, including parkinsonian tremor, and in some cases also a benefit on akinesia and axial symptoms. The aim of this study was to evaluate objectively the effect of cZi DBS in patients with Parkinson’s disease (PD).

METHOD 25 patients with PD were randomised to either cZi DBS or best medical treatment. The primary outcomes were differences between the groups in the motor scores of the Unified Parkinson’s Disease Rating Scale (UPDRS-III) rated single-blindly at 6 months and differences in the Parkinson’s Disease Questionnaire 39 items (PDQ-39). 19 patients, 10 in the medical arm and 9 in the DBS arm, fulfilled the study.

RESULTSThe DBS group had 41% better UPDRS-III scores off-medication on-stimulation compared with baseline, whereas the scores of the non-surgical patients off-medication were unchanged. In the on-medication condition, there were no differences between the groups, neither at baseline nor at 6 months. Subitems of the UPDRS-III showed a robust effect of cZi DBS on tremor. The PDQ-39 domains 'stigma' and 'ADL' improved only in the DBS group. The PDQ-39 summary index improved in both groups.

CONCLUSION This is the first randomised blinded evaluation of cZi DBS showing its efficacy on PD symptoms. The most striking effect was on tremor; however, the doses of dopaminergic medications could not be decreased. cZi DBS in PD may be an addition to existing established targets, enabling tailoring the surgery to the needs of the individual patient.

Database: Medline

90. Awake versus asleep deep brain stimulation for Parkinson's disease: a critical comparison and meta-analysis.

Author(s): Ho, Allen L; Ali, Rohaid; Connolly, Ian D; Henderson, Jaimie M; Dhall, Rohit; Stein, Sherman C; Halpern, Casey H

Source: Journal of neurology, neurosurgery, and psychiatry; Jul 2018; vol. 89 (no. 7); p. 687-691

Publication Date: Jul 2018

Publication Type(s): Meta-analysis Comparative Study Journal Article

PubMedID: 28250028

Abstract: OBJECTIVE No definitive comparative studies of the efficacy of 'awake' deep brain stimulation (DBS) for Parkinson's disease (PD) under local or general anaesthesia exist, and there remains significant debate within the field regarding differences in outcomes between these two techniques. METHODS We conducted a literature review and meta-analysis of all published DBS for PD studies (n=2563) on PubMed from January 2004 to November 2015. Inclusion criteria included patient number >15, report of precision and/or clinical outcomes data, and at least 6 months of follow-up. There were 145 studies, 16 of which were under general anaesthesia. Data were pooled using an inverse-variance weighted, random effects meta-analytic model for observational data. RESULTS There was no significant difference in mean target error between local and general anaesthesia, but there was a significantly less mean number of DBS lead passes with general anaesthesia (p=0.006). There were also significant decreases in DBS complications, with fewer
intracerebral haemorrhages and infections with general anaesthesia (p<0.001). There were no
significant differences in Unified Parkinson's Disease Rating Scale (UPDRS) Section II scores off
medication, UPDRS III scores off and on medication or levodopa equivalent doses between the two
techniques. Awake DBS cohorts had a significantly greater decrease in treatment-related side effects
as measured by the UPDRS IV off medication score (78.4% awake vs 59.7% asleep,
p=0.022).CONCLUSIONSOur meta-analysis demonstrates that while DBS under general anaesthesia
may lead to lower complication rates overall, awake DBS may lead to less treatment-induced side
effects. Nevertheless, there were no significant differences in clinical motor outcomes between the
two techniques. Thus, DBS under general anaesthesia can be considered at experienced centres in
patients who are not candidates for traditional awake DBS or prefer the asleep alternative.

Database: Medline

91. Motor outcome and electrode location in deep brain stimulation in Parkinson's disease.

Author(s): Koivu, Maija; Huotarinen, Antti; Scheperjans, Filip; Laakso, Aki; Kivisaari, Riku; Pekkonen,
Eero

Source: Brain and behavior; Jul 2018; vol. 8 (no. 7); p. e01003

Publication Date: Jul 2018

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

PubMedID: 29851316

Available at Brain and behavior - from Europe PubMed Central - Open Access

Abstract:Objectives: To evaluate the efficacy and adverse effects of subthalamic deep brain
stimulation (STN-DBS) in patients with advanced Parkinson's disease (PD) and the possible
correlation between electrode location and clinical outcome.Methods: We retrospectively reviewed
87 PD-related STN-DBS operations at Helsinki University Hospital (HUH) from 2007 to 2014. The
changes of Unified Parkinson's Disease Rating Scale (UPDRS) part III score, Hoehn & Yahr stage,
antiparkinson medication, and adverse effects were studied. We estimated the active electrode
location in three different coordinate systems: direct visual analysis of MRI correlated to brain atlas,
location in relation to the nucleus borders and location in relation to the midcommissural
point. Results: At 6 months after operation, both levodopa equivalent doses (LEDs; 35%, Wilcoxon
signed-rank test = 0.000) and UPDRS part III scores significantly decreased (38%, Wilcoxon signed-
rank test = 0.000). Four patients (5%) suffered from moderate DBS-related dysarthria. The generator
and electrodes had to be removed in one patient due to infection (1%). Electrode coordinates in the
three coordinate systems correlated well with each other. On the left side, more ventral location of
the active contact was associated with greater LED decrease. Conclusions: STN-DBS improves motor
function and enables the reduction in antiparkinson medication with an acceptable adverse effect
profile. More ventral location of the active contact may allow stronger LED reduction. Further
research on the correlation between contact location, clinical outcome, and LED reduction is
warranted.

Database: Medline

92. Effects of Wrist Weights on Kinematic and Myographic Movement Characteristics During a
Reaching Task in Individuals With Parkinson Disease.

Author(s): Li, Kuan-Yi; Hsiao, Yu-Pei; Chen, Rou- Shayn; Wu, Ching-Yi

Source: Archives of physical medicine and rehabilitation; Jul 2018; vol. 99 (no. 7); p. 1303-1310
OBJECTIVE To investigate the kinematic and myographic effects of weighted wrist cuffs on individuals with Parkinson disease (PD) during a reaching task.

DESIGN Cross-sectional study.

SETTING Biomechanics research laboratory.

PARTICIPANTS Individuals (N=39) with PD (n=19) and healthy age-matched control subjects (n=20).

INTERVENTIONS Participants were instructed to reach and grasp a can at a distance of 80% of their arm length without a wrist cuff, while wearing separate 0.5- and 1.0-kg wrist cuffs, and subsequently without a wrist cuff.

MAIN OUTCOME MEASURES Movement time, kinematic, and electromyographic data were recorded during all reach and grasp movements. Four end point coordinate strategy variables, 3 joint recruitment variables, and 2 co-contraction indices were derived from the raw data for analysis.

RESULTS Significant interaction effects were found in the trunk and index finger movement time as the weight of the cuff increased from 0.5 to 1.0 kg. The group of individuals with PD showed decreased movement times in both instances, whereas the control group showed increased movement times as the weight of the wrist cuff increased from baseline to 0.5 and 1.0 kg. No group difference was observed in the co-contraction index of the upper arm and forearm.

CONCLUSIONS Adoption of weighted wrist cuffs in the clinic should be cautiously undertaken because compensatory movements may be induced in the trunk of individuals with PD.

Database: Medline


Author(s): Dos Santos Delabary, Marcela; Komeroski, Isabel Giovannini; Monteiro, Elren Passos; Costa, Rochelle Rocha; Haas, Aline Nogueira

Source: Aging clinical and experimental research; Jul 2018; vol. 30 (no. 7); p. 727-735

Publication Date: Jul 2018

Publication Type(s): Meta-analysis Journal Article Review Systematic Review

PubMedID: 28980176

Available at Aging clinical and experimental research - from ProQuest (Health Research Premium) - NHS Version

Abstract: BACKGROUND Patients with Parkinson's Disease (PD) undergo motor injuries, which decrease their quality of life (QL). Dance, added to drug therapy, can help treating these patients. AIM: To conduct a systematic review with meta-analysis with the aim to analyze the effects of dance classes in comparison to other interventions or to the absence of intervention, in randomized clinical trials (RCTs), on functional mobility, motor symptoms and QL of PD patients. METHODS: The search was conducted in MEDLINE, LILACS, SciELO, Cochrane and PsycINFO (last searched in August 2017). RCTs analyzing dance effects in comparison to other physical training types or to no intervention, on functional mobility, motor symptoms and QL of PD patients were selected. The outcomes assessed were motor symptoms with Unified PD Rating Scale III (UPDRSIII), functional mobility with Timed Up and Go Test (TUG), endurance with 6 min walking test (6MWT), freezing of gait with Freezing of Gait Questionnaire (FOG_Q), walking velocity with GAITRite and QL with PD Questionnaire (PDQ39). Two reviewers independently extracted methodological quality and studies data. Results are presented as weighted mean differences. RESULTS Five RCTs were included, totaling 159 patients. Dance promoted significant improvements on UPDRSIII, and a decrease in TUG time when compared to other types of exercise. In comparison to the absence of intervention, dance
practice also showed significant improvements in motor scores. CONCLUSION: Dance can improve motor parameters of the disease and patients' functional mobility.

Database: Medline


Author(s): Ortiz-Rubio, Araceli; Cabrera-Martos, Irene; Torres-Sánchez, Irene; Casilda-López, Jesús; López-López, Laura; Valenza, Marie Carmen

Source: Medicina clinica; Jun 2018; vol. 150 (no. 12); p. 460-464

Publication Date: Jun 2018

Publication Type(s): Comparative Study Randomized Controlled Trial Journal Article

PubMedID: 29173985

Abstract: INTRODUCTION AND OBJECTIVE Fatigue and balance impairment leads to a loss of independence and are important to adequately manage. The objective of this study was to examine the effects of a resistance training program on dynamic balance and fatigue in patients with Parkinson's disease (PD). PATIENTS AND METHODS Randomized controlled trial. Forty-six patients with PD were randomly allocated to an intervention group receiving a 8-week resistance training program focused on lower limbs or to a control group. Balance was assessed using the Mini-BESTest and fatigue was assessed by the Piper Fatigue Scale. RESULTS Patients in the intervention group improved significantly (p<0.05) on dynamic balance (reactive postural control and total values) and perceived fatigue. CONCLUSIONS: An 8-week resistance training program was found to be effective at improving dynamic balance and fatigue in patients with PD.

Database: Medline


Author(s): Walker, Nikki; Cross, Jane

Source: International Journal of Therapy & Rehabilitation; May 2018; vol. 25 (no. 5); p. 223-233

Publication Date: May 2018

Publication Type(s): Academic Journal

Abstract: Background/Aims: To explore the experiences and perceptions of physiotherapists involved in the care of people with Parkinson's disease and respiratory compromise. Methods: This exploratory qualitative study recruited four physiotherapists who participated in a focus group and completed reflective diaries over a 3-month period. Experiences were explored using Interpretative Phenomenological Analysis. Findings: The study highlights three key themes: application of professional knowledge, application of clinical decision making and challenges to application of care. Conclusions: The results demonstrate sensitive awareness in caring for a dependent and vulnerable population whose key motor signs, compounded by ageing are perceived as influencing the presentation of respiratory compromise. There are descriptions of a reactive response to illness, alongside reflections on the challenges faced when asserting autonomy and recognising where the role of physiotherapy fits within the multidisciplinary team. Sputum clearance is perceived as being a key aspect of this role, although there is uncertainty with regard to the effectiveness and appropriateness of treatment options. Multiple perceived challenges to care provision are
highlighted, with key concerns surrounding clinician and patient knowledge levels, maintenance of patient mobility, person-centred care and clarity in the direction of care.

**Database:** CINAHL

96. **Treadmill walking reduces pre-frontal activation in patients with Parkinson's disease.**

**Author(s):** Thumm, Pablo Cornejo; Maidan, Inbal; Brozgol, Marina; Shustak, Shiran; Gazit, Eran; Shema Shiratzki, Shirley; Bernad-Elazari, Hagar; Beck, Yoav; Giladi, Nir; Hausdorff, Jeffrey M; Mirelman, Anat

**Source:** Gait & posture; May 2018; vol. 62; p. 384-387

**Publication Date:** May 2018

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article

**PubMedID:** 29626840

**Abstract:** BACKGROUND Among patients with Parkinson's disease (PD), gait is typically disturbed and less automatic. These gait changes are associated with impaired rhythmicity and increased prefrontal activation, presumably in an attempt to compensate for reduced automaticity. RESEARCH QUESTION We investigated whether during treadmill walking, when the pace is determined and fixed, prefrontal activation in patients with PD is lower, as compared to over-ground walking. METHOD Twenty patients with PD (age: 69.8 ± 6.5 yrs.; MoCA: 26.9 ± 2.4; disease duration: 7.9 ± 4.2 yrs) walked at a self-selected walking speed over-ground and on a treadmill. A wireless functional near infrared spectroscopy (fNIRS) system measured prefrontal lobe activation, i.e., oxygenated hemoglobin (Hb02) in the pre-frontal area. Gait was evaluated using 3D-accelerometers attached to the lower back and ankles (Opal™, APDM). Dynamic gait stability was assessed using the maximum Lyapunov exponent to investigate automaticity of the walking pattern. RESULTS Hb02 was lower during treadmill walking than during over-ground walking (p = 0.001). Gait stability was greater on the treadmill, compared to over-ground walking, in both the anteroposterior and medio-lateral axes (p < 0.001). SIGNIFICANCE These findings support the notion that when gait is externally paced, prefrontal lobe activation is reduced in patients with PD, perhaps reflecting a reduced need for compensatory cognitive mechanisms.

**Database:** Medline

97. **Lee Silverman Voice Treatment (LSVT)-BIG to improve motor function in people with Parkinson's disease: a systematic review and meta-analysis.**

**Author(s):** McDonnell, Michelle N; Rischbieth, Briony; Schammer, Tenille T; Seaforth, Chantel; Shaw, Alex J; Phillips, Anna C

**Source:** Clinical rehabilitation; May 2018; vol. 32 (no. 5); p. 607-618

**Publication Date:** May 2018

**Publication Type(s):** Meta-analysis Journal Article Systematic Review

**PubMedID:** 28980476

**Abstract:** OBJECTIVE The technique called Lee Silverman Voice Treatment (LSVT)-LOUD has previously been used to improve voice quality in people with Parkinson's disease. The objective of this study was to assess the effectiveness of an alternate intervention, LSVT-BIG (signifying big movements), to improve functional mobility. DESIGN Systematic review with meta-analysis of randomized trials. DATA SOURCES Medline, Embase, CINAHL, AgeLine, Scopus and Cochrane Library were searched from inception to September 2017 using multiple search terms related to Parkinson's disease and LSVT-BIG. REVIEW METHOD Two researchers searched the literature for studies of the LSVT-BIG
intervention of 16 sessions, delivered by a certified instructor over four weeks, to any other intervention. Outcomes related to functional ability were included. Study quality was appraised using the Cochrane Risk of Bias tool.

RESULTS:
Four studies were included, reporting on three randomized trials of 84 participants with mild Parkinson's disease. Compared to physiotherapy exercises, or a shorter training protocol, there was a significant improvement in motor function assessed with the Unified Parkinson's Disease Rating Scale part III (mean difference = -3.20, 95% confidence interval = -5.18 to -1.23) and a trend towards faster Timed Up and Go performance (mean difference = -0.47, 95% confidence interval = -0.99 to 0.06) and 10-metre walk test (mean difference = -0.53, 95% confidence interval = -1.07 to 0.01). CONCLUSION: Compared to shorter format LSVT-BIG or general exercise, LSVT-BIG was more effective at improving motor function. This provides preliminary, moderate quality evidence that amplitude-oriented training is effective in reducing motor impairments for people with mild Parkinson's disease.

Database: Medline

98. Are functional mobility tests responsive to group physical therapy intervention in individuals with Parkinson’s disease?
Author(s): Spagnuolo, Gessyca; Faria, Christina D.C.M.; da Silva, Bruna Adriana; Ovando, Angélica Cristiane; Gomes-Osman, Joyce; Swarowsky, Alessandra
Source: NeuroRehabilitation; Apr 2018; vol. 42 (no. 4); p. 465-472
Publication Date: Apr 2018
Publication Type(s): Academic Journal

Abstract: BACKGROUND: The Timed up and go test (TUG), the Five times sit-to-stand test (FTSTS) and the Bed Mobility test (BMT) are widely used in clinical practice for Parkinson Disease (PD). However, no reported studies have evaluated the responsiveness to group physical therapy intervention (GPTI). OBJECTIVE: To verify if TUG, FTSTS and BMT were responsive to GPTI. METHODS: Thirty individuals with PD were assessed prior to and after an 8-week evidence-based GPTI. Paired t test was used to determine statistically significant change pre-and post-intervention. Internal responsiveness (IR) was classified with the standardized response mean (SRM). A 5-point Likert scale assessed self-perceived performance by the subjects after the intervention. Analysis of the receiver operating characteristic (ROC) curve was used to determine the accuracy and cut-off scores for identifying participants who had shown improvement. RESULTS: GPTI was efficient in improving real (p≤0.001) and self-perceived mobility performance in all measures. All tests were responsive to changes: the IR varied from medium to high (SRM = 0.7–1.5); the cut-off point for TUG test was >2.2 s, for FTSTS test was >2.5 s and for BM test >1.4 s. CONCLUSIONS: The TUG, FTSTS and BMT were responsive to the GPTI and accurately detected meaningful clinical changes. Our results provide an important information about the clinical application of these tests in PD individuals.

Database: CINAHL

Author(s): Dagan, Moria; Herman, Talia; Harrison, Rachel; Zhou, Junhong; Giladi, Nir; Ruffini, Giulio; Manor, Brad; Hausdorff, Jeffrey M
Source: Movement disorders : official journal of the Movement Disorder Society; Apr 2018; vol. 33 (no. 4); p. 642-646
Publication Date: Apr 2018
Publication Type(s): Research Support, Non-u.s. Gov’t Randomized Controlled Trial Video-audio Media Journal Article
BACKGROUND Recent findings suggest that transcranial direct current stimulation of the primary motor cortex may ameliorate freezing of gait. However, the effects of multitarget simultaneous stimulation of motor and cognitive networks are mostly unknown. The objective of this study was to evaluate the effects of multitarget transcranial direct current stimulation of the primary motor cortex and left dorsolateral prefrontal cortex on freezing of gait and related outcomes.

METHODS Twenty patients with Parkinson’s disease and freezing of gait received 20 minutes of transcranial direct current stimulation on 3 separate visits. Transcranial direct current stimulation targeted the primary motor cortex and left dorsolateral prefrontal cortex simultaneously, primary motor cortex only, or sham stimulation (order randomized and double-blinded assessments). Participants completed a freezing of gait-provoking test, the Timed Up and Go, and the Stroop test before and after each transcranial direct current stimulation session.

RESULTS Performance on the freezing of gait-provoking test (P = 0.010), Timed Up and Go (P = 0.006), and the Stroop test (P = 0.016) improved after simultaneous stimulation of the primary motor cortex and left dorsolateral prefrontal cortex, but not after primary motor cortex only or sham stimulation.

CONCLUSIONS Transcranial direct current stimulation designed to simultaneously target motor and cognitive regions apparently induces immediate aftereffects in the brain that translate into reduced freezing of gait and improvements in executive function and mobility. © 2018 International Parkinson and Movement Disorder Society.
living, depression, dyskinesias, and adverse events were compared. The influence of disease duration (a priori) and the proportion of male patients within a study (post hoc) were explored as potential subgroups. RESULTS Thirteen studies (6 original cohorts) were identified. No difference in motor scores or activities of daily living was identified at 36 months. Medications were significantly reduced with STN stimulation (5 studies, weighted mean difference [WMD] -365.46, 95% CI -599.48 to -131.44, p = 0.002). Beck Depression Inventory scores were significantly better with Gpi stimulation (3 studies; WMD 2.53, 95% CI 0.99-4.06 p = 0.001). The motor benefits of Gpi and STN DBS for PD are similar. CONCLUSIONS The motor benefits achieved with Gpi and STN DBS for PD are similar. DBS of STN allows for a greater reduction of medication, but not as significant an advantage as DBS of Gpi with respect to mood. This difference is sustained at 36 months. Further long-term studies are necessary.

**Database:** Medline

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101. **Effects of Ai Chi on balance, quality of life, functional mobility, and motor impairment in patients with Parkinson's disease.**

**Author(s):** Kurt, Emine Eda; Büyükturan, Buket; Büyükturan, Öznur; Erdem, Hatice Rana; Tuncay, Figen

**Source:** Disability and rehabilitation; Apr 2018; vol. 40 (no. 7); p. 791-797

**Publication Date:** Apr 2018

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 28084851

**Abstract:** PURPOSE: In this study, we aimed to investigate effects of Ai Chi on balance, functional mobility, health-related quality of life, and motor impairment in patients with Parkinson’s disease. METHOD: This study was conducted as an open-label randomized controlled trial (ISRCTN26292510) with repeated measures. Forty patients with Parkinson’s disease stages 2 to 3 according to the Hoehn and Yahr Scale were randomly allocated to either an Ai Chi exercise group or a land-based exercise control group for 5 weeks. Balance was measured using the Biodex 3,1 and the Berg Balance Scale. Functional mobility was evaluated using the Timed Up and Go Test. Additionally, health-related quality of life and motor activity were assessed with the Parkinson’s Disease Questionnaire-39 and the Unified Parkinson’s Disease Rating Scale–III. RESULTS: Although patients in both groups showed significant improvement in all outcome variables, improvement of dynamic balance was significantly greater in the Ai Chi group (p < 0.001), Berg Balance Scale (p < 0.001), Timed Up and Go Test (p = 0.002), Parkinson’s Disease Questionnaire-39 (p < 0.001), Unified Parkinson’s Disease Rating Scale–III (p < 0.001). CONCLUSION: Our results suggest that an Ai Chi exercise program improves balance, mobility, motor ability, and quality of life. In addition, Ai Chi exercise was more effective as an intervention than land-based exercise in patients with mild to moderate Parkinson’s disease. Implications for rehabilitation Ai Chi exercises (aquatic exercises) may help improve balance, functional mobility, health-related quality of life, and motor ability in patients with mild to moderate Parkinson’s disease more efficiently than similar land-based exercises. Ai Chi exercises should be considered as a rehabilitation option for treatment of patients with mild or moderate Parkinson’s disease.

**Database:** Medline

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102. **Deep Brain Stimulation of the Subthalamic Nucleus Parameter Optimization for Vowel Acoustics and Speech Intelligibility in Parkinson’s Disease.**
Purpose The settings of 3 electrical stimulation parameters were adjusted in 12 speakers with Parkinson’s disease (PD) with deep brain stimulation of the subthalamic nucleus (STN-DBS) to examine their effects on vowel acoustics and speech intelligibility. Method Participants were tested under permutations of low, mid, and high STN-DBS frequency, voltage, and pulse width settings. At each session, participants recited a sentence. Acoustic characteristics of vowel production were extracted, and naive listeners provided estimates of speech intelligibility. Results Overall, lower-frequency STN-DBS stimulation (60 Hz) was found to lead to improvements in intelligibility and acoustic vowel expansion. An interaction between speaker sex and STN-DBS stimulation was found for vowel measures. The combination of low frequency, mid to high voltage, and low to mid pulse width led to optimal speech outcomes; however, these settings did not demonstrate significant speech outcome differences compared with the standard clinical STN-DBS settings, likely due to substantial individual variability. Conclusions Although lower-frequency STN-DBS stimulation was found to yield consistent improvements in speech outcomes, it was not found to necessarily lead to the best speech outcomes for all participants. Nevertheless, frequency may serve as a starting point to explore settings that will optimize an individual’s speech outcomes following STN-DBS surgery. Supplemental Material https://doi.org/10.23641/asha.5899228.

Database: Medline

103. Evidence for Differential Effects of 2 Forms of Exercise on Prefrontal Plasticity During Walking in Parkinson’s Disease.

Author(s): Maidan, Inbal; Nieuwhof, Freek; Bernad-Elazari, Hagar; Bloem, Bastiaan R; Giladi, Nir; Hausdorff, Jeffrey M; Claassen, Jurgen A H R; Mirelman, Anat

Source: Neurorehabilitation and neural repair; Mar 2018; vol. 32 (no. 3); p. 200-208

Publication Date: Mar 2018

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

PubMedID: 29546797

Available at Neurorehabilitation and neural repair - from Unpaywall

Abstract: BACKGROUND In a randomized control trial conducted in patients with Parkinson’s disease, a treadmill training program combined with virtual reality that targeted motor and cognitive aspects of safe ambulation led to fewer falls, compared with treadmill training alone. OBJECTIVE To investigate if the 2 types of training differentially affected prefrontal activation and if this might explain differences in fall rates after the intervention. METHOD Sixty-four patients with Parkinson’s disease were randomized into the treadmill training arm (n = 34, mean age 73.1 ± 1.1 years, 64% men, disease duration 9.7 ± 1.0 years) or treadmill training with virtual reality arm (n = 30, mean age 70.1 ± 1.3 years, 71% men, disease duration 8.9 ± 1.1 years). Prefrontal activation during usual, dual-task, and obstacle negotiation walking was assessed before and after 6 weeks of training, using a
functional near-infrared spectroscopy system. RESULTS Treadmill training with and without virtual reality reduced prefrontal activation during walking (P < .001), with specific interactions related to training arm (P = .01), lateration (P = .05), and walking condition (P = .001). For example, among the subjects who trained with treadmill training alone, prefrontal activation during dual-task walking and obstacle negotiation increased after training, while in the combined training arm, activation decreased. CONCLUSIONS Prefrontal activation during usual and during more challenging walking conditions can be altered in response to 2 different types of training. The addition of a cognitive training component to a treadmill exercise program apparently modifies the effects of the training on the magnitude and lateralization of prefrontal activation and on falls, extending the understanding of the plasticity of the brain in PD.

Database: Medline

104. Motor learning in people with Parkinson’s disease: Implications for fall prevention across the disease spectrum.

Author(s): Paul, Serene S; Dibble, Leland E; Peterson, Daniel S

Source: Gait & posture; Mar 2018; vol. 61; p. 311-319

Publication Date: Mar 2018

Publication Type(s): Journal Article Review

PubMedID: 29413803

Abstract: BACKGROUND Falls are a significant burden for people with Parkinson’s disease (PD), however, individuals across the spectrum of disease severity respond differently to fall prevention interventions. Despite the multifactorial causes of falls in people with PD, recent work has provided insight into interventions that hold promise for fall prevention. Further, studies have begun to identify patient characteristics that may predict responsiveness to such interventions.

RESEARCH QUESTION We discuss (i) the postural motor learning abilities of people with mild versus severe PD that could affect their ability to benefit from fall prevention interventions, (ii) how people with different severity of PD respond to such interventions, and (iii) the practical considerations of providing effective fall prevention interventions for people with PD across the spectrum of disease severity.

METHODS This narrative review consolidates recent work on postural motor learning and fall prevention rehabilitation involving exercise in people with PD.

RESULTS People with PD are able to improve postural motor control through practice, enabling them to benefit from exercise which challenges their gait and balance to reduce falling. Worsening of axial and cognitive symptoms may result in diminished learning, and those with more severe PD may require fully supervised, high intensity programs to reduce falls.

SIGNIFICANCE Understanding how people with PD across the spectrum of disease severity differ in their postural motor learning ability and response to different fall prevention interventions will enable researchers and clinicians to refine such interventions and their delivery to minimize falls and their negative sequelae in people with PD.

Database: Medline


Author(s): Song, Jooeun; Paul, Serene S; Caetano, Maria Joana D; Smith, Stuart; Dibble, Leland E; Love, Rachelle; Schoene, Daniel; Menant, Jasmine C; Sherrington, Cathie; Lord, Stephen R; Canning, Colleen G; Allen, Natalie E

Source: Clinical rehabilitation; Mar 2018; vol. 32 (no. 3); p. 299-311

Publication Date: Mar 2018
OBJECTIVES: To determine whether 12-week home-based exergame step training can improve stepping performance, gait and complementary physical and neuropsychological measures associated with falls in Parkinson's disease. DESIGN: A single-blinded randomised controlled trial. SETTING: Community (experimental intervention), university laboratory (outcome measures). SUBJECTS: Sixty community-dwelling people with Parkinson's disease. INTERVENTION: Home-based step training using videogame technology. MAIN MEASURES: The primary outcomes were the choice stepping reaction time test and Functional Gait Assessment. Secondary outcomes included physical and neuropsychological measures associated with falls in Parkinson's disease, number of falls over six months and self-reported mobility and balance. RESULTS: Post intervention, there were no differences between the intervention (n = 28) and control (n = 25) groups in the primary or secondary outcomes except for the Timed Up and Go test, where there was a significant difference in favour of the control group (P = 0.02). Intervention participants reported mobility improvement, whereas control participants reported mobility deterioration between-group difference on an 11-point scale = 0.9 (95% confidence interval: -1.8 to 0.1, P = 0.03). Interaction effects between intervention and disease severity on physical function measures were observed (P = 0.01 to P = 0.08) with seemingly positive effects for the low-severity group and potentially negative effects for the high-severity group. CONCLUSION: Overall, home-based exergame step training was not effective in improving the outcomes assessed. However, the improved physical function in the lower disease severity intervention participants as well as the self-reported improved mobility in the intervention group suggest home-based exergame step training may have benefits for some people with Parkinson's disease.

Database: Medline

106. Trunk Exercises Improve Gait Symmetry in Parkinson Disease: A Blind Phase II Randomized Controlled Trial.

Author(s): Hubble, Ryan P; Naughton, Geraldine; Silburn, Peter A; Cole, Michael H

Source: American journal of physical medicine & rehabilitation; Mar 2018; vol. 97 (no. 3); p. 151-159

Publication Date: Mar 2018

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Clinical Trial, Phase Ii Journal Article

PubMedID: 29095706

Abstract: OBJECTIVE: Deficits in step-to-step symmetry and trunk muscle activations have been linked to falls in Parkinson disease. Given such symptoms are poorly managed with anti-parkinsonian medications, alternate therapies are needed. This blind phase II randomized controlled trial sought to establish whether exercise can improve step-to-step symmetry in Parkinson disease. DESIGN: Twenty-four Parkinson disease patients with a falls history completed baseline assessments of symptom severity, balance confidence, mobility, and quality of life. Step-to-step symmetry was assessed by deriving harmonic ratios from three-dimensional accelerations collected for the head and trunk. Patients were randomly assigned to either 12 wks of exercise and falls prevention education or falls prevention education only. Both groups repeated the baseline tests 12 and 24 wks after the initial assessment. The Australian and New Zealand Clinical Trials Registry number is ACTRN12613001175763. RESULTS: At 12 wks, the exercise group had statistically significant and clinically relevant improvements in anterior-posterior step-to-step trunk symmetry. In contrast, the education group recorded statistically significant and clinically meaningful reductions in medial-lateral and vertical step-to-step trunk symmetry at 12 wks. CONCLUSION: Given that step-to-step symmetry improved for the exercise group and declined for the education group after
intervention, active interventions seem more suited to increasing independence and quality of life for people with Parkinson disease. TO CLAIM CME CREDITS Complete the self-assessment activity and evaluation online at http://www.physiatry.org/Journal CME OBJECTIVES: Upon completion of this article, the reader should be able to do the following: (1) Describe the effect deficits in trunk muscle function have on gait in individuals with Parkinson disease; (2) Identify the benefits of targeted trunk exercises on step-to-step symmetry; and (3) Discuss the benefits of improving step-to-step symmetry in individuals with Parkinson disease. LEVEL Advanced ACCREDITATION: The Association of Academic Physiatrists is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. The Association of Academic Physiatrists designates this Journal-based CME activity for a maximum of 0.5 AMA PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Database: Medline


Author(s): Santens, Patrick
Source: Acta neurologica Belgica; Mar 2018; vol. 118 (no. 1); p. 13-19
Publication Date: Mar 2018
Publication Type(s): Journal Article Review
PubMedID: 29139079
Abstract: The neurophysiology of gait is complex and involves numerous structures in the central nervous system. Gait disorders occur frequently in Parkinson’s disease (PD), and their management may become cumbersome, especially in the more advanced stages. Neuromodulatory treatments, including deep brain stimulation, cortical stimulation and spinal cord stimulation, are reviewed with respect to their effectiveness to improve gait in PD patients. Although positive effects have been reported for all of these procedures, many issues remain in view of methodological heterogeneity, variability in outcome measures and sample size. Gait in PD remains a difficult issue with a tremendous impact on quality of life, for which future research is badly needed.

Database: Medline

108. Effectiveness and costs of specialised physiotherapy given via ParkinsonNet: a retrospective analysis of medical claims data.

Author(s): Ypinga, Jan H L; de Vries, Nienke M; Boonen, Lieke H M; Koolman, Xander; Munneke, Marten; Zwinderman, Aeilko H; Bloem, Bastiaan R
Source: Lancet Neurology; Feb 2018; vol. 17 (no. 2); p. 153-161
Publication Date: Feb 2018
Publication Type(s): Academic Journal
PubMedID: NLM29246470
Available at The Lancet Neurology - from ProQuest (Health Research Premium) - NHS Version
Abstract: Background: Parkinson’s disease is a complex condition that is best managed by specialised professionals. Trials show that specialised allied health interventions are cost-effective, as compared with usual care. We aimed to study the long-term benefits of specialised physiotherapy using the ParkinsonNet approach in real-world practice. Methods: We did an observational study, retrospectively analysing a database of health insurance claims that included a representative population of Dutch patients with Parkinson’s disease, who were followed for up to 3 years (Jan 1,
Eligibility criteria included having both a diagnosis of Parkinson’s disease and having received physiotherapy for the disease. Allocation to specialised or usual care physiotherapy was based on the choices of patients and referring physicians. We used a mixed-effects model to compare health-care use and outcomes between patients treated by specialised or usual care physiotherapists. The primary outcome was the percentage of patients with a Parkinson’s disease-related complication (ie, visit or admission to hospital because of fracture, other orthopaedic injuries, or pneumonia) adjusted for baseline variables. We compared physiotherapist caseload, the number of physiotherapy sessions, physiotherapy costs, and total health-care costs (including hospital care, but excluding community care, long-term care, and informal care) between the groups, and used a Cox’s proportional hazard model for survival time to establish whether mortality was influenced by treatment by a specialised physiotherapist. Findings: We analysed 2129 patients (4649 observations) receiving specialised physiotherapy and 2252 patients (5353 observations) receiving usual care physiotherapy. Significantly fewer patients treated by a specialised physiotherapist had a Parkinson’s disease-related complication (n=368 [17%]) than patients treated by a usual care physiotherapist (n=480 [21%]; odds ratio 0.67, 95% CI 0.56–0.81, p<0.0001). The annual caseload of patients per therapist was significantly higher for specialised physiotherapists (mean 3.89 patients per therapist [SD 3.91]) than usual care physiotherapists (1.48 [1.24]). Patients who saw specialised physiotherapists received fewer treatment sessions (mean 33.72 [SD 26.70]) than usual care physiotherapists (47.97 [32.11]). Consequently, expenditure was lower for specialised than usual care physiotherapists, both for direct costs (mean €933 [SD 843] vs €1329 [1021]; annual difference €395, 95% CI 358–432, p<0.0001) and total health-care expenditure (€2056 [3272] vs €2586 [3756]; €530, 391–669, p<0.0001). Mortality risk was lower for patients receiving specialised physiotherapy (134 [6%]) compared with patients receiving usual care physiotherapy (205 [9%], p=0.001) before correction for baseline variables, although Cox’s survival model showed no significant difference between the two (hazard ratio 0.86, 95% CI 0.69–1.07, p=0.195). Interpretation: These results confirm the findings from controlled trials, and offer evidence that specialised physiotherapy as delivered through ParkinsonNet is associated with fewer Parkinson’s disease-related complications and lower costs in real-world practice. Neurologists can facilitate specialised physiotherapy by specific referral to such experts. Funding: None.

Database: CINAHL

109. Treadmill training in Parkinson’s patients after deep brain stimulation: Effects on gait kinematic.

Author(s): Luna, N.M.S.; Lucareli, P.R.G.; Sales, V.C.; Speciali, D.; Alonso, A.C.; Peterson, M.D.; Rodrigues, R.B.M.; Fonoffc, E.T.; Barbosac, E.R.; Teixeira, M.J.; Greve, J.M.D.A.

Source: NeuroRehabilitation; Feb 2018; vol. 42 (no. 2); p. 149-158

Publication Date: Feb 2018

Publication Type(s): Academic Journal

Abstract: OBJECTIVE: The purpose of this study was to evaluate the effect of treadmill training with body weight support on gait kinematics parameters in patients with PD using DBS. DESIGN: Twelve patients completed the protocols (age: 60.9±10.6 years; disease duration: 20±7 years; and time since DBS surgery: 20±4 months). The same set of patients underwent two trainings protocols and four gait analyses (before and after each training). They received eight weeks of treadmill training without body weight support (16 sessions) in conjunction with physiotherapy program followed by six weeks of wash out period, followed by eight weeks of body-weight-supported treadmill training in conjunction with a same physiotherapy program. The Gait Kinematic Analysis involved eight infrared cameras that detected 19 reflective spherical markers attached in limb lower of patients. Statistical analysis used the Wilcoxon test (p≤0.05). RESULTS: Both the training no showed significant
differences in linear variables. As the angular variables, only training with support showed significant increase of ranges of motion: pelvis tilt, obliquity and rotation amplitude; hip adduction-abduction and rotation amplitude; percentage of peak flexion in swing phase; foot progression amplitude.

CONCLUSION: The body weight supported treadmill training may promote in increase of mobility of lower limbs during gait and it could be a targeted intervention for PD patients treated with DBS.

Database: CINAHL

110. Effect of High-Intensity Treadmill Exercise on Motor Symptoms in Patients With De Novo Parkinson Disease: A Phase 2 Randomized Clinical Trial.

Author(s): Schenkman, Margaret; Moore, Charity G; Kohrt, Wendy M; Hall, Deborah A; Delitto, Anthony; Comella, Cynthia L; Josbeno, Deborah A; Christiansen, Cory L; Berman, Brian D; Kluger, Benzi M; Melanson, Edward L; Jain, Samay; Robichaud, Julie A; Poon, Cynthia; Corcos, Daniel M

Source: JAMA neurology; Feb 2018; vol. 75 (no. 2); p. 219-226

Publication Date: Feb 2018

Publication Type(s): Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Randomized Controlled Trial Clinical Trial, Phase Ii Journal Article

PubMedID: 29228079

Available at JAMA neurology - from Unpaywall

Abstract: Importance: Parkinson disease is a progressive neurologic disorder. Limited evidence suggests endurance exercise modifies disease severity, particularly high-intensity exercise. Objectives: To examine the feasibility and safety of high-intensity treadmill exercise in patients with de novo Parkinson disease who are not taking medication and whether the effect on motor symptoms warrants a phase 3 trial. Design, Setting, and Participants: The Study in Parkinson Disease of Exercise (SPARX) was a phase 2, multicenter randomized clinical trial with 3 groups and masked assessors. Individuals from outpatient and community-based clinics were enrolled from May 1, 2012, through November 30, 2015, with the primary end point at 6 months. Individuals with idiopathic Parkinson disease (Hoehn and Yahr stages 1 or 2) aged 40 to 80 years within 5 years of diagnosis who were not exercising at moderate intensity greater than 3 times per week and not expected to need dopaminergic medication within 6 months participated in this study. A total of 384 volunteers were screened by telephone; 128 were randomly assigned to 1 of 3 groups (high-intensity exercise, moderate-intensity exercise, or control). Interventions: High-intensity treadmill exercise (4 days per week, 80%-85% maximum heart rate [n = 43]), moderate-intensity treadmill exercise (4 days per week, 60%-65% maximum heart rate [n = 45]), or wait-list control (n = 40) for 6 months. Main Outcomes and Measures: Feasibility measures were adherence to prescribed heart rate and exercise frequency of 3 days per week and safety. The clinical outcome was 6-month change in Unified Parkinson’s Disease Rating Scale motor score. Results: A total of 128 patients were included in the study (mean [SD] age, 64 [9] years; age range, 40-80 years; 73 [57.0%] male; and 108 [84.4%] non-Hispanic white). Exercise rates were 2.8 (95% CI, 2.4-3.2) days per week at 80.2% (95% CI, 78.8%-81.7%) maximum heart rate in the high-intensity group and 3.2 (95% CI, 2.8-3.6; P = .13) days per week at 65.9% (95% CI, 64.2%-67.7%) maximum heart rate in the moderate-intensity group (P < .001). The mean change in Unified Parkinson’s Disease Rating Scale motor score in the high-intensity group was 0.3 (95% CI, -1.7 to 2.3) compared with 3.2 (95% CI, 1.4 to 5.1) in the usual care group (P = .03). The high-intensity group, but not the moderate-intensity group, reached the predefined nonfutility threshold compared with the control group. Anticipated adverse musculoskeletal events were not severe. Conclusions and Relevance: High-intensity treadmill exercise may be feasible and prescribed safely for patients with Parkinson disease. An efficacy trial is warranted to determine whether high-intensity treadmill exercise produces meaningful clinical benefits in de novo Parkinson disease. Trial Registration: clinicaltrials.gov Identifier: NCT01506479.
111. Bilateral Deep Brain Stimulation of the Nucleus Basalis of Meynert for Parkinson Disease Dementia: A Randomized Clinical Trial.

**Author(s):** Gratwicke, James; Zrinzo, Ludvic; Kahan, Joshua; Peters, Amy; Beigi, Mazda; Akram, Harith; Hyam, Jonathan; Oswal, Ashwini; Day, Brian; Mancini, Laura; Thornton, John; Yousry, Tarek; Limousin, Patricia; Hariz, Marwan; Jahanshahi, Marjan; Foltynie, Thomas

**Source:** JAMA neurology; Feb 2018; vol. 75 (no. 2); p. 169-178

**Publication Date:** Feb 2018

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 29255885

Available at [JAMA neurology](https://jamanetwork.com) from Unpaywall

**Abstract:** Importance: Deep brain stimulation of the nucleus basalis of Meynert (NBM DBS) has been proposed as a treatment option for Parkinson disease dementia. Objective: To evaluate the safety and potential symptomatic effects of NBM DBS in patients with Parkinson disease dementia. Design, Setting, and Participants: A randomized, double-blind, crossover clinical trial evaluated the results of 6 patients with Parkinson disease dementia who were treated with NBM DBS at a neurosurgical referral center in the United Kingdom from October 26, 2012, to July 31, 2015. Eligible patients met the diagnostic criteria for Parkinson disease dementia, had motor fluctuations, were appropriate surgical candidates aside from the coexistence of dementia, were age 35 to 80 years, were able to give informed consent, had a Mini-Mental State Examination score of 21 to 26, had minimal atrophy seen on results of brain magnetic resonance imaging, and lived at home with a caregiver-informant. Interventions: After surgery, patients were assigned to receive either active stimulation (bilateral, low-frequency [20 Hz] NBM DBS) or sham stimulation for 6 weeks, followed by the opposite condition for 6 weeks. Main Outcomes and Measures: The primary outcome was the difference in scores on each item of an abbreviated cognitive battery (California Verbal Learning Test-II, Wechsler Adult Intelligence Scale-III digit span, verbal fluency, Posner covert attention test, and simple and choice reaction times) between the 2 conditions. Secondary outcomes were exploratory and included differences in scores on standardized measurements of cognitive, psychiatric, and motor symptoms and resting state functional magnetic resonance imaging. Results: Surgery and stimulation were well tolerated by all 6 patients (all men; mean [SD] age, 65.2 [10.7] years), with no serious adverse events during the trial. No consistent improvements were observed in the primary cognitive outcomes or in results of resting state functional magnetic resonance imaging. An improvement in scores on the Neuropsychiatric Inventory was observed with NBM DBS (8.5 points [range, 4-26 points]) compared with sham stimulation (12 points [range, 8-38 points]; median difference, 5 points; 95% CI, 2.5-8.5 points; P = .03) and the preoperative baseline (13 points [range, 5-25 points]; median difference, 2 points; 95% CI, -8 to 5.5 points; P = .69). Conclusions and Relevance: Low-frequency NBM DBS was safely conducted in patients with Parkinson disease dementia; however, no improvements were observed in the primary cognitive outcomes. Further studies may be warranted to explore its potential to improve troublesome neuropsychiatric symptoms. Trial Registration: clinicaltrials.gov Identifier: NCT01701544.

**Database:** Medline

112. A bicentric controlled study on the effects of aquatic Ai Chi in Parkinson disease.

**Author(s):** Pérez-de la Cruz, Sagrario

**Source:** Complementary therapies in medicine; Feb 2018; vol. 36 ; p. 147-153
OBJECTIVES Various exercise strategies have been suggested to address movement deficits in order to improve motor function and quality of life for individuals in the early or moderate stages of Parkinson disease. The purpose is to evaluate the effects of an aquatic Ai Chi intervention on balance, gait speed and quality of life of patients. 

DESIGN AND INTERVENTION Twenty-nine people with Parkinson disease participated in this pilot study. People were randomized into (1) aquatic Ai Chi program (experimental group) and (2) a dry land conventional Western physical therapy intervention (control group). Twenty-two twice-weekly sessions were performed with the 14 patients assigned to the experimental group, during the same period of time as the control group (same number of sessions), who received dry land therapy.

MAIN OUTCOMES MEASURES Visual Analogue scale (VAS), The Timed Get up and Go test, Five Times Sit-to-Stand test, single leg standing, Yesavage test and Parkinson’s Disease Questionnaire (PDQ-39). A descriptive analysis was performed on all study variables.

RESULTS The results showed a significant effect on time - of a high effect which indicates that the VAS scores (F 1.3; p < 0.001), Five time (F = 1.8; p = 0.001) and Get up and Go (F = 1.7; p < 0.001) significantly decreased in time, independent of the treatment group. In contrast, no significant differences were found in the results shown on the PDQ-39 scale, finding only changes in the section of social support (p < 0.001 F = 18.63).

CONCLUSIONS The results of this 11-week controlled pilot trial suggest that aquatic Ai Chi applied twice weekly may potentially reduce Parkinsonian symptoms as measured on different motor symptoms, bradykinesia and rigidity.

Database: Medline


Author(s): Elgebaly, Ahmed; Elfil, Mohamed; Attia, Attia; Magdy, Mayar; Negida, Ahmed

Source: CNS spectrums; Feb 2018; vol. 23 (no. 1); p. 10-23

Publication Date: Feb 2018

Publication Type(s): Meta-analysis Comparative Study Journal Article Systematic Review

PubMedID: 28236811

Abstract: BACKGROUND Studies comparing subthalamus (STN) and globus pallidus internus (GPi) deep brain stimulation (DBS) for the management of Parkinson’s disease in terms of neuropsychological performance are scarce and heterogeneous. Therefore, we performed a systematic review and metaanalysis to compare neuropsychological outcomes following STN DBS versus GPi DBS. METHODS A computer literature search of PubMed, the Web of Science, and Cochrane Central was conducted. Records were screened for eligible studies, and data were extracted and synthesized using Review Manager (v. 5.3 for Windows). RESULTS Seven studies were included in the qualitative synthesis. Of them, four randomized controlled trials (n=345 patients) were pooled in the metaanalysis models. The standardized mean difference (SMD) of change in the Stroop color-naming test favored the GPi DBS group (SMD=-0.31, p=0.009). However, other neuropsychological outcomes did not favor either of the two groups (Stroop word-reading: SMD=-0.21, p=0.08; the Wechsler Adult Intelligence Scale (WAIS) digits forward: SMD=0.08, p=0.47; Trail Making Test Part A: SMD=0.05, p=0.65; WAIS-R digit symbol: SMD=-0.16, p=0.29; Trail Making Test Part B: SMD=0.14, p=0.23; Stroop color-word interference: SMD=-0.16, p=0.18; phonemic verbal fluency: bilateral DBS SMD=-0.04, p=0.73, and unilateral DBS SMD=-0.05, p=0.83; semantic verbal fluency: bilateral DBS SMD=-0.09, p=0.37, and unilateral DBS SMD=-0.29, p=0.22; Boston Naming Test: SMD=-0.11, p=0.33; Beck Depression Inventory: bilateral DBS SMD=0.15, p=0.31, and unilateral
CONCLUSIONSThere was no statistically significant difference in most of the neuropsychological outcomes. The present evidence does not favor any of the targets in terms of neuropsychological performance.

Database: Medline

114. Effects of Transcranial Direct Current Stimulation Plus Physical Therapy on Gait in Patients With Parkinson Disease: A Randomized Controlled Trial.

Author(s): Yotnuengnit, Pattarapol; Bhidayasiri, Roongroj; Donkhan, Rattana; Chaluaysrimuang, Juthamas; Piravej, Krisna

Source: American Journal of Physical Medicine & Rehabilitation; Jan 2018; vol. 97 (no. 1); p. 7-15

Publication Date: Jan 2018

Publication Type(s): Academic Journal

Abstract:Objective: The aim of the study was to study the combined effects of transcranial direct current stimulation (tDCS) and physical therapy on the walking ability of patients with Parkinson disease (PD). Study Design: The study used an experimental, double-blinded, randomized controlled trial. Results: After intervention, group 1 (only tDCS) demonstrated a significant increase in gait speed by 0.13 to 0.14 m/sec (17.8%-19.2%) and an increase in step length by 5.9 to 6.1 cm (14.0%-14.5%), whereas group 2 (tDCS and physical therapy) revealed a significant increase in gait speed by 0.10 to 0.13 m/sec (14.9%-19.4%) and step length by 4.5 to 5.4 cm (10.6%-12.8%) and group 3 (sham tDCS and physical therapy) showed a significant increase in gait speed by 0.09 to 0.14 m/sec (13.0%-20.3%) and step length by 3.0 to 5.4 cm (6.8%-12.3%). All these results lasted for at least 8 wks after intervention. Upon comparing the parameters of gait among the three groups at every follow-up visit, no significant difference was observed. Conclusions: Anodal tDCS or physical therapy could be used alone or together as a combination treatment to improve the walking speed of patients with Parkinson disease. The effects lasted for approximately 8 wks. The combination treatment was not superior to the use of tDCS or physical therapy alone.

Database: CINAHL

115. Does deep brain stimulation improve lower urinary tract symptoms in Parkinson’s disease?

Author(s): Witte, Lambertus P; Odekerken, Vincent J J; Boel, Judith A; Schuurman, P Richard; Gerbrandy-Schreuders, Lara C; de Bie, Rob M A; NSTAPS study group

Source: Neurourology and urodynamics; Jan 2018; vol. 37 (no. 1); p. 354-359

Publication Date: Jan 2018

Publication Type(s): Research Support, Non-u.s. Gov’t Randomized Controlled Trial Journal Article

PubMedID: 28464331

Abstract:AIMSTo investigate whether deep brain stimulation (DBS) of the globus pallidus pars interna (GPI) or the subthalamic nucleus (STN) improve lower urinary tract symptoms (LUTS) in advanced Parkinson’s disease (PD).METHODSAn exploratory post-hoc analysis was performed of specific LUTS items of questionnaires used in a randomized clinical trial with 128 patients (NSTAPS study). First, we compared scores on LUTS items at baseline and 12 months for the GPI DBS and STN DBS group separately. Second, we divided the group by sex, instead of DBS location; to assess a possible gender associated influence of anatomical and pathophysiological differences, again comparing scores at baseline and 12 months. Third, we reported on Foley-catheter use at baseline and after 12 months.RESULTSUrinary incontinence and frequency improved after both GPI DBS and STN DBS at 12 months, postoperatively, but this was only statistically significant for the STN DBS
group (P = 0.004). The improvements after DBS were present in both men (P = 0.01) and women (P = 0.05). Nocturia and urinary incontinence did not improve significantly after any type of DBS, irrespective of sex. At 12 months, none of the patients had a Foley-catheter.

**CONCLUSIONS:** Urinary incontinence and frequency significantly improved after STN DBS treatment in male and female patients with PD. Nocturia and nighttime incontinence due to parkinsonism did not improve after DBS, irrespective of gender.

**Database:** Medline

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**116. Can Dual Task Walking Improve in Parkinson’s Disease After External Focus of Attention Exercise? A Single Blind Randomized Controlled Trial.**

**Author(s):** Beck, Eric N; Intzandt, Brittany N; Almeida, Quincy J

**Source:** Neurorehabilitation and neural repair; Jan 2018; vol. 32 (no. 1); p. 18-33

**Publication Date:** Jan 2018

**Publication Type(s):** Research Support, Non-u.s. Gov’t Randomized Controlled Trial Journal Article

**PubMedID:** 29262749

Available at [Neurorehabilitation and neural repair](https://doi.org/10.1177/1545968317736237) - from Unpaywall

**Abstract:** BACKGROUND It may be possible to use attention-based exercise to decrease demands associated with walking in Parkinson’s disease (PD), and thus improve dual task walking ability. For example, an external focus of attention (focusing on the effect of an action on the environment) may recruit automatic control processes degenerated in PD, whereas an internal focus (limb movement) may recruit conscious (nonautomatic) control processes. Thus, we aimed to investigate how externally and internally focused exercise influences dual task walking and symptom severity in PD.

**METHODS** Forty-seven participants with PD were randomized to either an Externally (n = 24) or Internally (n = 23) focused group and completed 33 one-hour attention-based exercise sessions over 11 weeks. In addition, 16 participants were part of a control group. Before, after, and 8 weeks following the program (pre/post/washout), gait patterns were measured during single and dual task walking (digit-monitoring task, ie, walking while counting numbers announced by an audio-track), and symptom severity (UPDRS-III) was assessed ON and OFF dopamine replacement. Pairwise comparisons (95% confidence intervals [CIs]) and repeated-measures analyses of variance were conducted.

**RESULTS** Pre to post: Dual task step time decreased in the external group (Δ = 0.02 seconds, CI 0.01-0.04). Dual task step length (Δ = 2.3 cm, CI 0.86-3.75) and velocity (Δ = 4.5 cm/s, CI 0.59-8.48) decreased (became worse) in the internal group. UPDRS-III scores (ON and OFF) decreased (improved) in only the External group. Pre to washout: Dual task step time (P = .005) and percentage in double support (P = .014) significantly decreased (improved) in both exercise groups, although only the internal group increased error on the secondary counting task (ie, more errors monitoring numbers). UPDRS-III scores in both exercise groups significantly decreased (P = .001).

**CONCLUSIONS:** Since dual task walking improvements were found immediately, and 8 weeks after the cessation of an externally focused exercise program, we conclude that externally focused exercise may improve on functioning of automatic control networks in PD. Internally focused exercise hindered dual tasking ability. Overall, externally focused exercise led to greater rehabilitation benefits in dual tasking and motor symptoms compared with internally focused exercise.

**Database:** Medline

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**117. Short pulse width in subthalamic stimulation in Parkinson’s disease: a randomized, double-blind study.**
Author(s): Bouthour, Walid; Wegryzak, Jennifer; Momjian, Shahan; Péron, Julie; Fleury, Vanessa; Tomkova Chaoui, Emilie; Horvath, Judit; Boëx, Colette; Lüscher, Christian; Burkhard, Pierre R; Krack, Paul; Zacharia, André

Source: Movement disorders : official journal of the Movement Disorder Society; Jan 2018; vol. 33 (no. 1); p. 169-173

Publication Date: Jan 2018
Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article
PubMedID: 29266392

Abstract: BACKGROUND: We investigated the acute effect of short pulse widths on the therapeutic window in subthalamic nucleus deep brain stimulation in Parkinson's disease. METHODS: We assessed 10 PD patients with STN-DBS at a 60-µs pulse width. We randomly and double-blindedly applied 10- to 50-µs pulse widths. The principal outcome was the therapeutic window (difference between the amplitude thresholds for visible muscle contraction and for best rigidity control). The secondary outcome was the charge per pulse (which reflects the efficiency of the stimulation) needed to control rigidity. Two-way analysis of variance and pairwise t tests were applied. RESULTS: The therapeutic window widened when the pulse width shortened (r = -0.45; P < 0.001), and charge per pulse was reduced (P < 0.05). CONCLUSIONS: This randomized, double-blind study showed that shorter pulse widths widen the therapeutic window of STN-DBS in PD without increasing the electrical charge required to obtain the same acute clinical benefit. © 2017 International Parkinson and Movement Disorder Society.

Database: Medline

118. Effects of Exercise on Non-motor Symptoms in Parkinson's Disease.

Author(s): Amara, Amy W; Memon, Adeel A

Source: Clinical therapeutics; Jan 2018; vol. 40 (no. 1); p. 8-15

Publication Date: Jan 2018
Publication Type(s): Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Journal Article
PubMedID: 29198450

Abstract: Patients with Parkinson's disease experience disabling non-motor symptoms, including autonomic dysfunction, cognitive decline, and sleep disorders. Pharmacologic treatments for these symptoms are often ineffective or have intolerable side effects. Therefore, non-pharmacologic interventions are an attractive alternative. Exercise in particular has the potential to alleviate the progressive impairment related to these non-motor symptoms. In this commentary, we explore available research that addresses the impact of exercise and physical activity on autonomic dysfunction, cognitive impairment, and sleep disorders in Parkinson's disease and suggest areas in need of further study. Many gaps remain in our understanding of the most effective exercise intervention for these symptoms, the mechanisms underlying exercise-induced changes, and the best way to monitor response to therapy. However, available research suggests that exercise is a promising approach to improve non-motor symptoms in patients with Parkinson's disease.

Database: Medline
119. Aquatic obstacle training improves freezing of gait in Parkinson's disease patients: a randomized controlled trial.

**Author(s):** Zhu, Zhizhong; Yin, Miaomiao; Cui, Liling; Zhang, Ying; Hou, Weijia; Li, Yaqing; Zhao, Hua

**Source:** Clinical rehabilitation; Jan 2018; vol. 32 (no. 1); p. 29-36

**Publication Date:** Jan 2018

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 28629269

Available at [Clinical rehabilitation](https://clinicalrehabilitation.com) - from Unpaywall

**Abstract:**

**OBJECTIVE** Our aim was to evaluate the effect of aquatic obstacle training on balance parameters in comparison with a traditional aquatic therapy in patients with Parkinson's disease.

**DESIGN** A randomized single-blind controlled trial.

**SETTING** Outpatients in the rehabilitation department.

**SUBJECTS** A total of 46 patients with Parkinson's disease in Hoehn-Yahr stage 2-3.

**INTERVENTIONS** Participants were randomly assigned to (1) aquatic therapy or (2) obstacle aquatic therapy. All participants undertook aquatic therapy for 30 minutes, five times per week for six weeks.

**MAIN MEASURES** The Freezing of Gait Questionnaire, Functional Reach Test, Timed Up and Go test, and Berg Balance Scale were assessed at baseline, posttreatment and at six-month follow-up.

**RESULTS** Both groups of patients had improved primary outcomes after the training program. A between-group comparison of the changes revealed that obstacle aquatic therapy was significantly higher for the Freezing of Gait Questionnaire (after treatment: 8.7 ± 3.3 vs 6.2 ± 2.1, P = 0.004; posttest: 7.7 ± 3.1 vs 5.3 ± 2.0, P = 0.003) and Timed Up and Go test (after treatment: 17.1 ± 2.9 vs 13.8 ± 1.9, P < 0.001; posttest: 16.3 ± 2.8 vs 12.9 ± 1.4, P < 0.001). CONCLUSION Obstacle aquatic therapy in this protocol seems to be more effective than traditional protocols for gait and balance in patients with Parkinson's disease, and the effect lasts for six months.

**Database:** Medline

120. Factors Affecting Stereotactic Accuracy in Image-Guided Deep Brain Stimulator Electrode Placement.

**Author(s):** Ko, Andrew L; Ibrahim, Aly; Magown, Philippe; Macallum, Rebecca; Burchiel, Kim J

**Source:** Stereotactic and functional neurosurgery; 2017; vol. 95 (no. 5); p. 315-324

**Publication Date:** 2017

**Publication Type(s):** Journal Article

**PubMedID:** 28889124

**Abstract:**

**BACKGROUND/AIMS** Intraoperative imaging allows near-real-time assessment of stereotactic accuracy during implantation of deep brain stimulation (DBS) electrodes. Such technology can be used to examine factors impacting stereotactic error.

**METHODS** Intraoperative CT imaging was reviewed in patients undergoing DBS placement at Oregon Health and Sciences University. Coordinates of the target electrode were compared to the operative plan to characterize the magnitude and direction of stereotactic error with respect to side of implantation, target, and electrode approach angles.

**RESULTS** One hundred sixty-nine leads in 94 patients were examined. Targets were GPi (n = 86), STN (n = 31), and Vim (n = 52). The average Euclidean error was 1.63 mm (SD 0.87). The error magnitude was higher for Vim (1.95 mm) than for GPi (1.44 mm), while STN (1.65 mm) did not differ from either Vim or GPi (ANOVA: F = 6.15, p = 0.003). Electrodes targeting Vim and STN were significantly more likely to deviate medially compared to those targeting GPi (ANOVA: F = 9.13, p < 0.001). The coronal approach angle affected the error when targeting Vim (p = 0.338, p = 0.01). These findings were confirmed during multivariate analyses. CONCLUSION This study shows a significant effect of target on the accuracy of electrode placement for DBS. Targeting
Vim results in a greater Euclidean error and a greater medial deviation off target. These systematic deviations should be taken into account during electrode implantation.

**Database:** Medline

121. **Remotely Programmed Deep Brain Stimulation of the Bilateral Subthalamic Nucleus for the Treatment of Primary Parkinson Disease: A Randomized Controlled Trial Investigating the Safety and Efficacy of a Novel Deep Brain Stimulation System.**

**Author(s):** Li, Dianyou; Zhang, Chencheng; Gault, Judith; Wang, Wei; Liu, Jianmin; Shao, Ming; Zhao, Yanyan; Zeljic, Kristina; Gao, Guodong; Sun, Bomin

**Source:** Stereotactic and functional neurosurgery; 2017; vol. 95 (no. 3); p. 174-182

**Publication Date:** 2017

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Multicenter Study Journal Article

**PubMedID:** 28571034

**Abstract:** BACKGROUND Deep brain stimulation (DBS) is the most commonly performed surgery for the debilitating symptoms of Parkinson disease (PD). However, DBS systems remain largely unaffordable to patients in developing countries, warranting the development of a safe, economically viable, and functionally comparable alternative. OBJECTIVE To investigate the efficacy and safety of wirelessly programmed DBS of bilateral subthalamic nucleus (STN) in patients with primary PD. METHOD Sixty-four patients with primary PD were randomly divided into test and control groups (1:1), where DBS was initiated at either 1 month or 3 months, respectively, after surgery. Safety and efficacy of the treatment were compared between on- and off-medication states 3 months after surgery. Outcome measures included analysis of Unified Parkinson's Disease Rating Scale (UPDRS) scores, duration of "on" periods, and daily equivalent doses of levodopa. All patients were followed up both 6 and 12 months after surgery. RESULT Three months after surgery, significant decrease in the UPDRS motor scores were observed for the test group in the off-medication state (25.08 ± 1.00) versus the control group (4.20 ± 1.99). CONCLUSION Bilateral wireless programming STN-DBS is safe and effective for patients with primary PD in whom medical management has failed to restore motor function.

**Database:** Medline

122. **Physical Therapy Versus a General Exercise Programme in Patients with Hoehn Yahr Stage II Parkinson’s Disease: A Randomized Controlled Trial.**

**Author(s):** Dipasquale, Savina; Meroni, Roberto; Sasanelli, Francesco; Messineo, Ivan; Piscitelli, Daniele; Perin, Cecilia; Cornaggia, Cesare Maria; Cerri, Cesare G

**Source:** Journal of Parkinson's disease; 2017; vol. 7 (no. 1); p. 203-210

**Publication Date:** 2017

**Publication Type(s):** Comparative Study Randomized Controlled Trial Journal Article

**PubMedID:** 28106568

**Abstract:** BACKGROUND AND OBJECTIVES Several studies suggest that general exercise (GE) and physical therapy programmes (PT) improve the outcomes of Parkinson’s disease (PD) patients; however, the available data do not allow a determination of which treatment is more effective. Our study aims to compare the effects of physiotherapy and general exercise in Parkinson’s disease. METHODS Design and setting: Randomized controlled trial - general hospital outpatient clinic. The participants were patients with Hoehn Yahr stage II PD. Two randomized groups: one receiving
PT and one receiving GE. The outcome measures were the FIM, Hamilton Rating Scale, TUG test, and UPDRS. RESULTS: FIM median scores improved by 3 points in the PT group after treatment, and the improvements were maintained at follow-up. The GE FIM median scores were unchanged after treatment and were reduced by 1 point at follow-up (p < 0.05). The TUG test time was reduced in the PT group but increased in the GE group with a 3-second difference between groups at follow-up, suggesting improved functional mobility after specific physiotherapy (p < 0.05). The UPDRS median score change from baseline was significantly different between the two groups at the end of treatment (6.5 points) and at follow-up (11 points), with a benefit for the physiotherapy group. CONCLUSIONS: Physiotherapy seems to be more effective than a generic exercise programme in patients with Hoehn Yahr stage II PD.

Database: Medline

123. The safety issues and hardware-related complications of deep brain stimulation therapy: a single-center retrospective analysis of 478 patients with Parkinson's disease.

Author(s): Zhang, Jing; Wang, Tao; Zhang, Chen-Cheng; Zeljic, Kristina; Zhan, Shikun; Sun, Bo-Min; Li, Dian-You

Source: Clinical interventions in aging; 2017; vol. 12; p. 923-928

Publication Date: 2017

Publication Type(s): Journal Article

PubMedID: 28652714

Abstract: INTRODUCTION: Deep brain stimulation (DBS) is a well-established therapy for the treatment of advanced Parkinson's disease (PD) in patients experiencing motor fluctuations and medication-refractory tremor. Despite the relative tolerability and safety of this procedure, associated complications and unnatural deaths are still unavoidable. METHODS: In this study, hardware-related complications and the causes of unnatural death were retrospectively analyzed in 478 patients with PD who were treated with DBS. RESULTS: The results showed a 3-year survival rate of 98.6% and a 5-year survival rate of 96.4% for patients with PD who underwent DBS treatment at the study center. Pneumonia was the cause of death with the highest frequency. Prophylactic antibiotics and steroids or antihistamine drugs were adopted to reduce the risk of infection. Twenty-two patients (4.6%) experienced hardware-related complications. CONCLUSION: Deaths of PD patients who receive DBS are typically unrelated to the disease itself or complications associated with the surgery. Pneumonia, malignant tumors, asphyxia, and multiple-organ failure are the common causes of death. Swallowing-related problems may be the most important clinical symptom in late-stage PD, as they cannot be stabilized or improved by DBS alone, and are potentially lethal. Although prophylactic antibiotics and steroids or antihistamine drugs may reduce the risk of infection, it is imperative to identify high-risk patients for whom a therapeutic approach not requiring an implantable device is more suitable, for example, pallidotomy and potentially transcranial ultrasound.

Database: Medline


Author(s): Ramazzina, Ileana; Bernazzoli, Benedetta; Costantino, Cosimo

Source: Clinical interventions in aging; 2017; vol. 12; p. 619-628

Publication Date: 2017
The purpose of this study was to investigate the effectiveness of strength training, performed against a different resistance from body weight, in improving motor and nonmotor symptoms in patients with Parkinson's disease (PD). The following electronic databases were searched: PubMed, Physiotherapy Evidence Database, Cochrane Central Register of Controlled Trials, Scopus, and Web of Science. The review was conducted and reported in accordance with the PRISMA statement. Thirteen high-quality randomized controlled trials were included. Strength training performed against external resistance is well tolerated and appears to be a suitable physical activity to improve both physical parameters and quality of life parameters of PD subjects. However, although the study intervention included strength training, only a few selected studies assessed the improvement of muscle strength. Despite the encouraging results, it is difficult to establish a correlation between strength training and the improvements made. Our review highlights the lack of common intent in terms of study design and the presence of different primary and secondary outcomes. Accordingly, further studies are needed to support the beneficial effects of different types of strength training in PD subjects and to underline the superiority of strength training in PD patients with respect to other training.

125. A novel approach to falls classification in Parkinson’s disease: development of the Fall-Related Activity Classification (FRAC).

**Author(s):** Ross, Annie; Yarnall, Alison J.; Rochester, Lynn; Lord, Sue

**Source:** Physiotherapy; Dec 2017; vol. 103 (no. 4); p. 459-464

**Publication Date:** Dec 2017

**Publication Type(s):** Academic Journal

Background Falls are a major problem for people with Parkinson’s disease (PD). Despite years of focused research knowledge of falls aetiology is poor. This may be partly due to classification approaches which conventionally report fall frequency. This nosology is blunt, and does not take into account causality or the circumstances in which the fall occurred. For example, it is likely that people who fall from a postural transition are phenotypically different to those who fall during high level activities. Recent evidence supports the use of a novel falls classification based on fall related activity, however its clinimetric properties have not yet been tested. Objective This study describes further development of the Fall-Related Activity Classification (FRAC) and reports on its inter-rater reliability (IRR). Method Descriptors of the FRAC were refined through an iterative process with a multidisciplinary team. Three categories based on the activity preceding the fall were identified. PD fallers were categorised as: (1) advanced (2) combined or (3) transitional. Fifty-five fall scenarios were rated by 23 raters using a standardised process. Raters comprised 3 clinical subgroups: (1) physiotherapists, (2) physicians, (3) non-medical researchers. IRR analysis was performed using weighted kappa coefficients and included sub group analysis based on clinical speciality. Results Excellent agreement was reached for all clinicians, $\kappa = 0.807$ (95% CI 0.732 to 0.870). Clinical subgroups performed similarly well (range of $\kappa$ = 0.780 to 0.822). Conclusion The FRAC can be reliably used to classify falls. This may discriminate between phenotypically different fallers and subsequently strengthen falls predictors in future studies.

**Database:** CINAHL
126. Effectiveness of aquatic therapy for the control of pain and increased functionality in people with Parkinson’s disease: a randomized clinical trial.

Author(s): Pérez de la Cruz, Sagrario

Source: European journal of physical and rehabilitation medicine; Dec 2017; vol. 53 (no. 6); p. 825-832

Publication Date: Dec 2017

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 28627861

Abstract: BACKGROUND Gait, balance disorders and pain associated with Parkinson's disease represent important therapeutic challenges, as they are related with an increased risk of falls, together with disability and physical decline. AIM To compare the effects of an aquatic ai chi training program on the perception of pain, the maintenance of balance and the functional independence of patients with Parkinson's disease. DESIGN A single-blind randomized controlled trial. SETTING Parkinson's associations and municipal pools. POPULATION Thirty individuals from two Parkinson's associations in Spain participated in the study. INCLUSION CRITERIA Individuals diagnosed with Parkinson's disease in stages 1 to 3 (Hoehn and Yahr Scale), older than 40 years, in the off phase (not medicated) and with a score greater or equal to 24 on the Mini-Mental State Examination Scale, without any medical contraindications and who accepted the study norms. METHODS The experimental group (N.=15 patients) participated in a program of aquatic ai chi. The control group (N.=15) received therapy on dry land. The intervention lasted 10 weeks with sessions held twice weekly. The pain VAS, Tinetti, Berg, Test Get Up and Go, Five Times Test and Unified Parkinson’s Disease Rating Scale were used. RESULTS Significant differences were found between the baseline and one-month follow up assessments in pain perception values (F=26.89, P<0.001), and the Tinetti Test (F=21.57, P<0.001) in the experimental group compared to the control group (P<0.05) with the exception of the FTSTS (P=0.006). In the control group, improvements were only seen on the VAS Pain Scale (F=8.3, P=0.004) and these were less significant than the changes found in the experimental group. Regarding the scores obtained on the UPDRS scale in the experimental group, there were significant differences in activities of daily living and motor examination, with the exception of mentation, behavior and mood. CONCLUSIONS An aquatic ai chi program appears to be a valid treatment option for patients diagnosed with mild to moderate Parkinson's disease for the treatment of pain, balance and functional capacity. CLINICAL REHABILITATION IMPACT Physical exercise performed in water has positive effects on some of the necessary elements that contribute towards improved biomechanical gait patterns in our patients with Parkinson's disease.

Database: Medline

127. A long-term self-managed handwriting intervention for people with Parkinson's disease: results from the control group of a phase II randomized controlled trial.

Author(s): Collett, Johnny; Franssen, Marloes; Winward, Charlotte; Izadi, Hooshang; Meaney, Andy; Mahmoud, Wala; Bogdanovic, Marko; Tims, Martin; Wade, Derick; Dawes, Helen

Source: Clinical rehabilitation; Dec 2017; vol. 31 (no. 12); p. 1636-1645

Publication Date: Dec 2017

Publication Type(s): Randomized Controlled Trial Clinical Trial, Phase II Journal Article

PubMedID: 28547999

Abstract: OBJECTIVE To report on the control group of a trial primarily designed to investigate exercise for improving mobility in people with Parkinson’s disease (pwP). The control group undertook a handwriting intervention to control for attention and time spent practising a specific
activity. DESIGN Secondary analysis of a two-arm parallel phase II randomized controlled trial with blind assessment. SETTING Community. PARTICIPANTS PwP able to walk ≥100 m and with no contraindication to exercise were recruited from the Thames Valley, UK, and randomized (1:1) to exercise or handwriting, via a concealed computer-generated list. INTERVENTION Handwriting was undertaken at home and exercise in community facilities; both were delivered through workbooks with monthly support visits and involved practice for 1 hour, twice weekly, over a period of six months. MAIN MEASURES Handwriting was assessed, at baseline, 3, 6 and 12 months, using a pangram giving writing speed, amplitude (area) and progressive reduction in amplitude (ratio). The Movement Disorder Society (MDS)-Unified Parkinson’s Disease Rating Scale (UPDRS) item 2.7 measured self-reported handwriting deficits. RESULTS In all, 105 pwP were recruited (analysed: n = 51 handwriting, n = 54 exercise). A total of 40 pwP adhered to the handwriting programme, most completing ≥1 session/week. Moderate effects were found for amplitude (total area: d = 0.32; 95% confidence interval (CI): -0.11 to 0.7; P = 0.13) in favour of handwriting over a period of 12 months; effects for writing speed and ratio parameters were small ≤0.11. Self-reported handwriting difficulties also favoured handwriting (UPDRS 2.7: odds ratio (OR) = 0.55; 95% CI: 0.34 to 0.91; P = 0.02). No adverse effects were reported. CONCLUSION: PwP generally adhere to self-directed home handwriting which may provide benefit with minimal risk. Encouraging effects were found in writing amplitude and, moreover, perceived ability.

Database: Medline


Author(s): Gandolfi, Marialuisa; Geroin, Christian; Dimitrova, Eleonora; Boldrini, Paolo; Waldner, Andreas; Bonadiman, Silvia; Picelli, Alessandro; Regazzo, Sara; Stirbu, Elena; Primon, Daniela; Bosello, Christian; Gravina, Aristide Roberto; Peron, Luca; Trevisan, Monica; Garcia, Alberto Carreño; Menel, Alessia; Boccari, Laura; Valè, Nicola; Saltuari, Leopold; Tinazzi, Michele


Publication Date: Nov 2017

Publication Type(s): Academic Journal

Available at BioMed Research International - from Europe PubMed Central - Open Access

Abstract: Introduction. Telerehabilitation enables patients to access remote rehabilitation services for patient-physiotherapist videoconferencing in their own homes. Home-based virtual reality (VR) balance training has been shown to reduce postural instability in patients with Parkinson’s disease (PD). The primary aim was to compare improvements in postural stability after remotely supervised in-home VR balance training and in-clinic sensory integration balance training (SIBT). Methods. In this multicenter study, 76 PD patients (modified Hoehn and Yahr stages 2.5–3) were randomly assigned to receive either in-home VR telerehabilitation (n=38) or in-clinic SIBT (n=38) in 21 sessions of 50 minutes each, 3 days/week for 7 consecutive weeks. VR telerehabilitation consisted of graded exergames using the Nintendo Wii Fit system; SIBT included exercises to improve postural stability. Patients were evaluated before treatment, after treatment, and at 1-month follow-up. Results. Analysis revealed significant between-group differences in improvement on the Berg Balance Scale for the VR telerehabilitation group (p=0.04) and significant Time × Group interactions in the Dynamic Gait Index (p=0.04) for the in-clinic group. Both groups showed differences in all outcome measures over time, except for fall frequency. Cost comparison yielded between-group differences in treatment and equipment costs. Conclusions. VR is a feasible alternative to in-clinic SIBT for reducing postural instability in PD patients having a caregiver.

Database: CINAHL

**Author(s):** Cugusi, Lucia; Manca, Andrea; Dragone, Daniele; Deriu, Franca; Solla, Paolo; Secci, Claudio; Monticone, Marco; Mercuro, Giuseppe

**Source:** PM & R: Journal of Injury, Function & Rehabilitation; Nov 2017; vol. 9 (no. 11); p. 1157-1166

**Publication Date:** Nov 2017

**Publication Type(s):** Academic Journal

**PubMedID:** NLM28694221

**Abstract:**

**Background:** It is well known that physical exercise is the main therapeutic element of rehabilitation programs for people with Parkinson disease (PD). As traditional forms of exercise can guarantee significant health benefits, the emergence of nonconventional physical activities, such as Nordic walking (NW), may add positive effects.

**Objective:** To appraise the available evidence on the main effects of NW in the rehabilitation programs for people with PD and to propose a design for upcoming research that might improve the uniformity of future trials.

**Study Design:** Systematic review.

**Literature Survey:** A literature search of 5 established databases (PubMed, MEDLINE, Scopus, Web of Science, and Cochrane) was conducted.

**Methodology:** Any relevant randomized control trials pertinent to NW in PD published in English from inception to February 2017 were included. Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines were followed, and the methodologic quality of each study was assessed by the Physiotherapy Evidence Database scale.

**Data Synthesis:** Sixty-six studies were retrieved, and 6 randomized controlled trials (221 subjects) were entered into the qualitative synthesis. Overall, these studies portrayed NW as feasible and likely to be effective in improving the functional and clinical outcomes of people with PD.

When we compared NW with other exercise-based interventions, such as treadmill training, free walking, a program of standardized whole-body movements with maximal amplitude (Lee Silverman Voice Treatment BIG training), or a home-based exercise program, the findings proved controversial.

**Conclusions:** High heterogeneity and methodologic discrepancies among the studies prevent us from drawing firm conclusions on the effectiveness of NW in comparison with other exercise-based interventions currently used by people with PD. Further investigations with a common design are necessary to verify whether NW may be included within conventional rehabilitation programs commonly recommended to people with PD.

**Level Of Evidence:** II.

**Database:** CINAHL

130. Robotic-assisted gait training in Parkinson's disease: a three-month follow-up randomized clinical trial.

**Author(s):** Furnari, Anna; Calabrò, Rocco Salvatore; De Cola, Maria Cristina; Bartolo, Michelangelo; Castelli, Alberto; Mapelli, Alessia; Buttacchio, Giampiero; Farini, Elena; Bramanti, Placido; Casale, Roberto

**Source:** The International journal of neuroscience; Nov 2017; vol. 127 (no. 11); p. 996-1004

**Publication Date:** Nov 2017

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 28132574

**Abstract:**

**PURPOSE** The aim of this study was to evaluate the efficacy of a robotic-assisted gait training (RAGT), together with a conventional exercise program (CEP), to improve PD ambulation, as compared to standard gait training.

**METHODS** Thirty-eight patients with mild PD stage (H&Y 2-2.5) were randomly assigned to an experimental group (EG) or a control group. The 19 patients in EG...
received 30 min RAGT (using Lokomat device), whereas the 19 controls received a conventional gait training; both groups received 30 min of CEP. Participants were evaluated before (T0), immediately after (T1), and 12 weeks after the end of treatment (T2), by using 10-MWT, Tinetti Test and the motor score of the UPDRS-III.

RESULTS We found that Tinetti Walking (TW) ($X^2(3) = 31.75; p < 0.001$), Tinetti Balance ($X^2(3) = 74.07; p < 0.001$), UPDRS-III ($X^2(3) = 6.87; p < 0.001$) and GDS ($X^2(3) = 28.83; p < 0.001$) scores were affected by the type of the rehabilitative treatment. At T2, we found a significant difference between the two groups for TW ($t = 2.62; p < 0.02, d = 0.85$). Concerning all the study outcomes, a significant improvement was observed from T0 to T1 in both groups. However, the functional motor gain at T2 was maintained only in the EG.

CONCLUSIONS: RAGT may significantly improve walking ability, motor function and for a maximum period of three months. Thus, our findings support the importance of a RAGT as a valid rehabilitative tool for PD.

Database: Medline

131. **Using non-invasive transcranial stimulation to improve motor and cognitive function in Parkinson's disease: a systematic review and meta-analysis.**

**Author(s):** Goodwill, Alicia M; Lum, Jarrad A G; Hendy, Ashlee M; Muthalib, Makii; Johnson, Liam; Albein-Urios, Natalia; Teo, Wei-Peng

**Source:** Scientific reports; Nov 2017; vol. 7 (no. 1); p. 14840

**Publication Date:** Nov 2017

**Publication Type(s):** Research Support, Non-u.s. Gov't Meta-analysis Journal Article Systematic Review

**PubMedID:** 29093455

Available at Scientific reports - from Europe PubMed Central - Open Access

**Abstract:** Parkinson's disease (PD) is a neurodegenerative disorder affecting motor and cognitive abilities. There is no cure for PD, therefore identifying safe therapies to alleviate symptoms remains a priority. This meta-analysis quantified the effectiveness of repetitive transcranial magnetic stimulation (rTMS) and transcranial electrical stimulation (TES) to improve motor and cognitive dysfunction in PD. PubMed, EMBASE, Web of Science, Google Scholar, Scopus, Library of Congress and Cochrane library were searched. 24 rTMS and 9 TES studies (n = 33) with a sham control group were included for analyses. The Physiotherapy Evidence Database and Cochrane Risk of Bias showed high quality (7.5/10) and low bias with included studies respectively. Our results showed an overall positive effect in favour of rTMS ($SMD = 0.394$, CI [0.106-0.683], $p = 0.007$) and TES ($SMD = 0.611$, CI [0.188-1.035], $p = 0.005$) compared with sham stimulation on motor function, with no significant differences detected between rTMS and TES ($Q [1] = 0.69, p = 0.406$). Neither rTMS nor TES improved cognition. No effects for stimulation parameters on motor or cognitive function were observed. To enhance the clinical utility of non-invasive brain stimulation (NBS), individual prescription of stimulation parameters based upon symptomology and resting excitability state should be a priority of future research.

Database: Medline

132. **Effects of Progressive Resistance Training on Cardiovascular Autonomic Regulation in Patients With Parkinson Disease: A Randomized Controlled Trial.**

**Author(s):** Kanegusuku, Hélcio; Silva-Batista, Carla; Peçanha, Tiago; Nieuwboer, Alice; Silva, Natan D; Costa, Luiz A; de Mello, Marco T; Piemonte, Maria E; Ugrinowitsch, Carlos; Forjaz, Cláudia L

**Source:** Archives of physical medicine and rehabilitation; Nov 2017; vol. 98 (no. 11); p. 2134-2141

**Publication Date:** Nov 2017
**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 28705551

**Abstract:**

OBJECTIVE To evaluate the effects of a progressive resistance training (RT) on cardiac autonomic modulation and on cardiovascular responses to autonomic stress tests in patients with Parkinson disease (PD).

DESIGN Randomized clinical trial.

SETTING The Brazil Parkinson Association.

PARTICIPANTS Patients (N=30) with PD (modified Hoehn & Yahr stages 2-3) were randomly divided into 2 groups: a progressive RT group (PD training [PDT] group) and a control group (PD control [PDC] group). In addition, a group of paired healthy control (HC) subjects without PD was evaluated.

INTERVENTIONS The PDT group performed 5 resistance exercises, 2 to 4 sets, 12 to 6 repetitions maximum per set. Individuals in the PDC group maintained their usual lifestyle.

MAIN OUTCOME MEASURES The PDT and PDC groups were evaluated before and after 12 weeks. The HC group was evaluated once. Autonomic function was assessed by spectral analysis of heart rate variability and cardiovascular responses to autonomic stress tests (deep breathing, Valsalva maneuver, orthostatic stress).

RESULTS Compared with baseline, the normalized low-frequency component of heart rate variability decreased significantly after 12 weeks in the PDT group only (PDT: 61±17 normalized units [nu] vs 47±20nu; PDC: 60±14nu vs 63±10nu; interaction P<.05). A similar result was observed for systolic blood pressure fall during orthostatic stress that also was reduced only in the PDT group (PDT: -14±11mmHg vs -6±10mmHg; PDC: -12±10mmHg vs -11±10mmHg; interaction P<.05). In addition, after 12 weeks, these parameters in the PDT group achieved values similar to those in the HC group.

CONCLUSIONS In patients with PD, progressive RT improved cardiovascular autonomic dysfunction.

Database: Medline

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133. Comparison of three physical therapy interventions with an emphasis on the gait of individuals with Parkinson’s disease.

**Author(s):** Bueno, Maria Eduarda Brandão; dos Reis Andrello, Ana Carolina; Terra, Marcelle Brandão; dos Santos, Hevely Beatriz Celestino; Marquioi, Júlia Marson; Santos, Suhaila Mahmoud Smaili

**Source:** Fisioterapia em Movimento; Oct 2017; vol. 30 (no. 4); p. 691-701

**Publication Date:** Oct 2017

**Publication Type(s):** Academic Journal

Available at Fisioterapia em Movimento - from Unpaywall

**Abstract:**

Introduction: Gait impairments are one of the earliest signs reported by patients with Parkinson's disease (PD) and cause an increased number of falls and decreased quality of life among these patients. Objective: To compare the effectiveness of three physical therapy interventions using Rhythmic Cues (RC), Swiss Ball (SB) and Dual Task (DT), with an emphasis on gait treatment (step and stride length, duration and velocity), in individuals with PD. Methods: Quasi-randomized clinical trial addressing a sample composed of 45 individuals assigned to three groups. The individuals were assessed before and after the intervention protocol using the following: Modified Hoehn and Yahr Scale (HY), Unified Parkinson's Disease Rating Scale (UPDRS), Footprint analysis, Video Gait analysis, and Timed Up and Go Test (TUG). The groups were homogeneous concerning age, HY and UPDRS. Statistical analysis was performed using SPSS, version 20.0. Results: Statistically significant differences were found in all the variables analyzed in the RC and SB groups when compared in the pre- and post-intervention. With the exception of the TUG variable, the DT group presented statistically significant differences in all the remaining variables. Conclusion: The three interventions were effective for the outcomes under study, but the SB group presented the greatest magnitude of change (effect size), while the RC group presented the greatest improvement in the temporal gait variables (duration and velocity) and TUG.
134. Endurance exercise improves function in individuals with Parkinson's disease: A meta-analysis.

Author(s): Flach, Alicia; Jaegers, Lisa; Krieger, Mary; Bixler, Emily; Kelly, Patrick; Weiss, Edward P; Ahmad, S Omar

Source: Neuroscience letters; Oct 2017; vol. 659 ; p. 115-119

Abstract: Current evidence has shown that exercise can reduce symptoms of Parkinson's disease (PD). However, previous studies indicated mixed results, possibly because of variability in terms of the nature of the exercise interventions. The purpose of this study was to perform a meta-analysis of current evidence from endurance exercise intervention studies for effects on the United Parkinson's Disease Rating Scale (UPDRS) in individuals with PD. A systematic literature search in six electronic databases was performed and two independent reviewers screened the title and abstract of 1106 records captured by the initial search. Inclusion criteria for full-text review were (A) peer-reviewed English-language publications, (B) randomized controlled trials that compared an endurance exercise intervention group to a non-exercising control group, and (C) an outcome measure which included the UPDRS total score or section III (motor) subscore. From the title/abstract screening, the same independent reviewers assessed 245 full-text articles for eligibility. Of the full-text articles reviewed 7 articles were included in our meta-analysis, 238 were excluded for the following reasons: 147 did not meet endurance exercise criteria, 53 were review/systematic reviews, 34 were conference abstracts or posters, 2 were editorial or commentary, 1 was a study protocol, and 1 was unpublished. The $d$ index was used to calculate the difference between means of different groups within individual studies, and a weighting factor or $w$ was used to calculate the effect size across studies. Overall, $d$ index was found to be $-0.32$ with 95% confidence interval, CI (-0.09, -0.56) found to be statistically significant indicating a positive effect of endurance exercise in UPDRS scores. In conclusion, this meta-analysis supports integrating endurance exercise training, as defined by ACSM, into treatment of PD.

Database: Medline


Author(s): Jitkritsadakul, Onanong; Thanawattano, Chusak; Anan, Chanawat; Bhidayasiri, Roongroj

Source: Journal of the neurological sciences; Oct 2017; vol. 381 ; p. 331-340

Abstract: Medically refractory resting tremor is a debilitating symptom of Parkinson's disease (PD) patients. In our pilot study, modulation of peripheral reflex mechanism by electrical muscle stimulation (EMS) temporarily suppressed tremor. OBJECTIVES To investigate the efficacy of EMS, delivered using Tremor’s glove, as a treatment of resting hand tremor. PATIENTS AND METHODS Thirty PD patients with medically refractory resting tremor were randomly allocated to a Tremor’s glove group (n=15) or a sham glove group (n=15). Gloves were placed on the most
tremulous hand for 30min per testing session. Demographics, clinical rating scales, and tremor parameters (RMS of angular velocity and angular displacement, peak magnitude, and frequency) were assessed before and during stimulation. Correlations with validated clinical rating scales were performed.

**RESULTS**

There were no statistically significant differences between groups in demographics, rating scales, or tremor parameters. During stimulation, significant reduction in RMS angular velocity (as percentage) in every axis and peak magnitude in axis (x-, y-) and UPDRS tremor score, were found with Tremor’s glove compared to the sham groups (p<0.05, each). Significant moderate correlations were observed between a percentage reduction of RMS angular velocity in every axis and UPDRS tremor scores. Mean duration of tremor reduction after stimulation was 107.78±104.15s. No serious adverse events were observed.

**CONCLUSION**

In this study, EMS-based Tremor’s glove was effective in suppressing resting hand tremor in PD patients. Tremor’s glove is lightweight with a good safety profile, making it a future potential therapeutic option for PD patients with medically refractory tremor.

**Database:** Medline

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**136. Subthalamic nucleus and globus pallidus internus stimulation for the treatment of Parkinson’s disease: A systematic review.**

**Author(s):** Xu, Hao; Zheng, Feng; Krischek, Boris; Ding, Wanhai; Xiong, Chi; Wang, Xin; Niu, Chaoshi

**Source:** The Journal of international medical research; Oct 2017; vol. 45 (no. 5); p. 1602-1612

**Publication Date:** Oct 2017

**Publication Type(s):** Meta-analysis Journal Article Review Systematic Review

**PubMedID:** 28701061

Available at [The Journal of international medical research](https://thejimr.com) - from Unpaywall

**Abstract:**

**Objective** Deep brain stimulation (DBS) for treatment of advanced Parkinson's disease (PD) has two anatomical targets: the subthalamic nucleus (STN) and the globus pallidus internus (GPI). The clinical effectiveness of these two stimulation targets was compared in the present study.

**Methods** A systematic review and meta-analysis was performed to evaluated the postoperative changes in the United Parkinson's Disease Rating Scale (UPDRS) on- and off-phase, on-stimulation motor scores; activities of daily living score (ADLS); and levodopa equivalent dose (LED) after STN and GPI stimulation. Randomized and nonrandomized controlled trials of PD treated by STN and GPI stimulation were considered for inclusion. Results Eight published reports of eligible studies involving 599 patients met the inclusion criteria. No significant differences were observed between the STN and GPI groups in the on-medication, on-stimulation UPDRS motor score [mean difference, 2.15; 95% confidence interval (CI), -0.96-5.27] or ADLS (mean difference, 3.40; 95% CI, 0.95-7.76). Significant differences in favor of STN stimulation were noted in the off-medication, on-stimulation UPDRS motor score (mean difference, 1.67; 95% CI, 0.98-2.37) and LED (mean difference, 130.24; 95% CI, 28.82-231.65). Conclusion The STN may be the preferred target for DBS in consideration of medication reduction, economic efficiency, and motor function improvement in the off phase. However, treatment decisions should be made according to the individual patient's symptoms and expectations.

**Database:** Medline

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**137. Effects of curved-walking training on curved-walking performance and freezing of gait in individuals with Parkinson's disease: A randomized controlled trial.**

**Author(s):** Cheng, Fang-Yu; Yang, Yea-Ru; Wu, Yih-Ru; Cheng, Shih-Jung; Wang, Ray-Yau

**Source:** Parkinsonism & related disorders; Oct 2017; vol. 43; p. 20-26
INTRODUCTION The purpose of this study was to investigate the effects of curved-walking training (CWT) on curved-walking performance and freezing of gait (FOG) in people with Parkinson's disease (PD).

METHOD Twenty-four PD subjects were recruited and randomly assigned to the CWT group or control exercise (CE) group and received 12 sessions of either CWT with a turning-based treadmill or general exercise training for 30 min followed by 10 min of over-ground walking in each session for 4-6 weeks. The primary outcomes included curved-walking performance and FOG. All measurements were assessed at baseline, after training, and at 1-month follow-up.

RESULTS Our results showed significant improvements in curved-walking performance (speed, \( p = 0.007 \); cadence, \( p = 0.003 \); step length, \( p < 0.001 \)) and FOG, measured by a FOG questionnaire (\( p = 0.004 \)). The secondary outcomes including straight-walking performance (speed, cadence and step length, \( p < 0.001 \)), timed up and go test (\( p = 0.014 \)), functional gait assessment (\( p < 0.001 \)), Unified Parkinson's disease Rating Scale III (\( p = 0.001 \)), and quality of life (\( p < 0.001 \)) were also improved in the experimental group. We further noted that the improvements were maintained for at least one month after training (\( p < 0.05 \)).

CONCLUSION: A 12-session CWT program can improve curved-walking ability, FOG, and other measures of functional walking performance in individuals with PD. Most of the improvements were sustained for at least one month after training.

Database: Medline
139. High-Speed Resistance Training Modifies Load-Velocity and Load-Power Relationships in Parkinson’s Disease.

**Author(s):** Ni, Meng; Signorile, Joseph F

**Source:** Journal of strength and conditioning research; Oct 2017; vol. 31 (no. 10); p. 2866-2875

**Publication Date:** Oct 2017

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 27893480

**Abstract:** Muscle power is a major neuromuscular factor affecting motor function and independence in patients with Parkinson’s disease (PD), and it is commonly targeted using high-speed exercise. This study examined the changes in velocities (Vpp) and percent loads (%1RMpp) at peak power and load-velocity (L-V) and load-power (L-P) relationships, resulting from resistance training because of exercise choice and loading in older patients with PD. Fourteen older adults with mild to moderate PD participated in a 12-week randomized controlled power training trial. Changes in L-V and L-P relationships for the biceps curl, chest press, leg press, hip abduction, and seated calf were assessed using pneumatic resistance machines at loads ranging from 30 through 90% of subjects’ 1 repetition maximum for each exercise. Significant increases in Vpp were seen for biceps curl, leg press, hip abduction, and seated calf and decreases in %1RMpp were noted for biceps curl and hip abduction. Additionally, unique patterns of change were seen in these relationships across exercises, with biceps curl, chest press, and leg press showing the greatest shifts at the lower load end of the loading spectrum, and hip abduction and seated calf showing greatest responses at the higher end. The patterns of change in L-V and L-P relationships provide evidence for the unique responses of the specific muscle groups and joints to the exercises evaluated and offer a framework for more exacting exercise prescriptions in patients with PD.

**Database:** Medline

140. Backward compared to forward over ground gait retraining have additional benefits for gait in individuals with mild to moderate Parkinson’s disease: A randomized controlled trial.

**Author(s):** Grobbelaar, Roné; Venter, Ranel; Welman, Karen Estelle

**Source:** Gait & posture; Oct 2017; vol. 58 ; p. 294-299

**Publication Date:** Oct 2017

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 28843186

**Abstract:** Over ground gait retraining in the reverse direction has shown to be beneficial for neurological rehabilitation, but has not yet been investigated in Parkinson’s disease (PD). Backwards walking (BW) might be a useful training alternative to improve PD gait and possibly reduce fall risk during complex multi-directional daily activities. The primary aim was to compare the effect of an eight-week forward (FWG) and backwards (BWG) gait retraining program on gait parameters in PD individuals. Twenty-nine participants (aged 71.0±8.8years; UPDRS-III 38.1±12.3; H&Y 2.7±0.5) were randomly assigned to either the control (FWG; n=14) or experimental group (BWG; n=15). Baseline measures included disease severity (UPDRS III), global cognition (MoCA) and depression (PHQ-9). Outcome measures were selected gait variables on the 10m-instrumented-walk-test (i10mWT) assessed before and after the interventions. Both groups improved usual gait speed (FWG: p=0.03, d=0.35; BWG: p<0.01, d=0.35) and height-normalized gait speed (FWG: p=0.04, d=0.35; BWG: p<0.01, d=0.57). Additionally, the BWG demonstrated improved cadence (p<0.01, d=0.67) and stride...
length (SL; p=0.02, d=0.39). Both interventions were effective to improved gait speed sufficiently to independently navigate in the community.

Database: Medline

141. Effects of progressive resistance exercise in akinetic-rigid Parkinson's disease patients: a randomized controlled trial.

Author(s): Santos, Luis; Fernandez-Rio, Javier; Winge, Kristian; Barragán-Pérez, Beatriz; González-Gómez, Lucia; Rodríguez-Pérez, Vicente; González-Diez, Vicente; Lucía, Alejandro; Iglesias-Soler, Eliseo; Dopico-Calvo, Xurxo; Fernández-Del-Olmo, Miguel; Del-Valle, Miguel; Blanco-Traba, Miguel; Suman, Oscar E; Rodríguez-Gómez, Javier

Source: European journal of physical and rehabilitation medicine; Oct 2017; vol. 53 (no. 5); p. 651-663

Publication Date: Oct 2017

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 28290191

Abstract: BACKGROUND Progressive resistance exercise (PRE) can have a positive effect in individuals with Parkinson's disease (PD). However, the effect of PRE may vary with the clinical subtype of PD. To date, no study has assessed the effects of PRE in the different subtypes of PD. AIM The aim of the present study was to assess the effects of PRE in PD patients with akinesia and rigidity (AR-subtype). DESIGN A randomized controlled trial was conducted. SETTING Outpatients clinics of the Bierzo Parkinson Association (Ponferrada, Spain) and the Asturias Parkinson Association (Oviedo, Spain). POPULATION Twenty-eight patients with AR-subtype PD were randomized into an Experimental Group (EG, N.=13) and Control Group (CG, N.=15). METHODS Static posturography (Centre of Pressure -CoP- parameters), gait (the Ten-Meter Walk Test [TMWT]), freezing of gait (the Freezing of Gait Questionnaire [FOG-Q]), the motor portion of the Movement Disorders Society- Unified Parkinson's Disease Rating Scale (MDS-UPDRS) and patient-perceived quality of life (the 39-item Parkinson's disease Questionnaire [PDQ39]), were assessed at pre-test, post-test, and re-test. Ratings of perceived exertion (RPE) (Borg >6-20 Scale) were recorded at the end of each PRE training session. RESULT The EG displayed significant ameliorations in Length (CoP parameters) from pre- to post-test (P=0.048), in speed of fast rhythm walking (TMWT) from pre- to post-test (P=0.000), and from pre- to re-test (P=0.027), and in the PDQ39 Score from pre- to post-test (P=0.024). No significant differences were detected in Area or Speed (CoP parameters), speed of preferred rhythm walking (TMWT), FOG-Q scores, or the motor portion of the MDS-UPDRS scores. The EG reported a mean RPE of 9.95 (between "very light" and "fairly light") for the whole training program. CONCLUSION These findings provide support for the use of PRE training in the rehabilitation of individuals with AR-subtype PD, as it can improve static posturography, gait, and quality of life. Furthermore, RPE scores showed that individuals with AR-subtype PD consider that PRE training require only light efforts. CLINICAL REHABILITATION IMPACT: The PRE training can be a helpful and fruitful rehabilitation tool for AR-subtype PD patients.

Database: Medline

142. Dance is more than therapy: Qualitative analysis on therapeutic dancing classes for Parkinson's.

Author(s): Rocha, Priscila A; Slade, Susan C; McClelland, Jodie; Morris, Meg E

Source: Complementary therapies in medicine; Oct 2017; vol. 34 ; p. 1-9

Publication Date: Oct 2017
Publication Type(s): Journal Article
PubMedID: 28917359

Abstract: OBJECTIVE To understand the benefits and limitations of therapeutic dancing classes for people with Parkinson's disease (PD) and how best to design and implement classes. DESIGN A stakeholder forum explored the opinions of 18 allied health clinicians, dance instructors, people with PD and caregivers. Data were thematically analysed and interpreted within a grounded theory framework. RESULTS Four main themes were identified: (1) the need to consider the stage of disease progression when designing classes; (2) recognition that dance is more than just therapy; (3) the benefits of carefully selecting music to move by; (4) ways to design classes that are both feasible and engaging. These themes give rise to the theory that dancing classes can provide more than just therapeutic benefits. Dance affords creative expression and enables people to immerse themselves in the art-form, rather than focussing on the disease. The results highlight the benefits of enabling individuals with PD to be able to express themselves in a supportive environment that does not see them solely through the lens of Parkinson’s. The feasibility of dance programs can be increased by educating dancing teachers about PD and the unique needs of people living with this condition. CONCLUSION Well-structured dance classes can promote social-connectedness and joy, in addition to facilitating movement to music and physical activity. Consumers advised that careful planning of the classes and tailoring them to participant needs optimizes outcomes.

Database: Medline

143. A randomized controlled feasibility trial exploring partnered ballroom dancing for people with Parkinson’s disease.

Author(s): Kunkel, D; Fitton, C; Roberts, L; Pickering, R M; Roberts, H C; Wiles, R; Hulbert, S; Robison, J; Ashburn, A

Source: Clinical rehabilitation; Oct 2017; vol. 31 (no. 10); p. 1340-1350

Publication Date: Oct 2017
Publication Type(s): Randomized Controlled Trial Journal Article
PubMedID: 28933613

Abstract: OBJECTIVE To determine the feasibility of a Dance Centre delivering a programme of mixed dances to people with Parkinson’s and identify suitable outcomes for a future definitive trial. DESIGN A two-group randomized controlled feasibility trial. METHODS People with Parkinson’s were randomized to a control or experimental group (ratio 15:35), alongside usual care. In addition, participants in the experimental group danced with a partner for one hour, twice-a-week for 10 weeks; professional dance teachers led the classes and field-notes were kept. Control-group participants were given dance class vouchers at the end of the study. Blinded assessments of balance, mobility and function were completed in the home. Qualitative interviews were conducted with a subsample to explore the acceptability of dance. RESULTS A total of 51 people with Parkinson’s (25 male) with Hoehn and Yahr scores of 1-3 and mean age of 71 years (range 49-85 years), were recruited to the study. Dance partners were of similar age (mean 68, range 56-91 years). Feasibility findings focused on recruitment (target achieved); retention (five people dropped out of dancing); outcome measures (three measures were considered feasible, changes were recommended). Proposed sample size for a Phase III trial, based on the 6-minute walk test at six months was 220. Participants described dance as extremely enjoyable and the instructors were skilled in instilling confidence and motivation. The main organizational challenges for a future trial were transport and identifying suitable dance partners. CONCLUSION We have demonstrated the feasibility of conducting the study through a Dance Centre and recommend a Phase III trial.

**Author(s):** Van Ooteghem, Karen; Frank, James S.; Horak, Fay B.

**Source:** Gait & Posture; Sep 2017; vol. 57; p. 299-304

**Publication Date:** Sep 2017

**Publication Type(s):** Academic Journal

**PubMedID:** NLM28688367

Abstract: Introduction: Although balance training is considered the most effective treatment for balance impairments in Parkinson's disease (PD), few studies have examined if learning for balance control remains intact with PD. This study aimed to determine if learning for automatic postural responses is preserved in people with PD. Methods: Eleven participants with moderate PD (68±6.4 years; H&Y: 2-3) on their usual medication maintained balance on a platform that oscillated forward and backward with variable amplitude and constant frequency. Participants completed 42 trials during one training session, and retention and transfer tests following a 24-h delay. Performance was measured by comparing spatial and temporal measures of whole-body centre of mass (COM) with platform displacements. Learning was compared between participants with PD and previously reported, age-matched older adults (Van Ooteghem et al., 2010). Results: Although postural responses in participants with PD were impaired compared to control participants, a majority of PD participants improved their postural responses with practice as revealed by reduced COM displacements and improved phase relationships between COM and platform motion. Rates of improvement were comparable between groups demonstrating preserved adaptive capacity for participants with PD. Similar to control participants, the PD group moved toward anticipatory COM control as a strategy for improving stability, exhibited short-term retention of performance improvements, and demonstrated generalizability of the learned responses. Rate of improvement with practice, but not retention, was related to severity of motor impairments. Conclusions: Patients with moderate PD on medication demonstrate retention of improvements in automatic postural responses with practice suggesting that intrinsic postural motor learning is preserved in this group.

**Database:** CINAHL


**Author(s):** Zhang, Shuai; Liu, Dong; Ye, Dan; Li, Haiyu; Chen, Feng

**Source:** Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology; Sep 2017; vol. 38 (no. 9); p. 1629-1636

**Publication Date:** Sep 2017

**Publication Type(s):** Meta-analysis Journal Article Review Systematic Review

**PubMedID:** 28634878

Available at Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology - from ProQuest (Health Research Premium) - NHS Version
Abstract: This study aimed to quantify whether there is an association between music-based movement therapy and motor dysfunction in patients with Parkinson's disease, and, if so, whether music-based movement therapy can be used as first-line non-pharmacological treatment. To conduct a systematic review and meta-analysis of clinical trials that examined the effect of music-based movement therapy on patient-relevant and disease-specific outcomes. Comprehensive literature was searched of PubMed, EMBase, and the Cochrane Library from inception to November 2016. Randomized controlled trial of patients with Parkinson’s disease was searched to identify trials comparing music-based movement therapy with no music care. A total of 8 studies (11 analyses, 241 subjects) were included; all of them had acceptable quality by PEDro scale score. Studies based on any type of Parkinson’s disease patients were combined and subgroup analyzed. Compared with the control group, the SMD of Berg Balance Scale score was 0.85 (0.46 to 1.25), -0.60 (-0.98 to -0.22) in Parkinson Disease Questionnaire-39 summary index, -0.90s (-1.56 to -0.23) in Time Up and Go text, and -0.43 (-1.11 to 0.25) in Unified Parkinson’s Disease Rating Scale Motor Subscale 3 as instrument methods for motor function. Secondary outcomes included cognitive function and quality of life. There was positive evidence to support the use of music-based movement therapy on treatment of motor function; there was neutral evidence to support the use of music for the treatment of cognitive function quality of life.

Database: Medline

146. A novel assistive method for rigidity evaluation during deep brain stimulation surgery using acceleration sensors.

Author(s): Shah, Ashesh; Coste, Jérôme; Lemaire, Jean-Jacques; Schkommodau, Erik; Taub, Ethan; Guzman, Raphael; Derost, Philippe; Hemm, Simone

Source: Journal of neurosurgery; Sep 2017; vol. 127 (no. 3); p. 602-612

Publication Date: Sep 2017

Publication Type(s): Journal Article

PubMedID: 27982769

Available at Journal of neurosurgery - from Unpaywall

Abstract: OBJECTIVE Despite the widespread use of deep brain stimulation (DBS) for movement disorders such as Parkinson’s disease (PD), the exact anatomical target responsible for the therapeutic effect is still a subject of research. Intraoperative stimulation tests by experts consist of performing passive movements of the patient’s arm or wrist while the amplitude of the stimulation current is increased. At each position, the amplitude that best alleviates rigidity is identified. Intrarater and interrater variations due to the subjective and semiquantitative nature of such evaluations have been reported. The aim of the present study was to evaluate the use of an acceleration sensor attached to the evaluator’s wrist to assess the change in rigidity, hypothesizing that such a change will alter the speed of the passive movements. Furthermore, the combined analysis of such quantitative results with anatomy would generate a more reproducible description of the most effective stimulation sites. METHODS To test the reliability of the method, it was applied during postoperative follow-up examinations of 3 patients. To study the feasibility of intraoperative use, it was used during 9 bilateral DBS operations in patients suffering from PD. Changes in rigidity were calculated by extracting relevant outcome measures from the accelerometer data. These values were used to identify rigidity-suppressing stimulation current amplitudes, which were statistically compared with the amplitudes identified by the neurologist. Positions for the chronic DBS lead implantation that would have been chosen based on the acceleration data were compared
with clinical choices. The data were also analyzed with respect to the anatomical location of the stimulating electrode. RESULTS Outcome measures extracted from the accelerometer data were reproducible for the same evaluator, thus providing a reliable assessment of rigidity changes during intraoperative stimulation tests. Of the 188 stimulation sites analyzed, the number of sites where rigidity-suppressing amplitudes were found increased from 144 to 170 when the accelerometer evaluations were considered. In general, rigidity release could be observed at significantly lower amplitudes with accelerometer evaluation (mean 0.9 ± 0.6 mA) than with subjective evaluation (mean 1.4 ± 0.6 mA) (p < 0.001). Of 14 choices for the implant location of the DBS lead, only 2 were the same for acceleration-based and subjective evaluations. The comparison across anatomical locations showed that stimulation in the fields of Forel ameliorates rigidity at similar amplitudes as stimulation in the subthalamic nucleus, but with fewer side effects. CONCLUSIONS This article describes and validates a new assistive method for assessing rigidity with acceleration sensors during intraoperative stimulation tests in DBS procedures. The initial results indicate that the proposed method may be a clinically useful aid for optimal DBS lead placement as well as a new tool in the ongoing scientific search for the optimal DBS target for PD.

Database: Medline

147. Dancing for Parkinson Disease: A Randomized Trial of Irish Set Dancing Compared With Usual Care.

Author(s): Shanahan, Joanne; Morris, Meg E; Bhriain, Orfhlaith Ni; Volpe, Daniele; Lynch, Tim; Clifford, Amanda M

Source: Archives of physical medicine and rehabilitation; Sep 2017; vol. 98 (no. 9); p. 1744-1751

Publication Date: Sep 2017

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Multicenter Study Journal Article

PubMedID: 28336345

Available at Archives of physical medicine and rehabilitation - from Unpaywall

Abstract: OBJECTIVE To examine the feasibility of a randomized controlled study design and to explore the benefits of a set dancing intervention compared with usual care. DESIGN Randomized controlled design, with participants randomized to Irish set dance classes or a usual care group. SETTING Community based. PARTICIPANTS Individuals with idiopathic Parkinson disease (PD) (N=90). INTERVENTIONS The dance group attended a 1.5-hour dancing class each week for 10 weeks and undertook a home dance program for 20 minutes, 3 times per week. The usual care group continued with their usual care and daily activities. MAIN OUTCOME MEASURES The primary outcome was feasibility, determined by recruitment rates, success of randomization and allocation procedures, attrition, adherence, safety, willingness of participants to be randomized, resource availability, and cost. Secondary outcomes were motor function (motor section of the Unified Parkinson's Disease Rating Scale), quality of life (Parkinson's Disease Questionnaire-39), functional endurance (6-min walk test), and balance (mini-BESTest). RESULTS Ninety participants were randomized (45 per group). There were no adverse effects or resource constraints. Although adherence to the dancing program was 93.5%, there was >40% attrition in each group. Postintervention, the dance group had greater nonsignificant gains in quality of life than the usual care group. There was a meaningful deterioration in endurance in the usual care group. There were no meaningful changes in other outcomes. The exit questionnaire showed participants enjoyed the classes and would like to continue participation. CONCLUSIONS: For people with mild to moderately severe PD, set dancing is feasible and enjoyable and may improve quality of life.

Database: Medline
148. Micro lesion effect of the globus pallidus internus with deep brain stimulation in Parkinson’s disease patients.

**Author(s):** Wang, Yi; Li, Peng; Gong, FeiLong; Gao, Yuan; Xu, Yang Y; Wang, Wei

**Source:** Acta neurochirurgica; Sep 2017; vol. 159 (no. 9); p. 1727-1731

**Publication Date:** Sep 2017

**Publication Type(s):** Journal Article

**PubMedID:** 28755172

Available at Acta neurochirurgica - from ProQuest (Health Research Premium) - NHS Version

**Abstract:** BACKGROUND The micro-lesion effect (MLE) has been observed in many Parkinson’s disease (PD) patients after deep brain stimulation (DBS) surgery. For subthalamic nucleus (STN) stimulation, the MLE has been reported as a predictor of the long-term efficacy of DBS. However, the research on the MLE in the globus pallidus internus (GPI) is insufficient. In this report, we conducted a study of the correlation between the MLE and improvement of GPI DBS.

**METHODS** From July 2014 to November 2015, 36 PD patients underwent GPI DBS in our hospital. The patients were evaluated before DBS and postoperatively at 24 h, 1 week, 2 weeks, 3 weeks, 6 months and 1 year. The evaluated items included the following: the UPDRSIII score with and without medication, off time per day and severe dyskinesia time per day. The dose of L-dopa, magnitude and duration of MLE were also recorded.

**RESULTS** There were 32 patients with a postoperative MLE. In these 32 cases, the dose of L-dopa decreased from 960.5 ± 257.8 mg (range, 550-1550) to 910.4 ± 207.5 mg (range, 550-1250). There is a correlation between the magnitude of the MLE in UPDRSIII and the improvement degree of DBS at 6 and 12 months compared with the preoperative findings when off medication. The duration of the MLE is also an indication of the improvement of DBS in the long term when off medication. However, there was no correlation with on medication. Compared with the preoperative state, the UPDRSIII score, off time and severe dyskinesia time had improved postoperatively.

**CONCLUSION** The MLE of GPI is a predictor of PD patients who would benefit from DBS in the long term. Medication may have some conflicting effects on the MLE. The exact mechanism of the MLE requires further exploration.

**Database:** Medline

149. Training dual tasks together or apart in Parkinson’s disease: Results from the DUALITY trial.

**Author(s):** Strouwen, Carolien; Molenaar, Esther A. L. M.; Münks, Liesbeth; Keus, Samyra H. J.; Zijlmans, Jan C. M.; Vandenbergh, Wim; Bloem, Bastiaan R.; Nieuwboer, Alice

**Source:** Movement Disorders; Aug 2017; vol. 32 (no. 8); p. 1201-1211

**Publication Date:** Aug 2017

**Publication Type(s):** Academic Journal

**PubMedID:** NLM28440888

**Abstract:** Background and Objectives: Many controversies surround the usefulness of dual-task training in Parkinson’s disease (PD). This study (1) compared the efficacy of two different dual-task training programs for improving dual-task gait and (2) assessed the possible fall risk of such training.

**METHODS** Patients (N = 121) with a diagnosis of PD (aged 65.93 ±9.22 years, Hoehn and Yahr stage II-III on medication) were randomized to (1) a consecutive group in which gait and cognitive tasks were trained separately or (2) an integrated group in which gait and cognitive tasks were trained simultaneously. Both interventions involved 6 weeks of at-home physiotherapist-led training. Two baseline tests were performed as a 6-week control period before training. Posttests...
were performed immediately after training and at 12-week follow-up. Dual-task gait was assessed during trained and untrained secondary tasks to assess consolidation of learning. Fall risk was determined by a weekly telephone call for 24 weeks. Results: No significant time by group interactions were found, suggesting that both training modes had a similar effect on dual-task gait. Immediately after training, and not after the control period, significant improvements (P < .001) in dual-task gait velocity were found in all trained and untrained dual tasks. Improvements ranged between 7.75% and 13.44% when compared with baseline values and were retained at 12-week follow-up. No significant change in fall risk occurred in both study arms (P = .84). Conclusions: Consecutive and integrated dual-task training led to similar and sustained improvements in dual-task gait velocity without increasing fall risk. These novel findings support adoption of dual-task training in clinical practice. © 2017 International Parkinson and Movement Disorder Society.

**Database:** CINAHL

### 150. The involvement of people with Parkinson's in designing a study of the lived experience of anxiety.

**Author(s):** Lovegrove, Christopher J.; Bannigan, Katrina; Cheeseman, Debbie; Latour, Jos M.

**Source:** British Journal of Occupational Therapy; Aug 2017; vol. 80 (no. 8); p. 494-501

**Publication Date:** Aug 2017

**Publication Type(s):** Academic Journal

**Abstract:**

**Introduction:** Anxiety is a common non-motor symptom of Parkinson's and is an important consideration for occupational therapists working with this population. Little is known about how people with Parkinson's experience anxiety. A pragmatic inquiry framework and inductive approach were used to perform a patient and public consultation round to inform future occupational therapy research exploring anxiety in people with Parkinson's. Method: Seven telephone and two Skype interviews were conducted with people with Parkinson's, who were accessed and recruited through the charity Parkinson's UK. They were selected on the basis of their previous experience and training to participate in a consultation exercise. Thematic analysis was used to develop codes using an inductive approach. Findings: Three key themes emerged: experiences of anxiety in Parkinson’s; coping with anxiety in Parkinson’s; and considerations for future research. These include timing with regards to medication 'wearing-off' phenomena, easy access to medications, and providing a safe, sensitive research environment. Occupational therapists need to take these findings into account when designing intervention studies. Conclusion: This patient and public involvement consultation round proved valuable and the participants' contributions will directly improve the design of future occupational therapy research exploring the lived experience of anxiety for people with Parkinson's.

**Database:** CINAHL

### 151. Assessment of individual cognitive changes after deep brain stimulation surgery in Parkinson's disease using the Neuropsychological Test Battery Vienna short version.

**Author(s):** Foki, Thomas; Hitzl, Daniela; Pirker, Walter; Novak, Klaus; Pusswald, Gisela; Auff, Eduard; Lehrner, Johann

**Source:** Wiener klinische Wochenschrift; Aug 2017; vol. 129 (no. 15-16); p. 564-571

**Publication Date:** Aug 2017

**Publication Type(s):** Comparative Study Journal Article

**PubMedID:** 28176003
Available at Wiener klinische Wochenschrift - from Unpaywall

Abstract: Long-term therapy of Parkinson's disease with L-DOPA is associated with a high risk of developing motor fluctuations and dyskinesia. Deep brain stimulation (DBS) of the subthalamic nucleus (STN) can improve these motor complications. Although the positive effect on motor symptoms has been proven, postoperative cognitive decline has been documented. To tackle the impact of DBS on cognition, 18 DBS patients were compared to 25 best medically treated Parkinson's patients, 24 patients with mild cognitive impairment (MCI) and 12 healthy controls using the Neuropsychological Test Battery Vienna short version (NTBV-short) for cognitive outcome 12 months after the first examination. Reliable change index methodology was used. Roughly 10% of DBS patients showed cognitive decline mainly affecting the domains attention and executive functioning (phonemic fluency). Further research is needed to identify the mechanisms that lead to improvement or deterioration of cognitive functions in individual cases.

Database: Medline

152. Home based training for dexterity in Parkinson's disease: A randomized controlled trial.
Author(s): Vanbellingen, Tim; Nyffeler, Thomas; Nigg, Julia; Janssens, Jorina; Hoppe, Johanna; Nef, Tobias; Müri, René M; van Wegen, Erwin E H; Kwakkel, Gert; Bohlhalter, Stephan
Source: Parkinsonism & related disorders; Aug 2017; vol. 41 ; p. 92-98
Publication Date: Aug 2017
Publication Type(s): Randomized Controlled Trial Journal Article
PubMedID: 28578819
Abstract: BACKGROUND Patients with Parkinson's disease exhibit disturbed manual dexterity. This impairment leads to difficulties in activities of daily living, such as buttoning a shirt or hand-writing. The aim of the present study was to investigate the effectiveness of a home-based dexterity program on fine motor skills in a single-blinded, randomized controlled trial, in patients with Parkinson's disease. METHODS One hundred and three patients with Parkinson's disease (aged between 48 and 80 years, Hoehn & Yahr stage I-IV) were randomized to either a home-based dexterity program (HOMEDEXT) or Thera-band program. All patients trained over a period of 4 weeks, 5 times/week, 30 min for each session. A baseline, post-intervention, and follow-up assessment (12 weeks later, time period without intervention) were done. The primary outcome measure was dexterity as measured with the Nine Hole peg test (9-HPT). Secondary outcome measures included strength, motor parkinsonian symptoms, dexterity-related activities of daily living (ADL) and Health-related Quality of Life (HrQoL). RESULTS There was a significant difference in favor of the HOMEDEXT group as compared to the Thera-band group on the primary outcome 9-HPT (p = 0.006) and dexterity-related ADL (p = 0.02) at post intervention. No significant differences were found for the other outcomes, nor at follow-up. CONCLUSION This is the first randomized controlled trial showing that an intensive, task specific home-based dexterity program significantly improved fine motor skills in Parkinson's disease. The effect generalized to dexterity-related ADL functions. As these improvements did not sustain, the finding suggest that continuous training is required to maintain the benefit.

Database: Medline

Author(s): Allen, Natalie E; Song, Jooeun; Paul, Serene S; Smith, Stuart; O'Duffy, Jonathan; Schmidt, Matthew; Love, Rachelle; Sherrington, Catherine; Canning, Colleen G
INTRODUCTION
People with Parkinson’s disease (PD) have difficulty performing upper extremity (UE) activities. The aim of this study was to investigate if exergames targeting the UE improve arm and hand activities and impairments and to establish the acceptability and feasibility of these games in people with PD.

METHODS
Two tablet-based exergames were developed which were controlled with finger movements or unimanual whole arm movements. Participants with PD were randomized to an exergame (n = 19) or control (n = 19) group. The exergame group performed UE exergames at home, 3 times per week for 12 weeks. The primary outcome measure was the nine hole peg test. Secondary outcomes included measures of UE activities and impairments, including the tapping test [speed (taps/60s), and error (weighted error score/speed)].

RESULTS
There were no between group differences in the nine hole peg test, or in any secondary outcome measures except for the tapping test. Horizontal tapping test results showed that exergame participants improved their speed (mean difference = 10.9 taps/60s, p < 0.001) but increased error (mean difference = 0.03, p = 0.03) compared to the control group. Participants enjoyed the games and improved in their ability to play the games. There were no adverse events.

CONCLUSION: The UE exergames were acceptable and safe, but did not translate to improvement in functional activities. It is likely that the requirement of the games resulted in increased movement speed at the detriment of accuracy. The design of exergames should consider task specificity.

Database: Medline

154. The impact of Tai Chi and Qigong mind-body exercises on motor and non-motor function and quality of life in Parkinson's disease: A systematic review and meta-analysis.

Author(s): Song, R; Grabowska, W; Park, M; Osypiuk, K; Vergara-Diaz, G P; Bonato, P; Hausdorff, J M; Fox, M; Sudarsky, L R; Macklin, E; Wayne, P M

Source: Parkinsonism & related disorders; Aug 2017; vol. 41 ; p. 3-13

Publication Type(s): Meta-analysis Journal Article Review Systematic Review

PubMedID: 28602515

Available at Parkinsonism & related disorders - from Unpaywall

Abstract: PURPOSETo systematically evaluate and quantify the effects of Tai Chi/Qigong (TCQ) on motor (UPDRS III, balance, falls, Timed-Up-and-Go, and 6-Minute Walk) and non-motor (depression and cognition) function, and quality of life (QOL) in patients with Parkinson's disease (PD).

METHODS A systematic search in 7 electronic databases targeted clinical studies evaluating TCQ for individuals with PD published through August 2016. Meta-analysis was used to estimate effect sizes (Hedges’s g) and publication bias for randomized controlled trials (RCTs). Methodological bias in RCTs was assessed by two raters.

RESULTS
Our search identified 21 studies, 15 of which were RCTs with a total of 735 subjects. For RCTs, comparison groups included no treatment (n = 7, 47%) and active interventions (n = 8, 53%). Duration of TCQ ranged from 2 to 6 months. Methodological bias was low in 6 studies, moderate in 7, and high in 2. Fixed-effect models showed that TCQ was associated with significant improvement on most motor outcomes (UPDRS III [ES = -0.444, p < 0.001], balance [ES = 0.544, p < 0.001], Timed-Up-and-Go [ES = -0.341, p = 0.005], 6 MW [ES = -0.293, p = 0.06], falls [ES = -0.403, p = 0.004], as well as depression [ES = -0.457, p = 0.008] and QOL [ES = -0.393, p < 0.001], but not cognition [ES = -0.225, p = 0.477]). I2 indicated limited heterogeneity. Funnel plots suggested some degree of publication bias.

CONCLUSION Evidence to
date supports a potential benefit of TCQ for improving motor function, depression and QOL for individuals with PD, and validates the need for additional large-scale trials.

**Database:** Medline

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**155. Perturbation During Treadmill Training Improves Dynamic Balance and Gait in Parkinson’s Disease: A Single-Blind Randomized Controlled Pilot Trial.**

**Author(s):** Steib, Simon; Klamroth, Sarah; Gaßner, Heiko; Pasluosta, Cristian; Eskofier, Björn; Winkler, Jürgen; Klucken, Jochen; Pfeifer, Klaus

**Source:** Neurorehabilitation and neural repair; Aug 2017; vol. 31 (no. 8); p. 758-768

**Publication Date:** Aug 2017

**Publication Type:** Randomized Controlled Trial Journal Article

**PubMedID:** 28758519

Available at [Neurorehabilitation and neural repair](https://www.neurorehabjournal.com) - from Unpaywall

**Abstract:**

**BACKGROUND**

Gait and balance dysfunction are major symptoms in Parkinson's disease (PD). Treadmill training improves gait characteristics in this population but does not reflect the dynamic nature of controlling balance during ambulation in everyday life contexts.

**OBJECTIVE**

To evaluate whether postural perturbations during treadmill walking lead to superior effects on gait and balance performance compared with standard treadmill training.

**METHODS**

In this single-blind randomized controlled trial, 43 PD patients (Hoehn & Yahr stage 1-3.5) were assigned to either an 8-week perturbed treadmill intervention (n = 21) or a control group (n = 22) training on the identical treadmill without perturbations. Patients were assessed at baseline, postintervention, and at 3 months' follow-up. Primary endpoints were overground gait speed and balance (Mini-BESTest). Secondary outcomes included fast gait speed, walking capacity (2-Minute Walk Test), dynamic balance (Timed Up-and-Go), static balance (postural sway), and balance confidence (Activities-Specific Balance Confidence [ABC] scale).

**RESULTS**

There were no significant between-group differences in change over time for the primary outcomes. At postintervention, both groups demonstrated similar improvements in overground gait speed (P = .009), and no changes in the Mini-BESTest (P = .641). A significant group-by-time interaction (P = .048) existed for the Timed Up-and-Go, with improved performance only in the perturbation group. In addition, the perturbation but not the control group significantly increased walking capacity (P = .038). Intervention effects were not sustained at follow-up.

**CONCLUSIONS**

Our primary findings suggest no superior effect of perturbation training on gait and balance in PD patients. However, some favorable trends existed for secondary gait and dynamic balance parameters, which should be investigated in future trials.

**Database:** Medline

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**156. Resistance Training Improves Sleep Quality in Subjects With Moderate Parkinson’s Disease.**

**Author(s):** Silva-Batista, Carla; de Brito, Leandro C; Corcos, Daniel M; Roschel, Hamilton; de Mello, Marco T; Piemonte, Maria E P; Tricoli, Valmor; Ugrinowitsch, Carlos

**Source:** Journal of strength and conditioning research; Aug 2017; vol. 31 (no. 8); p. 2270-2277

**Publication Date:** Aug 2017

**Publication Type:** Randomized Controlled Trial Journal Article

**PubMedID:** 27787472

**Abstract:**

Silva-Batista, C, de Brito, LC, Corcos, DM, Roschel, H, de Mello, MT, Piemonte, MEP, Tricoli, V, and Ugrinowitsch, C. Resistance training improves sleep quality in subjects with moderate Parkinson’s disease. J Strength Cond Res 31(8): 2270-2277, 2017-The objectives of this study were to
test if 12 weeks of progressive resistance training (RT) improves sleep quality and muscle strength in subjects with moderate Parkinson's disease (PD) and if sleep quality values of subjects with moderate PD are closer to those of age-matched healthy controls (HC) at posttraining. This was a randomized controlled trial conducted between March 2013 and September 2014. Twenty-two subjects with moderate PD were randomly assigned to a nonexercising control group (n = 11) or an RT group (n = 11). Thirty-one HC were not randomized to any group. The RT group performed a RT program twice a week for 12 weeks, whereas the control group made no change to their weekly routine. For subjects with PD, sleep quality (i.e., Pittsburgh Sleep Quality Index [PSQI]) and knee-extensor peak torque were assessed before and after 12 weeks of intervention; for HC, these outcomes were assessed at pretest only. There were differences between RT and control groups in PSQI scores, PSQI subscores (i.e., subjective sleep quality and daytime dysfunction), and knee-extensor peak torque at posttraining (p ≤ 0.05). After RT, the average subjects with PD showed lower (i.e., improved) PSQI scores than the average HC (p ≤ 0.05). A negative association was observed between changes in PSQI scores and changes in knee-extensor peak torque at posttraining (r = 0.58, p = 0.028). No adverse events were reported. The RT is recommended as an adjunct therapeutic method for improving sleep quality of subjects with moderate PD and moving these levels to those observed in HC.

**Database:** Medline

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157. Effects of supervised slackline training on postural instability, freezing of gait, and falls efficacy in people with Parkinson's disease.

**Author(s):** Santos, Luis; Fernandez-Rio, Javier; Winge, Kristian; Barragán-Pérez, Beatriz; Rodríguez-Pérez, Vicente; González-Diez, Vicente; Blanco-Traba, Miguel; Suman, Oscar E; Philip Gabel, Charles; Rodríguez-Gómez, Javier

**Source:** Disability and rehabilitation; Aug 2017; vol. 39 (no. 16); p. 1573-1580

**Publication Date:** Aug 2017

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 27416005

**Abstract:**

**PURPOSE** The aim of this study was to assess whether supervised slackline training reduces the risk of falls in people with Parkinson's disease (PD).

**METHOD** Twenty-two patients with idiopathic PD were randomized into experimental (EG, N = 11) and control (CG, N = 11) groups. Center of Pressure (CoP), Freezing of Gait (FOG), and Falls Efficacy Scale (FES) were assessed at pretest, post-test and re-test. Rate perceived exertion (RPE, Borg's 6-20 scale) and local muscle perceived exertion (LRPE) were also assessed at the end of the training sessions.

**RESULTS** The EG group showed significant improvements in FOG and FES scores from pretest to post-test. Both decreased at re-test, though they did not return to pre-test levels. No significant differences were detected in CoP parameters. Analysis of RPE and LRPE scores revealed that slacklining was associated with minimal fatigue and involved the major lower limb and lumbar muscles.

**CONCLUSIONS**

The findings suggest that slacklining is a simple, safe, and challenging training and rehabilitation tool for PD patients. It could be introduced into their physical activity routine to reduce the risk of falls and improve confidence related to fear of falling. Implications for Rehabilitation Individuals with Parkinson's disease (PD) are twice as likely to have falls compared to patients with other neurological conditions. This study support slackline as a simple, safe, and challenging training and rehabilitation tool for people with PD, which reduce their risk of falls and improve confidence related to fear of falling. Slackline in people with PD yields a low tiredness or fatigue impact and involves the major lower limb and lumbar muscles.

**Database:** Medline
158. Individualized guidance and telephone monitoring in a self-supervised home-based physiotherapeutic program in Parkinson.

**Author(s):** Guerra de Oliveira Gondim, Ihana Thaís; Cabral dos Santos Accioly Lins, Carla; Jorge Asano, Nadja Maria; Asano, Amdore Guescel C.; Dantas Cabral, Etenildo; das Graças Wanderley de Sales Coriolano, Maria

**Source:** Fisioterapia em Movimento; Jul 2017; vol. 30 (no. 3); p. 559-568

**Publication Date:** Jul 2017

**Publication Type(s):** Academic Journal

**Available at:** Fisioterapia em Movimento - from Unpaywall

**Abstract:** Introduction: Home therapeutic exercises have been a target of interest in the treatment of the Parkinson's disease (PD). The way that the physical therapist guides and monitors these exercises can impact the success of therapy. Objective: To evaluate the effects of individualized orientation and monitoring by telephone in a self-supervised home therapeutic exercise program on signs and symptoms of PD and quality of life (QoL). Methods: Single-blind randomized clinical trials with 28 people with PD (Hoehn and Yahr 1 to 3). Patients were randomized into two groups: experimental and control. The experimental group had a meeting with individualized guidance about physiotherapy exercises present in a manual, received the manual to guide their activities at home and obtained subsequent weekly monitoring by telephone. The control group received the usual cares by the service. Both were orientated to carry out exercises three times a week during 12 weeks. Was evaluated: (1) activities of daily living (ADL) and motor examination sections of the Unified Parkinson's Disease Rating Scale (UPDRS) and QoL by the Parkinson Disease Questionnaire 39 (PDQ-39). The analysis between groups was performed by the Mann-Whitney test and intragroup through the Wilcoxon (p < 0.05). Results: Significant improvement in ADL (p= 0.001) and motor examination (p= 0.0008) of the UPDRS, PDQ-39 total (p = 0.027) and dimensions mobility (p = 0.027), emotional well-being (p= 0.021) and bodily discomfort (p = 0.027) in the experimental group compared to the control group. Conclusion: The individualized guidance and weekly monitoring by telephone in a self-supervised home therapeutic exercises program promoted positive effects on ADL, motor examination and QoL of people in early stages of PD.

**Database:** CINAHL


**Author(s):** Lawrence, Blake J; Gasson, Natalie; Bucks, Romola S; Troeung, Lakhina; Loftus, Andrea M

**Source:** Neurorehabilitation and neural repair; Jul 2017; vol. 31 (no. 7); p. 597-608

**Publication Date:** Jul 2017

**Publication Type(s):** Meta-analysis Journal Article Review

**PubMedID:** 28583011

**Available at:** Neurorehabilitation and neural repair - from Unpaywall

**Abstract:** BACKGROUND Many people with Parkinson's disease (PD) experience cognitive decline. It is not known whether cognitive training or noninvasive brain stimulation are effective at alleviating cognitive deficits in PD. OBJECTIVE To examine cognitive training and non-invasive brain stimulation interventions for cognition in PD. METHODS An extensive search was conducted of published and unpublished studies in online databases. Studies were selected if they were controlled trials examining standard (not individualized) or tailored (individualized) cognitive training, repetitive transcranial magnetic stimulation (rTMS), or transcranial direct current stimulation (tDCS) in PD, with outcomes measured by standardized neuropsychological tests. RESULTS Fourteen controlled trials...
met inclusion criteria. For executive function, the pooled effect size (Hedges’ g) for cognitive training (standard and tailored combined) was small (g = 0.42) but statistically significant (95% CI 0.15-0.68). The pooled effect for standard cognitive training (alone) was medium (g = 0.51) and significant (95% CI 0.16-0.85). For attention/working memory, small pooled effect sizes were found when combining standard and tailored cognitive training (g = 0.23; 95% CI 0.02-0.44) and for standard cognitive training alone (g = 0.29; 95% CI 0.04-0.53), both significant. For memory, small but significant pooled effect sizes were also found when combining standard and tailored cognitive training and for standard cognitive training alone.

CONCLUSIONS The results suggest that standard and tailored cognitive training may improve executive function, attention/working memory, and memory in PD. Future studies must adopt randomized controlled trial designs to explore the therapeutic potential of these interventions.

Database: Medline


Author(s): Quinn, Lori; Morgan, Don

Source: Journal of neurologic physical therapy : JNPT; Jul 2017; vol. 41

Publication Date: Jul 2017

Publication Type(s): Journal Article Review

PubMedID: 28628596

Abstract: BACKGROUND AND PURPOSE Over the last decade there has been a substantial increase in efforts to better understand how targeted physical activity and exercise interventions can be used to minimize secondary consequences arising from neurological damage in both adult and pediatric populations. This article offers an overview of contemporary research that addresses mediators of functional and neuroplastic adaptations associated with physical activity and exercise. We emphasize the important role that physical therapists can play to increase participation and improve well-being in adults and children with neurological disorders. We further highlight potential strategies to foster translation of evidence-based findings for use by clinicians and consumers.

SUMMARY OF KEY POINTS Engagement in physical activity can serve as a powerful promoter of health and well-being in adults and youth with neurologic disease, and has the potential to alter the course of disease processes. Physical therapists can play a key role in promoting fitness and wellness by encouraging active living, providing early diagnosis of disease and prescribing targeted activity interventions to improve fitness and participation, and helping individuals overcome personal and environmental barriers to an active lifestyle.

RECOMMENDATIONS FOR CLINICAL PRACTICE Physical therapists must adopt a model of rehabilitation that emphasizes secondary prevention in adults and youth with neurologic diseases. Physical therapists have a unique role in developing forward-thinking approaches in using innovative health and wellness strategies to promote positive changes in activity and exercise behaviors.

Database: Medline

161. Anticipatory Postural Adjustment During Self-Initiated, Cued, and Compensatory Stepping in Healthy Older Adults and Patients With Parkinson Disease.

Author(s): Schlenstedt, Christian; Mancini, Martina; Horak, Fay; Peterson, Daniel

Source: Archives of physical medicine and rehabilitation; Jul 2017; vol. 98 (no. 7); p. 1316

Publication Date: Jul 2017
**Pub death Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Research Support, U.s. Gov't, Non-p.h.s. Journal Article

**PubMedID:** 28254637

Available at [Archives of physical medicine and rehabilitation](https://www.archives-pmr.com) - from Unpaywall

**Abstract:** OBJECTIVE To characterize anticipatory postural adjustments (APAs) across a variety of step initiation tasks in people with Parkinson disease (PD) and healthy subjects. DESIGN Cross-sectional study. Step initiation was analyzed during self-initiated gait, perceptual cued gait, and compensatory forward stepping after platform perturbation. People with PD were assessed on and off levodopa. SETTING University research laboratory. PARTICIPANTS People (N=31) with PD (n=19) and healthy aged-matched subjects (n=12). INTERVENTIONS Not applicable. MAIN OUTCOME MEASURES Mediolateral (ML) size of APAs (calculated from center of pressure recordings), step kinematics, and body alignment. RESULTS With respect to self-initiated gait, the ML size of APAs was significantly larger during the cued condition and significantly smaller during the compensatory condition (P<.001). Healthy subjects and patients with PD did not differ in body alignment during the stance phase prior to stepping. No significant group effect was found for ML size of APAs between healthy subjects and patients with PD. However, the reduction in APA size from cued to compensatory stepping was significantly less pronounced in PD off medication compared with healthy subjects, as indicated by a significant group by condition interaction effect (P<.01). No significant differences were found comparing patients with PD on and off medications. CONCLUSIONS Specific stepping conditions had a significant effect on the preparation and execution of step initiation. Therefore, APA size should be interpreted with respect to the specific stepping condition. Across-task changes in people with PD were less pronounced compared with healthy subjects. Antiparkinsonian medication did not significantly improve step initiation in this mildly affected PD cohort.

**Database:** Medline


**Author(s):** Lu, Chiahao; Amundsen Huffmaster, Sommer L; Tuite, Paul J; Vachon, Jacqueline M; MacKinnon, Colum D

**Source:** Archives of physical medicine and rehabilitation; Jul 2017; vol. 98 (no. 7); p. 1291

**Publication Date:** Jul 2017

**Publication Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Journal Article Observational Study

**PubMedID:** 28167093

Available at [Archives of physical medicine and rehabilitation](https://www.archives-pmr.com) - from Unpaywall

**Abstract:** OBJECTIVE To examine the effects of cue timing, across 3 sensory modalities, on anticipatory postural adjustments (APAs) during gait initiation in people with Parkinson disease (PD). DESIGN Observational study. SETTING Biomechanics research laboratory. PARTICIPANTS Individuals with idiopathic PD (N=25; 11 with freezing of gait [FOG]) were studied in the off-medication state (12-h overnight withdrawal). INTERVENTIONS Gait initiation was tested without cueing (self-initiated) and with 3 cue timing protocols: fixed delay (3s), random delay (4-12s), and countdown (3-2-1-go, 1-s intervals) across 3 sensory modalities (acoustic, visual, and vibrotactile). MAIN OUTCOME MEASURES The incidence and spatiotemporal characteristics of APAs during gait initiation were analyzed, including vertical ground reaction forces and center of pressure. RESULTS All cue timings and modalities increased the incidence and amplitude of APAs compared with self-initiated stepping. Acoustic and visual cues, but not vibrotactile stimulation,
improved the timing of APAs. Fixed delay or countdown timing protocols were more effective at decreasing APA durations than random delay cues. Cue-evoked improvements in APA timing, but not amplitude, correlated with the level of impairment during self-initiated gait. Cues did not improve the late push-off phase in the FOG group.

**CONCLUSIONS**
External cueing improves gait initiation in PD regardless of cue timing, modality, or clinical phenotype (with and without FOG). Acoustic or visual cueing with predictive timing provided the greatest improvements in gait initiation; therefore, these protocols may provide the best outcomes when applied by caregivers or devices.

**Database:** Medline

163. **Effect of Dual-Mode and Dual-Site Noninvasive Brain Stimulation on Freezing of Gait in Patients With Parkinson Disease.**

**Author(s):** Chang, Won Hyuk; Kim, Min Soo; Park, Eunhee; Cho, Jin Whan; Youn, Jinyoung; Kim, Yun Kwan; Kim, Yun-Hee

**Source:** Archives of physical medicine and rehabilitation; Jul 2017; vol. 98 (no. 7); p. 1283-1290

**Publication Date:** Jul 2017

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 28193533

**Abstract:**
OBJECTIVE To investigate the effect of dual-mode noninvasive brain stimulation (NIBS) with high-frequency repetitive transcranial magnetic stimulation (rTMS) over the primary motor cortex of the lower leg and anodal transcranial direct current stimulation (tDCS) over the left dorsolateral prefrontal cortex compared with rTMS alone in patients with Parkinson disease (PD) with freezing of gait (FOG).

DESIGN Randomized, double-blind, controlled study.

SETTING Outpatient rehabilitation clinics.

PARTICIPANTS Patients diagnosed as having PD with FOG (N=32). INTERVENTIONS Patients in the dual-mode group underwent 5 consecutive daily sessions of dual-mode NIBS with high-frequency rTMS and tDCS simultaneously, whereas patients in the rTMS group underwent high-frequency rTMS and sham tDCS. MAIN OUTCOME MEASURES Assessments of FOG and motor, ambulatory, and cognitive function were performed 3 times: at baseline before NIBS, immediately after NIBS, and 1 week after cessation of NIBS. RESULTS Significant adverse effects were not observed in either group. Significant changes over time were observed in FOG, motor function, and ambulatory function in each group; however, there was no significant difference between the 2 groups. Executive function showed significant improvement after NIBS only in the dual-mode group. CONCLUSION These results suggest the potential for dual-mode NIBS to modulate 2 different cortices simultaneously. Dual-mode NIBS might be considered a novel therapeutic approach for patients with PD.

**Database:** Medline

164. **Land Plus Aquatic Therapy Versus Land-Based Rehabilitation Alone for the Treatment of Balance Dysfunction in Parkinson Disease: A Randomized Controlled Study With 6-Month Follow-Up.**

**Author(s):** Palamara, Grazia; Gotti, Francesco; Maestri, Roberto; Bera, Rossana; Gargantini, Roberto; Bossio, Fabiola; Zivi, Ilaria; Volpe, Daniele; Ferrazzoli, Davide; Frazzitta, Giuseppe

**Source:** Archives of Physical Medicine & Rehabilitation; Jun 2017; vol. 98 (no. 6); p. 1077-1085

**Publication Date:** Jun 2017

**Publication Type(s):** Academic Journal
**Abstract:** Objectives To assess whether a specific land-based physical intervention with the inclusion of aquatic therapy is more effective than land-based rehabilitation alone for the treatment of balance dysfunction in patients with Parkinson disease (PD), immediately after therapy and at 6 months’ follow-up. Design Randomized controlled study with 6-month follow-up. Setting A PD and brain injury rehabilitation department in a general hospital. Participants Patients (N=34) with moderate-stage PD. Intervention Seventeen patients underwent a land-based rehabilitation protocol called multidisciplinary intensive rehabilitation treatment (MIRT), and 17 underwent MIRT plus aquatic therapy (MIRT-AT). Main Outcome Measures The primary outcome measure was the Berg Balance Scale (BBS); secondary outcome measures were the Unified Parkinson Disease Rating Scale parts II and III (UPDRS II/III) and the Timed Up and Go (TUG) test. These measures were assessed in both groups at admission, at discharge, and after 6 months. Results BBS improved after treatment in both groups. Even though no statistically significant difference between groups was observed at each observation time, BBS scores at follow-up were significantly higher than at baseline in MIRT-AT patients. Both groups also showed an improvement in UPDRS II/III and TUG at the end of treatment compared with baseline, but these findings were lost at the 6-month follow-up. Conclusions Aquatic therapy added to land-based rehabilitation could provide a contribution to the treatment of balance dysfunction in patients with moderate-stage PD.

**Database:** CINAHL

165. Balance training in individuals with Parkinson's disease: Therapist-supervised vs. home-based exercise programme.

**Author(s):** Atterbury, Elizabeth Maria; Welman, Karen Estelle

**Source:** Gait & posture; Jun 2017; vol. 55; p. 138-144

**Publication Date:** Jun 2017

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 28445854

**Abstract:** BACKGROUND Poor locomotion and balance in Parkinson's disease (PD) often diminishes independence. Accordingly, gait is considered one of the most relevant rehabilitation outcomes, and home-based balance exercises might be a viable mode of exercise delivery for individuals with PD. However, research on PD interventions rarely indicate best practices to deliver exercises. Therefore, this study endeavoured to compare the efficacy of a home-based and therapist-supervised balance programme on gait parameters, dynamic balance, balance confidence and motivation in individuals diagnosed with PD. METHODS An experimental study design, including a cluster randomized convenience sample, of 40 participants with idiopathic PD (Hoehn and Yahr stage I-III; age: 65.0±7.7 years). Participants were divided into a therapist-supervised (n=24) and home-based group (n=16). Groups received either eight weeks of balance training with an exercise therapist or a DVD. Outcome measures include the instrumented Timed-Up-and-Go, Functional Gait Analysis (FGA), Activity-specific Balance confidence (ABC) scale and Intrinsic Motivation Inventory (IMI). RESULTS Both groups improved in stride length (p<0.05). Similar FGA improved by 9% and 16% in the therapist-supervised and home-based group, respectively (p<0.01). Only the therapist-supervised group showed improvements in ABC (p=0.051), stride velocity (p=0.0006) and cadence (p=0.046) over the intervention; the latter two were also better compared to home-based (p<0.05). Furthermore the therapist-supervised group were more motivated (p=0.002). CONCLUSION: The home-based balance programme was effective in improving some aspects of gait, albeit the programme supervised by an exercise therapist included somewhat more benefits after the intervention i.e. stride velocity and cadence in individuals with mild to moderate PD.

**Database:** Medline
166. Dance for Parkinson’s-The effects on whole body co-ordination during turning around.

**Author(s):** Hulbert, Sophia; Ashburn, Ann; Roberts, Lisa; Verheyden, Geert

**Source:** Complementary therapies in medicine; Jun 2017; vol. 32 ; p. 91-97

**Publication Date:** Jun 2017

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 28619310

**Abstract:**

OBJECTIVE: To investigate the effects of ballroom and Latin American dancing classes on turning in people with Parkinson’s.

DESIGN: This study employed a randomised, controlled, experimental design.

SETTING: Dance classes were performed in a community dance centre in Southern England and all assessments took place in a gait laboratory.

PARTICIPANTS: Twenty-seven people with mild-moderate Parkinson’s participated.

INTERVENTION: Participants were randomly allocated to receive either 20, 1-h dancing classes over 10 weeks (n=15), or a ‘usual care’ control group (n=12).

MAIN OUTCOME MEASURES: Twelve, 180° on-the-spot turns to the predicted/un-predicted and preferred/un-preferred direction were analysed for each participant, using 3-dimensional motion analysis before and after the intervention period, alongside clinical measures.

RESULTS: Movement of the head, pelvis, and feet during turning in people with Parkinson’s are affected by dancing with tighter coupling of body segments. Significant 4-way interactions between the groups, over time and turn style, with longer latency of the head (p=0.008) and greater rotation in the pelvis (p=0.036), alongside a trend of slower movement of the first (p=0.063) and second (p=0.081) foot in controls were shown, with minimal change in dancers. All interactions were affected by the type of turn. No significant differences were found in the centre of mass displacement, turn time or clinical measures.

CONCLUSION: Those who danced were better able to coordinate their axial and perpendicular segments and surprisingly became more ‘en bloc’ in their turning behaviour, suggesting this may be a beneficial adaptation, rather than a maladaptive result of Parkinson’s, as previously suggested.

**Database:** Medline


**Author(s):** Baumann-Vogel, Heide; Imbach, Lukas L; Sürücü, Oguzkan; Stieglitz, Lennart; Waldvogel, Daniel; Baumann, Christian R; Werth, Esther

**Source:** Sleep; May 2017; vol. 40 (no. 5)

**Publication Date:** May 2017

**Publication Type(s):** Journal Article Observational Study

**PubMedID:** 28369624

**Abstract:**

Study Objectives: This prospective observational study was designed to systematically examine the effect of subthalamic deep brain stimulation (DBS) on subjective and objective sleep-wake parameters in Parkinson patients.

Methods: In 50 consecutive Parkinson patients undergoing subthalamic DBS, we assessed motor symptoms, medication, the position of DBS electrodes within the subthalamic nucleus (STN), subjective sleep-wake parameters, 2-week actigraphy, video-polysomnography studies, and sleep electroencephalogram frequency and dynamics analyses before and 6 months after surgery.

Results: Subthalamic DBS improved not only motor symptoms and reduced daily intake of dopaminergic agents but also enhanced subjective sleep quality and reduced sleepiness (Epworth Sleepiness Scale: -2.1 ± 3.8, p < .001). Actigraphy recordings revealed longer bedtimes (+1:06 ± 0:51 hours, p < .001) without shifting of circadian timing. Upon polysomnography,
we observed an increase in sleep efficiency (+5.2 ± 17.6%, p = .005) and deep sleep (+11.2 ± 32.2 min, p = .017) and increased accumulation of slow-wave activity over the night (+41.0 ± 80.0%, p = .005). Rapid eye movement sleep features were refractory to subthalamic DBS, and the dynamics of sleep as assessed by state space analyses did not normalize. Increased sleep efficiency was associated with active electrode contact localization more distant from the ventral margin of the left subthalamic nucleus. Conclusion: Subthalamic DBS deepens and consolidates nocturnal sleep and improves daytime wakefulness in Parkinson patients, but several outcomes suggest that it does not normalize sleep. It remains elusive whether modulated activity in the STN directly contributes to changes in sleep-wake behavior, but dorsal positioning of electrodes within the STN is linked to improved sleep-wake outcomes.

Database: Medline


Author(s): Bombieri, Federica; Schena, Federico; Pellegrini, Barbara; Barone, Paolo; Tinazzi, Michele; Erro, Roberto

Source: Parkinsonism & related disorders; May 2017; vol. 38 ; p. 8-12

Publication Date: May 2017

Publication Type(s): Journal Article Review Systematic Review

PubMedID: 28202374

Abstract:Nordic Walking is a relatively high intensity activity that is becoming increasingly popular. It involves marching using poles adapted from cross-country skiing poles in order to activate upper body muscles that would not be used during normal walking. Several studies have been performed using this technique in Parkinson disease patients with contradictory results. Thus, we reviewed here all studies using this technique in Parkinson disease patients and further performed a meta-analysis of RCTs where Nordic Walking was evaluated against standard medical care or other types of physical exercise. Nine studies including four RCTs were reviewed for a total of 127 patients who were assigned to the Nordic Walking program. The majority of studies reported beneficial effects of Nordic Walking on either motor or non-motor variables, but many limitations were observed that hamper drawing definitive conclusions and it is largely unclear whether the benefits persist over time. It would appear that little baseline disability is the strongest predictor of response. The meta-analysis of the 4 RCTs yielded a statistically significant reduction of the UPDRS-3 score, but its value of less than 1 point does not appear to be clinically meaningful. Well-designed, large RCTs should be performed both against standard medical care and other types of physical exercise to definitively address whether Nordic Walking can be beneficial in PD.

Database: Medline

169. Aquatic Exercise Therapy for People With Parkinson Disease: A Randomized Controlled Trial.

Author(s): Carroll, Louise M.; Volpe, Daniele; Morris, Meg E.; Saunders, Jean; Clifford, Amanda M.

Source: Archives of Physical Medicine & Rehabilitation; Apr 2017; vol. 98 (no. 4); p. 631-638

Publication Date: Apr 2017

Publication Type(s): Academic Journal

Available at Archives of physical medicine and rehabilitation - from Unpaywall

Abstract: Objective To evaluate the effects of aquatic exercise therapy on gait variability and disability compared with usual care for people with Parkinson disease (PD). Design Single-blind randomized controlled trial. Setting Community-based hydrotherapy pool. Participants Individuals
with PD (Hoehn-Yahr stages I–III) (N=21). Interventions Participants were randomly assigned to either an aquatic exercise therapy group (45min, twice a week for 6wk) or a group that received usual care. Main Outcome Measures The primary outcome measure was gait variability as measured using a motion capture system. Secondary outcomes were quality of life measured on the Parkinson's Disease Questionnaire-39 and freezing of gait and motor disability quantified by the Unified Parkinson's Disease Rating Scale. Feasibility was evaluated by measuring safety, adverse events, and participant satisfaction. Results People in the aquatic therapy group and usual care group showed similar small improvements in gait variability. The aquatic therapy group showed greater improvements in disability than the usual care group (P <.01). No differences between groups or over time were identified for freezing of gait or quality of life. Aquatic therapy sessions were safe and enjoyable with no adverse events. Conclusions Aquatic therapy appears feasible and safe for some people in the early stages of PD.

**Database:** CINAHL

170. A home program of strength training, movement strategy training and education did not prevent falls in people with Parkinson’s disease: a randomised trial.

**Author(s):** Morris, Meg E; Taylor, Nicholas F; Watts, Jennifer J; Evans, Andrew; Horne, Malcolm; Kempster, Peter; Danoudis, Mary; Mcginley, Jennifer; Martin, Clarissa; Menz, Hylton B

**Source:** Journal of Physiotherapy (Elsevier); Apr 2017; vol. 63 (no. 2); p. 94-100

**Publication Date:** Apr 2017

**Publication Type(s):** Academic Journal

Available at Journal of physiotherapy - from Unpaywall

**Abstract:** Questions For people with idiopathic Parkinson’s disease, does a 6-week, comprehensive, home exercise program reduce falls and disability and improve health-related quality of life? Is the program cost-effective? Design Randomised, controlled trial with concealed allocation and assessor blinding. Participants One hundred and thirty-three community-dwelling adults with Parkinson’s disease. Intervention The experimental group completed a 6-week home program comprising progressive resistance strength training, movement strategy training and falls education. The control group completed 6 weeks of non-specific life skills training. Participants in both groups received weekly therapist-guided sessions for 6 consecutive weeks and a weekly self-directed home program. Outcome measures The primary outcome was the rate of falls, documented for the 12-month period immediately after therapy. Secondary outcomes were disability and health-related quality of life, assessed before and after intervention and at a 12-month follow-up. Results A total of 2255 falls were reported by the 12-month follow-up. The proportion of fallers in the experimental and control groups was 61 and 72%, respectively, which was not statistically significantly different (RR = 0.85, 95% CI 0.66 to 1.09). There was no significant between-group difference in the rate of falls (incidence rate ratio = 1.58, 95% CI 0.73 to 3.43). A survival analysis of participant time to first fall did not show a significant between-group difference (log-rank test χ 2 = 0.79, p = 0.37). No significant between-group differences occurred for mobility, disability or quality of life. The mean cost of delivering the experimental intervention was AUD1596. Conclusion A home program of strength and movement strategy training and falls education does not prevent falls when applied at the dose used in this study. Arguably, the dosage of therapy was insufficient. Future trials need to explore further therapy content, repetitions and duration, in order to optimise outcomes and cost-effectiveness.

**Database:** CINAHL

171. Pain in Parkinson disease: a cross-sectional survey of its prevalence, specifics, and therapy.
Author(s): Buhmann, Carsten; Wrobel, Nathalie; Grashorn, Wiebke; Freundt, Odette; Wesemann, Katharina; Diedrich, Sabrina; Bingel, Ulrike
Source: Journal of neurology; Apr 2017; vol. 264 (no. 4); p. 758-769
Publication Date: Apr 2017
Publication Type(s): Journal Article
PubMedID: 28243753

Available at Journal of neurology - from ProQuest (Health Research Premium) - NHS Version

Abstract: We aimed to evaluate prevalence, phenotype, and therapeutic realities of pain in patients with Parkinson disease (PD). Therefore, we assessed 181 outpatients with PD using a cross-sectional approach applying the German Pain Questionnaire (DSF), the PainDetect, and a self-developed Parkinson Disease Pain Questionaire (UPDPQ) covering detailed therapeutic aspects. Furthermore, we investigated the association between pain and PD-disease characteristics, quality of life (PDQ-39), depression, and anxiety (HADS-D, HADS-A). Overall, prevalence of pain was high (95.4%); 91.1% suffered from chronic pain, but in only 22.3% of them, pain disorder was diagnosed. Pain impaired everyday-life moderately to very severely in 48.4% of patients and was the most distressing symptom in 10.2% of all patients. Pain was localized mainly in the back (71.4%) or joints (52.4%), frequently occurred as pain attacks (79%) but appeared with neuropathic character in only 15.3% of patients. Most patients (74.2%) received some kind of pain treatment, mainly provided by orthopedists (62.0%) or general practitioners (50.0%). Physiotherapy (61.3%), pain killers (54.4%), or massage (35.5%) were the most frequent therapeutic measures. Rehabilitative therapy (96.3%) and physiotherapy (89.5%) were rated as most effective, but with vastly temporary effects. 53.3% of patients attributed PD as the main cause for their pain, but only 33.6% found relief from anti-parkinsonian drugs. High levels of pain were associated with higher scores of depression and anxiety, and lower quality of life. Results suggest that pain in PD is frequent, complex, and quality-of-life-impairing but under-diagnosed and unsystematically treated and indicate need to systematically investigate pathophysiology-based treatment strategies.

Database: Medline

172. The effects of Tai Chi on physical function and well-being among persons with Parkinson’s Disease: A systematic review.
Author(s): Cwiękała-Lewis, Klaudia J; Gallek, Matthew; Taylor-Piliae, Ruth E
Source: Journal of bodywork and movement therapies; Apr 2017; vol. 21 (no. 2); p. 414-421
Publication Date: Apr 2017
Publication Type(s): Journal Article Review Systematic Review
PubMedID: 28532886

Abstract: Current medical treatments for Parkinson’s disease (PD) are mainly palliative, though research indicates Tai Chi exercise improves physical function and well-being. An electronic database search of PubMed, CINAHL, Web of Science, Cochrane Library, PsycINFO and Embase was conducted, to examine current scientific literature for potential benefits of Tai Chi on physical function and well-being among persons with PD. A total of 11 studies met the inclusion criteria: 7 randomized clinical trials and 4 quasi-experimental studies. PD participants (n = 548) were on average age 68 years old and 50% women. Overall, participants enrolled in Tai Chi had better balance and one or more aspect of well-being, though mixed results were reported. Further research is needed with more rigorous study designs, larger sample sizes, adequate Tai Chi exercise doses, and carefully chosen outcome measures that assess the mechanisms as well as the effects of Tai Chi, before widespread recommendations can be made.
173. Effects of twelve weeks of aerobic or strength training in addition to standard care in Parkinson’s disease: a controlled study.

Author(s): Demonceau, Marie; Maquet, Didier; Jidovtseff, Boris; Donneau, Anne F; Bury, Thierry; Croisier, Jean L; Crielaard, Jean M; Rodriguez de la Cruz, Carlos; Delvaux, Valérie; Garraux, Gaëtan

Source: European journal of physical and rehabilitation medicine; Apr 2017; vol. 53 (no. 2); p. 184-200

Publication Date: Apr 2017

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 27585055

Abstract: BACKGROUND: Physical exercise in addition to standard care (SC) in patients with Parkinson's disease (PD) is now a common practice in many care units. However, exercises can cover a wide range of interventions, and the specific effects of different interventions still deserve to be further investigated. AIM: The aim of this study was to compare the effects of 12 weeks of two different types of physical exercises with SC in patients suffering from PD. DESIGN: Pseudo-randomized controlled trial. SETTING: University laboratory for outcomes, University Hospital Centre for interventions. POPULATION: Fifty-two outpatients suffering from mild to moderate PD at baseline. METHOD: Participants were allocated to three groups: the strength training (ST) group performed individualized upper and lower limbs strength training, the aerobic training (AE) group performed tailored gradual aerobic cycling, and the third group received SC. The effects of the interventions on body function were assessed by measuring isokinetic concentric peak torque for knee extension and flexion, peak oxygen consumption (VO2peak) and peak work load (PWL) during an incremental maximal cycling test. Changes in mobility were evaluated from spatial-temporal gait features measured by mean of an accelerometer system and the Six-Minute Walk Distance (6MWD) Test. We used questionnaires to estimate health-related quality of life and habitual physical activity. RESULTS: No significant changes in any outcome measures occurred in the SC group. More than 80% of the participants adequately completed the AE and the ST interventions. The ST group significantly improved all peak torque measures (P<0.01), except knee extension in the least affected side (P=0.13). This group also improved the PWL (P=0.009) and 6MWD (P=0.03). The AE group improved the VO2peak (P=0.02) and PWL (P<0.001). CONCLUSION: Physical fitness in patients with PD rapidly improved in compliance with training specificities, but better fitness hardly translated into better mobility and health-related quality of life. CLINICAL REHABILITATION IMPACT: Physiotherapists can efficiently propose physical conditioning to patients with mild to moderate PD, but these interventions are insufficient to improve gait and participation. Notwithstanding, ST is an efficient intervention for improving walking capacity.

Database: Medline

174. Balance versus resistance training on postural control in patients with Parkinson's disease: a randomized controlled trial.

Author(s): Santos, Suhaila M; da Silva, Rubens A; Terra, Marcelle B; Almeida, Isabela A; de Melo, Lúcio B; Ferraz, Henrique B

Source: European journal of physical and rehabilitation medicine; Apr 2017; vol. 53 (no. 2); p. 173-183

Publication Date: Apr 2017

Publication Type(s): Randomized Controlled Trial Journal Article
PubMedID: 27879959

Abstract: BACKGROUND: Evidences have shown that physiotherapy programs may improve the balance of individuals with Parkinson's disease (PD), although it is not clear which specific exercise program is better. AIM: The aim of this study was to compare the effectiveness of balance versus resistance training on postural control measures in PD patients. DESIGN: Randomized controlled trial. SETTING: The study was conducted in a physiotherapy outpatient clinic of a university hospital. POPULATION: A total of 40 PD participants were randomly divided into two groups: balance training (BT) and resistance training (RT). METHOD: The BT group focused on balance training, functional independence and gait while the RT group performed resistance exercises emphasizing the lower limbs and trunk, both supervised by trained physiotherapists. Therapy sessions were held twice a week (at 60 minutes), totaling 24 sessions. The primary outcome was evaluated by force platform with center of pressure sway measures in different balance conditions and the secondary outcome was evaluated by Balance Evaluation Systems Test (BESTest) scale to determine the effects of the intervention on postural control. RESULTS: Significant improvement of postural control (pre vs. post 15.1 vs. 9.6 cm²) was only reported in favor of BT group (d=1.17) for one-legged stand condition on force platform. The standardized mean difference between groups was significantly (P<0.02), with 36% of improvement for BT vs. 0.07% for RT on this condition. Significant improvement (P<0.05) was also observed in favor of BT (in mean 3.2%) for balance gains in some BESTest scores, when compared to RT group (-0.98%). CONCLUSION: Postural control in Parkinson's disease is improved when training by a directional and specific balance program than a resistance training program. CLINICAL REHABILITATION IMPACT: Balance training is superior to resistance training in regard to improving postural control of individuals with PD. Gold standard instruments (high in cost and difficult to access) were used to assess balance, as well as scales with clinical applicability (low cost, easily acceptable, applicable and valid), which can guide the management of physiotherapists both in their decision-making and in clinical practice.

Database: Medline

175. Effects of Nordic walking training on functional parameters in Parkinson's disease: a randomized controlled clinical trial.

Author(s): Monteiro, E P; Franzoni, L T; Cubillos, D M; de Oliveira Fagundes, A; Carvalho, A R; Oliveira, H B; Pantoja, P D; Schuch, F B; Rieder, C R; Martinez, F G; Peyré-Tartaruga, L A

Source: Scandinavian journal of medicine & science in sports; Mar 2017; vol. 27 (no. 3); p. 351-358

Publication Date: Mar 2017

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 26833853

Abstract: We compare the effects of Nordic walking training (NW) and Free walk (FW) on functional parameters (motor symptoms, balance) and functional mobility (Timed Up and Go at Self-selected Speed - TUGSS, and at forced speed, TUGFS; Self-selected Walking Speed, SSW; locomotor rehabilitation index, LRI) of Parkinson's disease (PD) patients. The study included 33 patients with clinical diagnosis of idiopathic PD, and staging between 1 and 4 in the Hoehn and Yahr scale (H&Y) randomized into two groups: NW (N = 16) and FW (N = 17) for 6 weeks. Baseline characteristics were compared trough a one-way ANOVA. Outcomes were analyzed using the Generalized Estimation Equations (GEE) with a Bonferroni post-hoc. Data were analyzed using SPSS v.20.0. Improvements in UPDRS III (P < 0.001), balance scores (P < 0.035), TUGSS distance (P < 0.001), TUGFS distance (P < 0.001), SSW (P < 0.001), and LRI (P < 0.001) were found for both groups. However, the NW group showed significant differences (P < 0.001) when compared to the FW group for the functional mobility. We conclude the NW improves functional parameters and walking mobility demonstrating
that NW is as effective as the FW, including benefits for FW on the functional mobility of people with PD.

**Database:** Medline

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**176. Does Nordic Walking restore the temporal organization of gait variability in Parkinson’s disease?**

**Author(s):** Warlop, Thibault; Detrembleur, Christine; Buxes Lopez, Maité; Stoquart, Gaëtan; Lejeune, Thierry; Jeanjean, Anne

**Source:** Journal of neuroengineering and rehabilitation; Feb 2017; vol. 14 (no. 1); p. 17

**Publication Date:** Feb 2017

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 28222810

Available at Journal of neuroengineering and rehabilitation - from Europe PubMed Central - Open Access

**Abstract:** BACKGROUND: Gait disorders of Parkinson’s disease (PD) are characterized by the breakdown of the temporal organization of stride duration variability that was tightly associated to dynamic instability in PD. Activating the upper body during walking, Nordic Walking (NW) may be used as an external cueing to improve spatiotemporal parameters of gait, such as stride length or gait variability, in PD. The aim of this study was to evaluate the beneficial effects of NW on temporal organization of gait variability and spatiotemporal gait variables in PD.

**METHODS:** Fourteen mild to moderate PD participants and ten age-matched healthy subjects performed 2 × 12 min overground walking sessions (with and without pole in a randomized order) at a comfortable speed. Gait speed, cadence, step length and temporal organization (i.e. long-range autocorrelations; LRA) of stride duration variability were studied on 512 consecutive gait cycles using a unidimensional accelerometer placed on the malleola of the most affected side in PD patients and of the dominant side in healthy controls. The presence of LRA was determined using the Rescaled Range Analysis (Hurst exponent) and the Power Spectral Density (α exponent). To assess NW and disease influences on gait, paired t-tests, Z-score and a two-way (pathological condition x walking condition) ANOVA repeated measure were used.

**RESULTS:** Leading to significant improvement of LRA, NW enhances step length and reduces gait cadence without any change in gait speed in PD. Interestingly, LRA and step length collected from the NW session are similar to that of the healthy population.

**CONCLUSION:** This cross-sectional controlled study demonstrates that NW may constitute a powerful way to struggle against the randomness of PD gait and the typical gait hypokinesia. Involving a voluntary intersegmental coordination, such improvement could also be due to the upper body rhythmic movements acting as rhythmical external cue to bypass their defective basal ganglia circuitries.

**ETHICS COMMITTEE’S REFERENCE NUMBER:** B403201318916

**TRIAL REGISTRATION:** NCT02419768.

**Database:** Medline

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**177. Walking in fully immersive virtual environments: an evaluation of potential adverse effects in older adults and individuals with Parkinson’s disease.**

**Author(s):** Kim, Aram; Darakjian, Nora; Finley, James M

**Source:** Journal of neuroengineering and rehabilitation; Feb 2017; vol. 14 (no. 1); p. 16

**Publication Date:** Feb 2017

**Publication Type(s):** Clinical Trial Journal Article
Abstract: BACKGROUND Virtual reality (VR) has recently been explored as a tool for neurorehabilitation to enable individuals with Parkinson’s disease (PD) to practice challenging skills in a safe environment. Current technological advances have enabled the use of affordable, fully immersive head-mounted displays (HMDs) for potential therapeutic applications. However, while previous studies have used HMDs in individuals with PD, these were only used for short bouts of walking. Clinical applications of VR for gait training would likely involve an extended exposure to the virtual environment, which has the potential to cause individuals with PD to experience simulator-related adverse effects due to their age or pathology. Thus, our objective was to evaluate the safety of using an HMD for longer bouts of walking in fully immersive VR for older adults and individuals with PD.

METHODS Thirty-three participants (11 healthy young, 11 healthy older adults, and 11 individuals with PD) were recruited for this study. Participants walked for 20 min while viewing a virtual city scene through an HMD (Oculus Rift DK2). Safety was evaluated using the mini-BESTest, measures of center of pressure (CoP) excursion, and questionnaires addressing symptoms of simulator sickness (SSQ) and measures of stress and arousal.

RESULTS Most participants successfully completed all trials without any discomfort. There were no significant changes for any of our groups in symptoms of simulator sickness or measures of static and dynamic balance after exposure to the virtual environment. Surprisingly, measures of stress decreased in all groups while the PD group also increased the level of arousal after exposure.

CONCLUSIONS: Older adults and individuals with PD were able to successfully use immersive VR during walking without adverse effects. This provides systematic evidence supporting the safety of immersive VR for gait training in these populations.

Database: Medline


Author(s): Dinkelbach, Lars; Möller, Bettina; Witt, Karsten; Schnitzler, Alfons; Südmeyer, Martin

Source: BMC neurology; Feb 2017; vol. 17 (no. 1); p. 36

Publication Date: Feb 2017

Publication Type(s): Journal Article

PubMedID: 28222691

Available at BMC neurology - from Europe PubMed Central - Open Access

Abstract: BACKGROUND The introduction of deep brain stimulation (DBS) about 25 years ago provided one of the major breakthroughs in the treatment of Parkinson’s disease (PD). However, a high percentage of patients are reluctant to undergo DBS. Previous research revealed that the critical step on the patient’s path to DBS is the decision whether to undergo further diagnostic assessment for surgery at a specialized DBS-center. The aims of the current study were to evaluate how effective the combination of an outpatient DBS screening tool, STIMULUS, with specially developed educational material was to enhance patient education on DBS and to identify motivational aspects which influenced the patients’ willingness to undergo further assessment.

METHODS In total, 264 patients were identified as appropriate candidates for DBS by general neurologists using the electronic preselection tool STIMULUS. Patient-centered information material was designed and handed out to support education on DBS. Further, several clinical characteristics and details of the patient counseling were documented. Refusal or consent to show up at a DBS center was registered over the following 16 months.

RESULTS 114 (43.2%) patients preselected as eligible for DBS (STIMULUS Score ≥ 6) agreed to show up at a specialized DBS center.
to undergo further diagnostic assessment. The patients' ages, PD classification as an akinetic-rigid type and the talks' topics side-effects of dopaminergic medication and the optimal time frame had a significant influence on the patients' decisions.

CONCLUSION
The combination of preselection tools as STIMULUS with comprehensive information material is effective to increase DBS-acceptance rate in PD patients. Important topics of the information about DBS cover the optimal time frame for DBS surgery, the side-effects of dopaminergic medication as well as side-effects and complications of DBS surgery.

Database: Medline

179. Repeated sessions of transcranial direct current stimulation evaluation on fatigue and daytime sleepiness in Parkinson's disease.

Author(s): Forogh, Bijan; Rafiei, Maryam; Arbabi, Amin; Motamed, Mohammad Reza; Madani, Seyed Pezehman; Sajadi, Simin

Source: Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology; Feb 2017; vol. 38 (no. 2); p. 249-254

Publication Date: Feb 2017

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 27796604

Available at Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology - from ProQuest (Health Research Premium) - NHS Version

Available at Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology - from EBSCO (Psychology and Behavioral Sciences Collection)

Abstract: Parkinson is a common and disabling disease that affects patient's and career's quality of life. Unfortunately, medications, such as dopaminergic and sedative-hypnotic drugs, as an effective treatment have unwilling side effects. Recently, Transcranial Direct Current Stimulation (tDCS) in conjunction with medication becomes popular as a complementary safe treatment and several studies have proved its effectiveness on controlling motor and specially non-motor aspects of Parkinson's disease. In this randomized double-blind parallel study, 23 patients with Parkinson's disease divided into two groups of real tDCS plus occupational therapy and sham tDCS plus occupational therapy and the effects of therapeutic sessions (eight sessions tDCS with 0.06 mA/cm2 current, 20 min on dorsolateral prefrontal cortex) were evaluated on fatigue and daytime sleepiness just after therapeutic course and in 3-month follow-up. tDCS had a significant effect on fatigue and no effect on daytime sleepiness reduction in patients with Parkinson’s disease. tDCS is an effective and safe complementary treatment on fatigue reduction in Parkinson's disease.

Database: Medline


Author(s): Belasen, Abigail; Rizvi, Khizer; Gee, Lucy E; Yeung, Philip; Prusik, Julia; Ramirez-Zamora, Adolfo; Hanspal, Era; Paiva, Priscilla; Durphy, Jennifer; Argoff, Charles E; Pilitsis, Julie G

Source: Journal of neurosurgery; Feb 2017; vol. 126 (no. 2); p. 397-403

Publication Date: Feb 2017

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 27104841
Abstract: OBJECTIVE Chronic pain is a major distressing symptom of Parkinson's disease (PD) that is often undertreated. Subthalamic nucleus (STN) deep brain stimulation (DBS) delivers high-frequency stimulation (HFS) to patients with PD and has been effective in pain relief in a subset of these patients. However, up to 74% of patients develop new pain concerns while receiving STN DBS. Here the authors explore whether altering the frequency of STN DBS changes pain perception as measured through quantitative sensory testing (QST). METHODS Using QST, the authors measured thermal and mechanical detection and pain thresholds in 19 patients undergoing DBS via HFS, low-frequency stimulation (LFS), and off conditions in a randomized order. Testing was performed in the region of the body with the most pain and in the lower back in patients without chronic pain. RESULTS In the patients with chronic pain, LFS significantly reduced heat detection thresholds as compared with thresholds following HFS (p = 0.029) and in the off state (p = 0.010). Moreover, LFS resulted in increased detection thresholds for mechanical pressure (p = 0.020) and vibration (p = 0.040) compared with these thresholds following HFS. Neither LFS nor HFS led to changes in other mechanical thresholds. In patients without chronic pain, LFS significantly increased mechanical pain thresholds in response to the 40-g pinprick compared with thresholds following HFS (p = 0.032). CONCLUSIONS Recent literature has suggested that STN LFS can be useful in treating nonmotor symptoms of PD. Here the authors demonstrated that LFS modulates thermal and mechanical detection to a greater extent than HFS. Low-frequency stimulation is an innovative means of modulating chronic pain in PD patients receiving STN DBS. The authors suggest that STN LFS may be a future option to consider when treating Parkinson's patients in whom pain remains the predominant complaint.

Database: Medline


Author(s): Volpe, Daniele; Pavan, Davide; Morris, Meg; Guiotto, Annamaria; Iansek, Robert; Fortuna, Sofia; Frazzitta, Giuseppe; Sawacha, Zimi

Source: Gait & posture; Feb 2017; vol. 52 ; p. 87-94

Publication Date: Feb 2017

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 27888696

Abstract: Although hydrotherapy is one of the physical therapies adopted to optimize gait rehabilitation in people with Parkinson disease, the quantitative measurement of gait-related outcomes has not been provided yet. This work aims to document the gait improvements in a group of parkinsonians after a hydrotherapy program through 2D and 3D underwater and on land gait analysis. Thirty-four parkinsonians and twenty-two controls were enrolled, divided into two different cohorts. In the first one, 2 groups of patients underwent underwater or land based walking training; controls underwent underwater walking training. Hence pre-treatment 2D underwater and on land gait analysis were performed, together with post-treatment on land gait analysis. Considering that current literature documented a reduced movement amplitude in parkinsonians across all lower limb joints in all movement planes, 3D underwater and on land gait analysis were performed on a second cohort of subjects (10 parkinsonians and 10 controls) who underwent underwater gait training. Baseline land 2D and 3D gait analysis in parkinsonians showed shorter stride length and slower speed than controls, in agreement with previous findings. Comparison between underwater and on land gait analysis showed reduction in stride length, cadence and speed on both parkinsonians and controls. Although patients who underwent underwater treatment exhibited significant changes on spatiotemporal parameters and sagittal plane lower limb kinematics, 3D gait analysis documented a significant (p<0.05) improvement in all movement planes. These data...
deserve attention for research directions promoting the optimal recovery and maintenance of walking ability.

**Database: Medline**

182. The effects of unilateral versus bilateral subthalamic nucleus deep brain stimulation on prosaccades and antisaccades in Parkinson's disease.

**Author(s):** Goelz, Lisa C; David, Fabian J; Sweeney, John A; Vaillancourt, David E; Poizner, Howard; Metman, Leonard Verhagen; Corcos, Daniel M

**Source:** Experimental brain research; Feb 2017; vol. 235 (no. 2); p. 615-626

**Publication Date:** Feb 2017

**Publication Type(s):** Research Support, N.i.h., Extramural Journal Article

**PubMedID:** 27844097

Abstract: Unilateral deep brain stimulation (DBS) of the subthalamic nucleus (STN) in patients with Parkinson's disease improves skeletomotor function assessed clinically, and bilateral STN DBS improves motor function to a significantly greater extent. It is unknown whether unilateral STN DBS improves oculomotor function and whether bilateral STN DBS improves it to a greater extent. Further, it has also been shown that bilateral, but not unilateral, STN DBS is associated with some impaired cognitive-motor functions. The current study compared the effect of unilateral and bilateral STN DBS on sensorimotor and cognitive aspects of oculomotor control. Patients performed prosaccade and antisaccade tasks during no stimulation, unilateral stimulation, and bilateral stimulation. There were three sets of findings. First, for the prosaccade task, unilateral STN DBS had no effect on prosaccade latency and it reduced prosaccade gain; bilateral STN DBS reduced prosaccade latency and increased prosaccade gain. Second, for the antisaccade task, neither unilateral nor bilateral stimulation had an effect on antisaccade latency, unilateral STN DBS increased antisaccade gain, and bilateral STN DBS increased antisaccade gain to a greater extent. Third, bilateral STN DBS induced an increase in prosaccade errors in the antisaccade task. These findings suggest that while bilateral STN DBS benefits spatiotemporal aspects of oculomotor control, it may not be as beneficial for more complex cognitive aspects of oculomotor control. Our findings are discussed considering the strategic role the STN plays in modulating information in the basal ganglia oculomotor circuit.

**Database: Medline**


**Author(s):** Leavy, Breiffni; Roaldsen, Kirsti Skavberg; Nylund, Kamilla; Hagströmer, Maria; Franzén, Erika

**Source:** Physical Therapy; Jan 2017; vol. 97 (no. 1); p. 81-89

**Publication Date:** Jan 2017

**Publication Type(s):** Academic Journal

Available at [Physical therapy](http://www.physicaltherapyjournal.com) - from HighWire - Free Full Text

Abstract: Background. There is growing evidence for the positive effects of exercise training programs on balance control in Parkinson disease (PD). To be effective, balance training needs to be
specific, progressive, and highly challenging. Little evidence exists, however, for how people with PD-related balance impairments perceive highly challenging and progressive balance training programs with dual-task components. Objective. The purpose of this study was to explore and describe perceptions of a highly challenging balance training program among people with mild to moderate PD. Design. This study was qualitative in nature. In-depth interviews were conducted with 13 individuals with mild to moderate PD who had participated in a highly challenging balance training program. Interview transcripts were analyzed using qualitative content analysis, with an inductive approach. Results. The analysis revealed 3 subthemes concerning participants' perceptions of highly challenging and progressive balance training: (1) movement to counter the disease, (2) dual-task training in contrast to everyday strategies, and (3) the struggle to maintain positive effects. The first subtheme reflects how physical activity was used as a short-term and long-term strategy for counteracting PD symptoms and their progression. The second sub-theme incorporates the described experiences of being maximally challenged in a secure and supportive group environment, circumstances that stood in contrast to participants' everyday lives. The third subtheme describes participants' long-term struggle to maintain program effects on cognitive and physical function in the face of disease progression. Interpretation of the underlying patterns of these subthemes resulted in one overarching theme: training at the limits of balance capacity causes a rethinking motor and cognitive resources. Limitations. The findings of this study cannot be considered to reflect the beliefs of those with weaker or negative beliefs concerning physical activity or be transferred to those at more severe stages of the disease. Conclusions. Findings from this study suggest that being pushed to the limits of balance capacity provoked people with mild to moderate PD to rethink their individual motor and cognitive resources, a process that was further enabled by the PD-specific group setting.

Database: CINAHL

184. Effects of 2 Years of Exercise on Gait Impairment in People With Parkinson Disease: The PRET-PD Randomized Trial.

Author(s): Rafferty, Miriam R; Prodoehl, Janey; Robichaud, Julie A; David, Fabian J; Poon, Cynthia; Goelz, Lisa C; Vaillancourt, David E; Kohrt, Wendy M; Comella, Cynthia L; Corcos, Daniel M

Source: Journal of neurologic physical therapy : JNPT; Jan 2017; vol. 41 (no. 1); p. 21-30

Publication Date: Jan 2017

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 27977518

Abstract: BACKGROUND AND PURPOSE:This study presents a secondary analysis from the Progressive Resistance Exercise Training in Parkinson Disease (PRET-PD) trial investigating the effects of progressive resistance exercise (PRE) and a Parkinson disease (PD)-specific multimodal exercise program, modified Fitness Counts (mFC), on spatial, temporal, and stability-related gait impairments in people with PD. METHODS:Forty-eight people with PD were randomized to participate in PRE or mFC 2 times a week for 24 months; 38 completed the study. Gait velocity, stride length, cadence, and double-support time were measured under 4 walking conditions (off-/on-medication, comfortable/fast speed). Ankle strength was also measured off- and on-medication. Twenty-four healthy controls provided comparison data at one time point. RESULTS:At 24 months, there were no significant differences between exercise groups. Both groups improved fast gait velocity off-medication, cadence in all conditions, and plantarflexion strength off-/on-medication. Both groups with PD had more gait measures that approximated the healthy controls at 24 months than at baseline. Plantarflexion strength was significantly associated with gait velocity and stride length in people with PD at baseline and 24 months, but changes in strength were not associated with changes in gait. DISCUSSION AND CONCLUSIONS: Twenty-four months of PRE and mFC were
associated with improved off-medication fast gait velocity and improved cadence in all conditions, which is important because temporal gait measures can be resistant to medications. Spatial and stability-related measures were resistant to long-term improvements, but did not decline over 24 months. Strength gains did not appear to transfer to gait. Video Abstract available for more insights from the authors (see Supplemental Digital Content 1, http://links.lww.com/JNPT/A161).

**Database:** Medline

**185. Influence of treadmill gait training with additional load on motor function, postural instability and history of falls for individuals with Parkinson’s disease: A randomized clinical trial.**

**Author(s):** Trigueiro, Larissa Coutinho de Lucena; Gama, Gabriela Lopes; Ribeiro, Tatiana Souza; Ferreira, Louise Gabriella Lopes de Macedo; Galvão, Élida Rayanne Viana Pinheiro; Silva, Emília Márzia Gomes de Souza E; Júnior, Clécio de Oliveira Godéiro; Lindquist, Ana Raquel Rodrigues

**Source:** Journal of bodywork and movement therapies; Jan 2017; vol. 21 (no. 1); p. 93-100

**Publication Date:** Jan 2017

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 28167197

**Abstract:** BACKGROUND Evaluate the effects of additional load (5% and 10% of body weight) with treadmill gait training on the motor aspects in Parkinson’s disease (PD). METHODS Randomized controlled single-blind trial with 30 individuals with PD. The volunteers were divided into three groups (treadmill with 0%, 5% or 10% load), where Unified Parkinson’s Disease Rating Scale was applied. Treadmill gait training was conducted over 4 consecutive weeks, with three weekly sessions of 30 min each. RESULTS There was a significant reduction in all groups in the time factor for motor function (F = 12.92; P = 0.001) and postural instability (F = 11.23; P = 0.002). No significant difference was observed in group x time interaction (F 0.19). CONCLUSION: The treadmill comprises an effective therapy for people with PD, for important motor aspects such as motor function and postural instability. Additional load had no influence on results.

**Database:** Medline

**186. Effect of high-frequency subthalamic neurostimulation on gait and freezing of gait in Parkinson’s disease: a systematic review and meta-analysis.**

**Author(s):** Schlenstedt, C; Shalash, A; Muthuraman, M; Falk, D; Witt, K; Deuschl, G

**Source:** European journal of neurology; Jan 2017; vol. 24 (no. 1); p. 18-26

**Publication Date:** Jan 2017

**Publication Type(s):** Meta-analysis Journal Article Review Systematic Review

**PubMedID:** 27766724

**Abstract:** The aim of this meta-analysis was to summarize the short- and long-term effects of bilateral deep brain stimulation of the subthalamic nucleus (STN-DBS) on gait and freezing of gait (FOG) in Parkinson’s disease and to detect predictors of post-stimulation outcome. A comprehensive review of the literature was conducted up to October 2015 using Medline Ovid databases for studies analyzing the effect of bilateral STN-DBS on FOG and/or gait. Sixteen studies with available data for the gait item (no. 29) of the Unified Parkinson’s Disease Rating Scale (UPDRS) and six studies with the FOG item (no. 14) were included. Data were summarized for the following follow-up periods: 6-15, 24-48 and >48 months. For the medication (Med)-Off/stimulation(Stim)-On condition compared with baseline Med-Off, STN-DBS significantly improved gait on average from 2.43 to 0.96, 2.53 to 1.31 and 2.56 to 1.40 points at 6-15, 24-48 and ≥48 months, respectively (P < 0.001).
There was no significant effect in the Med-On/Stim-On condition. This meta-analysis showed a robust improvement of gait and FOG by STN-DBS for more than 4 years in the Med-Off/Stim-On condition. No beneficial effect was found for the On state of medication. Pre-operative levodopa responsiveness of global motor performance (UPDRS-III) is the strongest predictor of the effect of deep brain stimulation on gait.

**Database:** Medline

**187.** *Deep Brain Stimulation for Parkinson's Disease with Early Motor Complications: A UK Cost-Effectiveness Analysis.*

**Author(s):** Fundament, Tomasz; Eldridge, Paul R; Green, Alexander L; Whone, Alan L; Taylor, Rod S; Williams, Adrian C; Schuepbach, W M Michael

**Source:** PloS one; 2016; vol. 11 (no. 7); p. e0159340

**Publication Date:** 2016

**Publication Type(s):** Journal Article

**PubMedID:** 27441637

Available at PloS one - from Europe PubMed Central - Open Access

**Abstract:** Background: Parkinson’s disease (PD) is a debilitating illness associated with considerable impairment of quality of life and substantial costs to health care systems. Deep brain stimulation (DBS) is an established surgical treatment option for some patients with advanced PD. The EARLYSTIM trial has recently demonstrated its clinical benefit also in patients with early motor complications. We sought to evaluate the cost-effectiveness of DBS, compared to best medical therapy (BMT), among PD patients with early onset of motor complications, from a United Kingdom (UK) payer perspective. Methods: We developed a Markov model to represent the progression of PD as rated using the Unified Parkinson’s Disease Rating Scale (UPDRS) over time in patients with early PD. Evidence sources were a systematic review of clinical evidence; data from the EARLYSTIM study; and a UK Clinical Practice Research Datalink (CPRD) dataset including DBS patients. A mapping algorithm was developed to generate utility values based on UPDRS data for each intervention. The cost-effectiveness was expressed as the incremental cost per quality-adjusted life-year (QALY). One-way and probabilistic sensitivity analyses were undertaken to explore the effect of parameter uncertainty. Results: Over a 15-year time horizon, DBS was predicted to lead to additional mean cost per patient of £26,799 compared with BMT (£73,077/patient versus £46,278/patient) and an additional mean 1.35 QALYs (6.69 QALYs versus 5.35 QALYs), resulting in an incremental cost-effectiveness ratio of £19,887 per QALY gained with a 99% probability of DBS being cost-effective at a threshold of £30,000/QALY. One-way sensitivity analyses suggested that the results were not significantly impacted by plausible changes in the input parameter values. Conclusion: These results indicate that DBS is a cost-effective intervention in PD patients with early motor complications when compared with existing interventions, offering additional health benefits at acceptable incremental cost. This supports the extended use of DBS among patients with early onset of motor complications.

**Database:** Medline

**188.** *Efficacies of globus pallidus stimulation and subthalamic nucleus stimulation for advanced Parkinson’s disease: a meta-analysis of randomized controlled trials.*

**Author(s):** Tan, Zhi-Gang; Zhou, Qian; Huang, Tao; Jiang, Yugang

**Source:** Clinical interventions in aging; 2016; vol. 11; p. 777-786

**Publication Date:** 2016
OBJECTIVES Deep brain stimulation (DBS) is the surgical procedure for patients with advanced Parkinson's disease. Globus pallidus internus (GPI) and subthalamic nucleus (STN) are the most targeted locations for the procedure. To investigate the variable efficiencies for the two different locations, we conducted a meta-analysis to compare both stimulation sites.

MATERIALS AND METHODS A systematic search was performed in PubMed, Embase, and the Cochrane Library databases. Randomized controlled trials comparing the efficacies of GPI and STN DBS were included. Clinical outcomes of motor function, nonmotor function, and quality of life (QOL) were collected for the meta-analysis.

RESULTS Ten eligible trials with 1,034 patients were included in the analysis. Unified Parkinson's disease rating scale III (UPDRS-III) scores were collected at 6, 12, and 24 months postsurgery separately to assess the motor function of the patients. A statistically significant effect in favor of the GPI DBS was obtained in the off-medication/on-stimulation phase of UPDRS-III at 12 months (mean difference [MD] =6.87, 95% confidence interval [95% CI]: 3.00-10.74, P=0.57, I²=0%). However, GPI DBS showed an opposite result at 24 months (MD =-2.46, 95% CI: -4.91 to -0.02, P=0.05, I²=0%). In the on-medication/on-stimulation phase, GPI DBS obtained a worse outcome compared with STN DBS (MD =-2.90, 95% CI: -5.71 to -0.09, P=0.05, I²=0%). Compared with STN DBS, increased dosage of levodopa equivalent doses was needed in GPI DBS (standardized MD =0.60, 95% CI: 0.46-0.74, P<0.00001, I²=24%). Meanwhile, Beck Depression Inventory II scores demonstrated that STN has a better performance (standardized MD =-0.31, 95% CI: -0.51 to -0.12, P=0.002, I²=0%). As for neurocognitive phase postsurgery, GPI DBS showed better performance in three of the nine tests, especially in verbal fluency. Use of GPI DBS was associated with a greater effect in eight of the nine subscales of QOL.

CONCLUSION GPI and STN DBS significantly improve advanced Parkinson's patients' symptoms, functionality, and QOL. Variable therapeutic efficiencies were observed in both procedures, GPI and STN DBS. GPI DBS allowed greater recovery of verbal fluency and provided greater relief of depression symptoms. Better QOL was also obtained using GPI DBS. Meanwhile, GPI DBS was also associated with increased dosage of levodopa equivalent doses. The question regarding which target is superior remained open for discussion. An understanding of the target selection still depends on individual symptoms, neurocognitive/mood status, therapeutic goals of DBS (eg, levodopa reduction), and surgical expertise.
neuropsychiatric and neuropsychological symptoms have been systematically studied in a longitudinal design so far. However, these are only a part of the non-motor symptoms spectrum. 

**HYPOTHESIS** We hypothesized that STN-DBS is associated with a beneficial effect on a range of non-motor symptoms.

**METHODS** In this multicenter, open, prospective, international study (EuroInf-study, UKCRN10084/DRKS00006735) we investigated non-motor effects of STN-DBS in "real-life" use. We evaluated Non-motor Symptom Scale, and Questionnaire, PD Questionnaire-8, Scales for Outcomes of PD motor examination and complications, and activities of daily living preoperatively and at 6 months follow-up in 60 consecutive patients (35 male, mean age: 61.6 ± 7.8 years, mean disease duration: 10.4 ± 4.2 years). 

**RESULTS** All outcomes improved significantly at 6 months follow-up (PD Questionaire-8, p = 0.006; activities of daily living, p = 0.012; all others, p < 0.001; Wilcoxon signed-rank, respectively paired t-test; Bonferroni-correction). Post-hoc analyses of Non-motor Symptom Scale domains showed a significant reduction of sleep/fatigue and miscellaneous domains (p ≤ 0.001), perceptual problems/hallucinations (p = 0.036), and urinary (p = 0.018) scores. Effect sizes were "moderate" for Non-motor Symptom Scale, and motor complications, "large" for motor examination, and "small" for other outcomes. 

**CONCLUSION** This study provides evidence that bilateral STN-DBS improves non-motor burden in patients with PD and opens the door to a more balanced evaluation of DBS outcomes. Further randomized studies are needed to confirm these findings and compare DBS non-motor effects to other invasive therapies of advanced PD.

**Database:** Medline

190. **Virtual reality for rehabilitation in Parkinson's disease.**

**Author(s):** Dockx, Kim; Bekkers, Esther Mj; Van den Bergh, Veerle; Ginis, Pieter; Rochester, Lynn; Haardorff, Jeffrey M; Mirelman, Anat; Nieuwboer, Alice

**Source:** The Cochrane database of systematic reviews; Dec 2016; vol. 12 ; p. CD010760

**Publication Date:** Dec 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Meta-analysis Journal Article Review Systematic Review

**PubMedID:** 28000926


**Abstract:** **BACKGROUND** Parkinson's disease (PD) is a neurodegenerative disorder that is best managed by a combination of medication and regular physiotherapy. In this context, virtual reality (VR) technology is proposed as a new rehabilitation tool with a possible added value over traditional physiotherapy approaches. It potentially optimises motor learning in a safe environment, and by replicating real-life scenarios could help improve functional activities of daily living. 

**OBJECTIVE** The objective of this review was to summarise the current best evidence for the effectiveness of VR interventions for the rehabilitation of people with PD in comparison with 1) active interventions, and 2) passive interventions. Our primary goal was to determine the effect of VR training on gait and balance. Secondary goals included examining the effects of VR on global motor function, activities of daily living, quality of life, cognitive function, exercise adherence, and the occurrence of adverse events.

**SEARCH METHODS** We identified relevant articles through electronic searches of the Cochrane Movement Disorders Group Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL) (the Cochrane Library), MEDLINE, Embase, CINAHL, the Physiotherapy Evidence Database (PEDro), online trials registers, and by handsearching reference lists. We carried out all searches up until 26 November 2016. 

**SELECTION CRITERIA** We searched for randomised and quasi-randomised controlled trials of VR exercise interventions in people with PD. We included only trials where motor rehabilitation was the primary goal. 

**DATA COLLECTION AND ANALYSIS** Two review authors independently searched for trials that corresponded to the predefined inclusion criteria. We
independently extracted and assessed all data for methodological quality. A third review author was responsible for conflict resolution when required. MAIN RESULTS We included 8 trials involving 263 people with PD in the review. Risk of bias was unclear or high for all but one of the included studies. Study sample sizes were small, and there was a large amount of heterogeneity between trials with regard to study design and the outcome measures used. As a result, we graded the quality of the evidence as low or very low. Most of the studies intended to improve motor function using commercially available devices, which were compared with physiotherapy. The interventions lasted for between 4 and 12 weeks. In comparison to physiotherapy, VR may lead to a moderate improvement in step and stride length (standardised mean difference (SMD) 0.69, 95% confidence interval (CI) 0.30 to 1.08; 3 studies; 106 participants; low-quality evidence). VR and physiotherapy interventions may have similar effects on gait (SMD 0.20, 95% CI -0.14 to 0.55; 4 studies; 129 participants; low-quality evidence), balance (SMD 0.34, 95% CI -0.04 to 0.71; 5 studies; 155 participants; low-quality evidence), and quality of life (mean difference 3.73 units, 95% CI -2.16 to 9.61; 4 studies; 106 participants). VR interventions did not lead to any reported adverse events, and exercise adherence did not differ between VR and other intervention arms. The evidence available comparing VR exercise with a passive control was more limited. The evidence for the main outcomes of interest was of very low quality due to the very small sample sizes of the two studies available for this comparison. AUTHORS’ CONCLUSIONS We found low-quality evidence of a positive effect of short-term VR exercise on step and stride length. VR and physiotherapy may have similar effects on gait, balance, and quality of life. The evidence available comparing VR with passive control interventions was more limited. Additional high-quality, large-scale studies are needed to confirm these findings.

Database: Medline

191. Acute and Long-Term Effects of Multidirectional Treadmill Training on Gait and Balance in Parkinson Disease.

Author(s): Bryant, Mon S; Workman, Craig D; Hou, Jyh-Gong G; Henson, Helene K; York, Michele K

Source: PM & R: the journal of injury, function, and rehabilitation; Dec 2016; vol. 8 (no. 12); p. 1151-1158

Publication Date: Dec 2016

Publication Type(s): Journal Article

PubMedID: 27178378

Abstract: BACKGROUND Treadmill training has been shown to be a promising rehabilitation strategy for improving gait and balance in persons with Parkinson disease (PD). Most studies have involved only forward walking as an intervention. The effects of multidirectional treadmill (forward, backward, and left and right sideways) on gait and balance have not been reported. OBJECTIVE To investigate the acute and long-term effects of multidirectional treadmill training (MDTT) on gait and balance in persons with PD, and to determine the optimal training duration. DESIGN Single group, repeated-measures design. SETTING Research laboratory in a hospital. PARTICIPANTS Ten persons with PD (mean age 65.9 ± 7.4 years; average disease duration 3.90 ± 2.18 years). INTERVENTIONS MDTT was used. Participants walked forward, backward, and left and right sideways for 5-7 minutes in each direction at their fastest tolerated speed. The training was 3 days per week continuously for 8 weeks. MAIN OUTCOME MEASUREMENTS Gait speed, cadence, and stride length of forward, backward and sideways walks; time and number of steps to turn 360°; and the timed 5-step test and Timed Up-and-Go (TUG) test were performed after the first session of MDTT and every 2 weeks. Effect size of MDTT on each gait and balance variable was measured every 2 weeks for 8 weeks to determine the optimal training duration. Gait and balance variables after the first session of MDTT were compared to the baseline values (pre-MDTT) to study the acute effect of MDTT. RESULTS Stride
length of forward, backward, and sideways walks improved immediately after 1 session of MDTT (P = .031, .012, and .001, respectively). The number of steps to turn and the timed 5-step test score decreased after the first session (P = .016, and .010, respectively). Six weeks of training was found to yield the largest mean effect size of all gait and balance variables. At 6 weeks of MDTT, gait speed of all walking directions (P = .001-.031), stride length of backward (P < .005) and sideways (P = .001) walks, cadence of sideways walk (P = .036), number of steps to turn (P = .014), and timed 5-step test (P = .033) improved from pre-MDTT measures. CONCLUSIONS: MDTT immediately improved gait and balance in persons with PD. Six weeks of MDTT might be the optimal training duration to improve gait and balance in the long term. LEVEL OF EVIDENCE IV.

Database: Medline


Author(s): Aldridge, Danielle; Theodoros, Deborah; Angwin, Anthony; Vogel, Adam P

Source: Parkinsonism & related disorders; Dec 2016; vol. 33 ; p. 3-11

Publication Date: Dec 2016

Publication Type(s): Journal Article Review Systematic Review

PubMedID: 27693195

Abstract: Deep brain stimulation (DBS) of the subthalamic nucleus (STN) is effective in reducing motor symptoms for many individuals with Parkinson's disease (PD). However, STN DBS does not appear to influence speech in the same way, and may result in a variety of negative outcomes for people with PD (PWP). A high degree of inter-individual variability amongst PWP regarding speech outcomes following STN DBS is evident in many studies. Furthermore, speech studies in PWP following STN DBS have employed a wide variety of designs and methodologies, which complicate comparison and interpretation of outcome data amongst studies within this growing body of research. An analysis of published evidence regarding speech outcomes in PWP following STN DBS, according to design and quality, is missing. This systematic review aimed to analyse and coalesce all of the current evidence reported within observational and experimental studies investigating the effects of STN DBS on speech. It will strengthen understanding of the relationship between STN DBS and speech, and inform future research by highlighting methodological limitations of current evidence.

Database: Medline


Author(s): Bonnechère, Bruno; Jansen, Bart; Omelina, Lubos; Van Sint Jan, Serge


Publication Date: Dec 2016

Publication Type(s): Journal Article Review Systematic Review

PubMedID: 27508968

Abstract: The aim of this paper was to investigate the effect of commercial video games (VGs) in physical rehabilitation of motor functions. Several databases were screened (Medline, SAGE Journals Online, and ScienceDirect) using combinations of the following free-text terms: commercial games, video games, exergames, serious gaming, rehabilitation games, PlayStation, Nintendo, Wii, Wii Fit,
Xbox, and Kinect. The search was limited to peer-reviewed English journals. The beginning of the search time frame was not restricted and the end of the search time frame was 31 December 2015. Only randomized controlled trial, cohort, and observational studies evaluating the effect of VGs on physical rehabilitation were included in the review. A total of 4728 abstracts were screened, 275 were fully reviewed, and 126 papers were eventually included. The following information was extracted from the selected studies: device type, number and type of patients, intervention, and main outcomes. The integration of VGs into physical rehabilitation has been tested for various pathological conditions, including stroke, cerebral palsy, Parkinson’s disease, balance training, weight loss, and aging. There was large variability in the protocols used (e.g. number of sessions, intervention duration, outcome measures, and sample size). The results of this review show that in most cases, the introduction of VG training in physical rehabilitation offered similar results as conventional therapy. Therefore, VGs could be added as an adjunct treatment in rehabilitation for various pathologies to stimulate patient motivation. VGs could also be used at home to maintain rehabilitation benefits.

Database: Medline


Author(s): Elsner, Bernhard; Kugler, Joachim; Pohl, Marcus; Mehrholz, Jan

Source: European journal of physical and rehabilitation medicine; Dec 2016; vol. 52 (no. 6); p. 902-906

Publication Date: Dec 2016

Publication Type(s): Meta-analysis Journal Article Review

PubMedID: 27701368

Abstract: INTRODUCTION Idiopathic Parkinson's Disease (IPD) is a neurodegenerative disorder. The severity of disability usually increases with disease duration and affects patients' impairment, disability and health-related quality of life. A possible adjunct to improve outcomes in patients with IPD might be transcranial direct current stimulation (tDCS) to modulate cortical excitability and hence improving outcomes in people with IPD. EVIDENCE ACQUISITION Until February 2016 we searched the following databases: the Cochrane Central Register of Controlled Trials (CENTRAL; the Cochrane Library; 2016, issue 2), MEDLINE, EMBASE, CINAHL, AMED, Science Citation Index, the Physiotherapy Evidence Database (PEDro), Rehabdata, and Inspec and handsearched conference proceedings, and contacted authors and equipment manufacturers. We included only randomized controlled trials (RCTs) and randomized controlled crossover trials comparing tDCS versus control interventions in adults with IPD. EVIDENCE SYNTHESIS Two authors independently extracted data and assessed trial quality. We included six trials with 137 participants. There was no effect of tDCS compared to sham tDCS in our primary outcome measure, impairment, as measured by the proportional change of the Unified Parkinson’s Disease Rating Scale (UPDRS) (mean difference (MD) -7.10%, 95% confidence interval (CI) -19.18 to 4.97; P=0.25). There was evidence of an effect on UPDRS part III motor subsection score at the end of the intervention period (MD -14.43%, 95% CI -24.68 to -4.18; P=0.006). There was no evidence of an effect regarding the reduction in off time and on time with dyskinesia (MD 0.10 hours, 95% CI -0.14 to 0.34; P=0.41; and MD 0.00 hours, 95% CI -0.12 to 0.12; P=1, respectively). There was no evidence of an effect for gait speed, health related quality of life and safety/acceptability, measured by dropouts and adverse events (including death). CONCLUSION There is insufficient evidence to determine the effects of tDCS in reducing off time and on time with dyskinesia and for improving health-related quality of life, disability and impairment in patients with IPD.

Database: Medline
195. A process evaluation of a home-based occupational therapy intervention for Parkinson’s patients and their caregivers performed alongside a randomized controlled trial.

Author(s): Sturkenboom, Ingrid Hwm; Nijhuis-van der Sanden, Maria Wg; Graff, Maud Jl

Source: Clinical rehabilitation; Dec 2016; vol. 30 (no. 12); p. 1186-1199

Publication Date: Dec 2016

Publication Type(s): Randomized Controlled Trial Multicenter Study Journal Article

PubMedID: 26672997

Abstract: OBJECTIVE To evaluate fidelity, treatment enactment and the experiences of an occupational therapy intervention in Parkinson’s disease, to identify factors that affect intervention delivery and benefits. DESIGN Mixed methods alongside a randomized controlled trial. SUBJECTS These include 124 home-dwelling Parkinson’s disease patients and their primary caregivers (recipients), and 18 occupational therapists. INTERVENTION Ten-week home-based intervention according to the Dutch guidelines for occupational therapy in Parkinson’s disease. MAIN MEASURES Data were collected on intervention dose, protocol process, content of treatment (fidelity), offered and performed strategies (treatment enactment), and recipients’ experiences. Therapists’ experiences were collected through case note analyses and focus group interviews. RESULTS Mean intervention dose was 9.3 (SD 2.3) hours. Mean protocol process adherence was high (93%; SD 9%), however the intervention did not (fully) address the goal for 268 of 617 treatment goals. Frequencies of offered and performed strategies appeared similar, apart from ‘using other tools and materials’ which showed a drop from 279 advised to 149 used. The recipients were satisfied overall with the intervention (mean score 8 out of 10). The therapists noted positive or negative influencing factors on both process and benefits: the research context, the socio-political healthcare context, the recipients’ personal and contextual factors, and the therapists’ competence. CONCLUSION We found some prerequisite factors in equipment provision and available dose important for treatment delivery. Other elicited factors related to, or affected, the required professional competencies and tools to tailor interventions to the complexity of interacting personal and contextual factors of patients and caregivers.

Database: Medline

196. The effect of the rehabilitation program on balance, gait, physical performance and trunk rotation in Parkinson’s disease.

Author(s): Stożek, Joanna; Rudzińska, Monika; Pustułka-Piwnik, Urszula; Szczudlik, Andrzej

Source: Aging clinical and experimental research; Dec 2016; vol. 28 (no. 6); p. 1169-1177

Publication Date: Dec 2016

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 26661467

Available at Aging clinical and experimental research - from ProQuest (Health Research Premium) - NHS Version

Available at Aging clinical and experimental research - from Unpaywall

Abstract: BACKGROUND Parkinson’s disease (PD) is a progressive, neurodegenerative disease which leads to postural and gait disorders, limitation in mobility, activities of daily living and disability. AIM The aim of the study is to assess the effects of the rehabilitation program on balance, gait, motor performance and trunk rotations in PD patients. METHOD Sixty-four patients with 1.5-3.0 stage PD in the Hoehn and Yahr scale were randomly allocated to rehabilitation and control groups.
Sixty-one patients completed the study. Patients were assessed three times, at month intervals. Between the first and second assessments, the rehabilitation group participated in a rehabilitation training program focused on mobility, balance and gait exercises, consisting of 28 sessions. Balance was assessed with tandem stance and the Pastor test (shoulder tug). Gait was assessed with a 10 m walk at preferred speed and 360° turn. Motor performance was evaluated by means of the Physical Performance Test (PPT) and timed motor activities. The trunk rotations were measured in the lumbar and thoraco-lumbar spine with a tape measure.

RESULTS The rehabilitation group significantly improved (p < 0.05) in balance and gait outcomes, PPT score, timed activities and trunk rotations both in comparison to the control group and baseline results. The positive effects of the exercise program maintained for at least 1 month.

CONCLUSION: The 4-week rehabilitation training program focused on mobility, balance and gait exercises improved balance, gait, physical performance and trunk rotations in patients with PD.

Database: Medline

197. Deep brain stimulation and sleep-wake functions in Parkinson's disease: A systematic review.
Author(s): Eugster, Lukas; Bargiotas, Panagiotis; Bassetti, Claudio L; Michael Schuepbach, W M
Source: Parkinsonism & related disorders; Nov 2016; vol. 32; p. 12-19
Publication Date: Nov 2016
Publication Type(s): Journal Article Review Systematic Review
PubMedID: 27605426

Abstract: Sleep-wake disturbances (SWD) are common nonmotor symptoms (NMS) and have a great impact on quality of life of patients with Parkinson’s disease (PD). Deep brain stimulation (DBS) is an established treatment in PD. While the beneficial effects of DBS on cardinal PD motor symptoms are indisputable, the data for several NMS, including sleep-wake functions, are limited and often controversial. Our primary objective was to review the literature on the impact of DBS on sleep-wake functions in patients with PD. A systematic review of articles, published in PubMed between January 1st, 2000 and December 31st, 2015 was performed to identify studies addressing the evolution of sleep-wake functions after DBS in patients with PD. Only 38 of 208 studies, involving a total of 1443 subjects, met the inclusion criteria. Most of them reported a positive effect of subthalamic DBS on sleep quality and consequently on quality of life. Seven studies used polysomnography to objectively assess sleep parameters. The data concerning subthalamic DBS and wake functions are controversial and studies using objective, laboratory-based measures for the assessment of wake functions are lacking. Very few studies assessed the impact of other DBS targets (e.g. pallidal stimulation) on SWD. Further prospective observational DBS studies assessing subjectively and objectively specific sleep-wake parameters in patients with PD are needed.

Database: Medline

198. The Effects of Physical Activity in Parkinson's Disease: A Review.
Author(s): Lauzé, Martine; Daneault, Jean-Francois; Duval, Christian
Source: Journal of Parkinson's disease; Oct 2016; vol. 6 (no. 4); p. 685-698
Publication Date: Oct 2016
Publication Type(s): Journal Article Review
PubMedID: 27567884

Abstract: Background: Physical activity (PA) is increasingly advocated as an adjunct intervention for individuals with Parkinson's disease (PD). However, the specific benefits of PA on the wide variety of
impairments observed in patients with PD has yet to be clearly identified.

**OBJECTIVE**

Highlight health parameters that are most likely to improve as a result of PA interventions in patients with PD.

**METHODS**

We compiled results obtained from studies examining a PA intervention in patients with PD and who provided statistical analyses of their results. 868 outcome measures were extracted from 106 papers published from 1981 to 2015. The results were classified as having a statistically significant positive effect or no effect. Then, outcome measures were grouped into four main categories and further divided into sub-categories.

**RESULTS**

Our review shows that PA seems most effective in improving Physical capacities and Physical and cognitive functional capacities. On the other hand, PA seems less efficient at improving Clinical symptoms of PD and Psychosocial aspects of life, with only 50% or less of results reporting positive effects. The impact of PA on Cognitive functions and Depression also appears weaker, but few studies have examined these outcomes.

**DISCUSSION**

Our results indicate that PA interventions have a positive impact on physical capacities and functional capacities. However, the effect of PA on symptoms of the disease and psychosocial aspects of life are moderate and show more variability. This review also highlights the need for more research on the effects of PA on cognitive functions, depression as well as specific symptoms of PD.

**Database:** Medline

199. **Dopamine-independent effects of combining transcranial direct current stimulation with cued gait training on cortical excitability and functional mobility in Parkinson's disease.**

**Author(s):** Costa-Ribeiro, Adriana; Maux, Ariadne; Bosford, Thamyris; Tenório, Yumi; Marques, Déborah; Carneiro, Maíra; Nitsche, Michael A; Filho, Alberto Moura; Monte-Silva, Kátia

**Source:** Journal of rehabilitation medicine; Oct 2016; vol. 48 (no. 9); p. 819-823

**Publication Date:** Oct 2016

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 27608611

Available at Journal of rehabilitation medicine - from IngentaConnect - Open Access

**Abstract:**

OBJECTIVE

To investigate the dopamine-dependent effect of combining transcranial direct current stimulation (tDCS) with visually cued gait training on cortical excitability and functional mobility in individuals with Parkinson's disease.

DESIGN

A pilot, randomized, double-blind, controlled trial.

METHODS

Twenty-two patients with Parkinson's disease were randomly assigned to 2 groups: (i) active anodal tDCS over the supplementary motor area (experimental group), or (ii) sham tDCS (control group). After tDCS, both groups participated in a visually cued gait training. Functional mobility was evaluated with the Timed Up and Go test (TUG). Cortical excitability was assessed by active motor threshold and motor-evoked potential amplitudes elicited by transcranial magnetic stimulation in patients in on and off medication states.

RESULTS

In the TUG test both groups achieved improvements either in on or off medication condition compared with baseline. However, for both medication conditions, these gains were maintained only in the experimental group during 1-month follow-up, compared with baseline. In the experimental group, enhancement of cortical excitability was observed at post-intervention and 1-month follow-up (both only for the "on" phase) compared with baseline.

CONCLUSION

These findings suggest that tDCS, independent of dopaminergic medication state, might prolong the positive effect induced by cued gait training on functional mobility.

**Database:** Medline
200. Long-term double-blinded unilateral pedunculopontine area stimulation in Parkinson's disease.

**Author(s):** Mestre, Tiago A; Sidiropoulos, Christos; Hamani, Clement; Poon, Yu-Yan; Lozano, Andres M; Lang, Anthony E; Moro, Elena

**Source:** Movement disorders : official journal of the Movement Disorder Society; Oct 2016; vol. 31 (no. 10); p. 1570-1574

**Publication Date:** Oct 2016

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 27392513

**Abstract:**
BACKGROUND: Gait-related symptoms are often refractory to current available treatment options with a significant reduction in quality of life in Parkinson's disease. OBJECTIVE: The objective of this study was to determine the long-term efficacy and safety of unilateral pedunculopontine area stimulation for refractory gait and balance impairment in Parkinson's disease. METHOD: This study used periodic randomized double-blinded assessments until 4 years postoperatively. The primary outcomes were gait-related items of the UPDRS part II and the MDS-UPDRS part III. RESULTS: At baseline, the median age and disease duration was 63 years (interquartile range: 62, 65) and 15 years (interquartile range: 11, 20). At 2 years, patient-reported freezing (UPDRS part II, off-time) was significantly better when compared with baseline (P =.028), with 62.5% of responders. At 4 years, there was no significant change in the used outcomes, but 66.7% (n = 4 of 6) were responders for off-time patient-reported freezing and falling. CONCLUSION: Pedunculopontine area stimulation has an initial but not sustained benefit for gait-related symptoms. © 2016 International Parkinson and Movement Disorder Society.

**Database:** Medline

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201. Immediate effects of perturbation treadmill training on gait and postural control in patients with Parkinson's disease.

**Author(s):** Klamroth, Sarah; Steib, Simon; Gaßner, Heiko; Goßler, Julia; Winkler, Jürgen; Eskofier, Bjoern; Klucken, Jochen; Pfeifer, Klaus

**Source:** Gait & posture; Oct 2016; vol. 50 ; p. 102-108

**Publication Date:** Oct 2016

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 27591395

**Abstract:**
The study investigates immediate adaptations of gait and balance to a single session of perturbed treadmill walking in patients with Parkinson's disease. 39 Parkinson's patients in stage 1-3.5 of the Hoehn and Yahr Scale were randomized into one of two groups, stratified by disease severity: The experimental group (n=19) walked on a treadmill prototype which constantly applied perturbation by small three-dimensional tilting movements of the walking surface. The control group (n=20) trained on the identical treadmill without perturbations. Patients walked on the treadmill for 20min. Primary outcome measure was overground walking speed. Secondary outcomes were postural sway during quiet standing and spatiotemporal gait parameters during treadmill walking. Outcomes were measured repeatedly throughout the training session and after 10min retention. The experimental group significantly increased overground walking speed after intervention compared to the control group (p=0.014; ES=+0.41). Gait variability during treadmill walking significantly decreased after walking with perturbation. Sway area increased with treadmill walking only in the control group (p=0.009; ES=+0.49). No other postural sway measures changed over time. Subgroup analyses revealed that in the experimental group patients with more pronounced motor...
impairment demonstrated larger increases in overground walking speed ($p=0.016; \text{ES}=+0.40$) and stance phase symmetry ($p=0.011; \text{ES}=-0.42$). In conclusion, a single session of perturbation treadmill training led to gait improvements, which were more pronounced compared to unperturbed treadmill walking. Effects on static postural sway were less pronounced.

**Database:** Medline

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**Author(s):** Mehrholz, Jan; Kugler, Joachim; Storch, Alexander; Pohl, Marcus; Hirsch, Kathleen; Elsner, Bernhard

**Source:** European journal of physical and rehabilitation medicine; Oct 2016; vol. 52 (no. 5); p. 704-713

**Publication Date:** Oct 2016

**Publication Type(s):** Journal Article Review Systematic Review

**PubMedID:** 26940123

**Abstract:** INTRODUCTION Treadmill training is used in rehabilitation might improve gait parameters of patients with Parkinson Disease. Aim of this study was to assess the effectiveness of treadmill training in improving the gait of patients with Parkinson Disease and the acceptability and safety of this type of therapy.

**EVIDENCE ACQUISITION** We searched the Cochrane Movement Disorders Group Specialized Register (last searched September 2014), Cochrane Central Register of Controlled Trials (The Cochrane Library 2014, Issue 10), MEDLINE (1950 to September 2014), and EMBASE (1980 to September 2014). We also handsearched relevant conference proceedings, searched trials and research registers, and checked reference lists (last searched September 2014). We contacted trialists, experts and researchers in the field and manufacturers of commercial devices. We included all randomized controlled trials comparing treadmill training with no treadmill training in patients with Parkinson Disease. Two review authors independently selected trials for inclusion, assessed trial quality and extracted data.

**EVIDENCE SYNTHESIS** Treadmill training improved gait speed ($\text{MD}=0.09 \text{ m/s}; 95\% \text{ confidence interval (CI)} \ 0.03 \text{ to } 0.14; \ P=0.001; \ I^2=24\%$; moderate quality of evidence), stride length ($\text{MD}=0.05 \text{ meters}; 95\% \text{ CI} 0.01 \text{ to } 0.09; \ P=0.01; \ I^2=0\%$; low quality of evidence), but walking distance ($\text{MD}=48.9 \text{ meters}; 95\% \text{ CI} -1.32 \text{ to } 99.14; \ P=0.06; \ I^2=91\%$; very low quality of evidence) and cadence did not improve ($\text{MD}=2.16 \text{ steps/minute}; 95\% \text{ CI} -0.13 \text{ to } 4.46; \ P=0.07; \ I^2=28\%$; low quality of evidence) at the end of study. Treadmill training did not increase the risk of patients dropping out from intervention ($\text{RD}=-0.02; 95\% \text{ CI} -0.06 \text{ to } 0.02; \ P=0.32; \ I^2=13\%$; moderate quality of evidence) and adverse events were not reported.

**CONCLUSION** This systematic review provides evidence from eighteen trials with moderate to low risk of bias that the use of treadmill training in patients with PD may improve clinically relevant gait parameters such as gait speed and stride length. This apparent benefit for patients is, however, not supported by all secondary variables (e.g. cadence and walking distance). The results must be interpreted with caution because the results were heterogeneous and it is not known how long improvements last and differences between the trials in terms of patient characteristics, duration and amount of training and types of treadmill training exists.

**Database:** Medline

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203. Effect of subthalamic stimulation on distal and proximal upper limb movements in Parkinson's disease.
INTRODUCTION
A different innervation pattern of proximal and distal muscles from the contra- and ipsilateral motor circuits raises the question as to whether bilateral, contra- and ipsilateral subthalamic stimulation may have different effects on the distal and proximal movements of the upper limb. To answer this question, we performed kinematic analyzes in patients with Parkinson's disease.

METHODS
Twenty-eight Parkinsonian patients treated by bilateral subthalamic stimulation were examined with an age-matched control group of 28 healthy subjects. They performed 14 s of finger tapping, hand grasping and pronation-supination. The patient group performed these sessions in four conditions (BOTH ON, BOTH OFF, CONTRA ON, IPSI ON) after withdrawal of dopaminergic medication for 12 h and a fifth condition after taking medication (BOTH ON-MED ON). A motion sensor with a three-dimensional gyroscope was worn on the index finger. Speed, amplitude, rhythm and decrement of movements were calculated and compared across these conditions.

RESULTS
Speed and amplitude of the more distal movements were improved similarly by contra- and bilateral stimulation. Bilateral stimulation was more effective than contralateral stimulation for the more proximal movements. Contra- and bilateral stimulation ameliorated the rhythm similarly in each movement task. Decrement of distal and proximal movements was not affected by the stimulation conditions.

CONCLUSION
This is the first study to show that the outcome of bilateral and unilateral subthalamic stimulation on proximal and distal upper limb movements should be evaluated separately postulating the different somatotopic organization of subloops in the cortico-basal ganglia motor circuits.

Abstract:
Two different training strategies to improve turning performance in individuals with Parkinson’s disease (PD) were designed and investigated in this study. Subjects were randomly assigned to a specific exercise group, turning-based training group, or control group to receive training that emphasized balance and strengthening, turning-based treadmill training, and general exercise training, respectively. A total of 12 30-min training sessions followed by 10 min of turning training on a level surface were administered over 4 to 6 weeks. The results (n = 12 for each group) showed that both the specific exercise and turning-based training group experienced improved turning performance, the primary outcome, compared with the control group (specific exercise, 33% change, p = 0.016; turning-based training, 35% change, p = 0.021). For the secondary outcomes, the

Database: Medline
specific exercise group performed better than the control group on the Tinetti balance scale, limit of stability test and lower extremity extensor and abductor strength. The turning-based training groups performed better than the control group in sensory organization and ankle plantar flexor strength. In summary, specific exercise training and turning-based treadmill training were both effective in improving turning performance in participants with PD. However, the improvements in turning performance of these two groups resulted from improving different aspects of impairment in individuals with PD.

**Database:** Medline

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**205. Economic Analysis of Deep Brain Stimulation in Parkinson Disease: Systematic Review of the Literature.**

**Author(s):** Becerra, Jaime Eduardo; Zorro, Oscar; Ruiz-Gaviria, Rafael; Castañeda-Cardona, Camilo; Otálora-Esteban, Margarita; Henao, Sara; Navarrete, Sergio; Acevedo, Juan Carlos; Rosselli, Diego

**Source:** World neurosurgery; Sep 2016; vol. 93 ; p. 44-49

**Publication Date:** Sep 2016

**Publication Type(s):** Meta-analysis Journal Article Review Systematic Review

**PubMedID:** 27216925

**Abstract:** BACKGROUND Parkinson disease (PD) is a chronic multifaceted neurodegenerative disorder of adult onset that affects quality of life and places a burden on patients, caregivers, and society. In early disease, dopaminergic therapy improves motor symptoms, but as the disease progresses, symptoms tend to increase in frequency and severity, even with best medical treatment (BMT). Deep brain stimulation (DBS) becomes an option for certain patients, but cost becomes an important issue. OBJECTIVE We performed a systematic review of the literature of economic studies of the use of DBS in patients with PD, including costs studies or economic evaluations expressed as cost per improvement in quality life, decrease in dose of pharmacological treatments, and the decrease of caregiver burden. METHODS We reviewed the following databases: Medline/PubMed, Embase, Cochrane Database of Systematic Reviews, LILACS, Cochrane Central Register of Controlled Trials, WHO International Clinical Trials Registry Platform ICTRP portal and ClinicalTrials.gov from 1980 to 2015. Costs have been converted or adjusted to 2016 US dollars (US$). RESULTS Nine studies were identified. The average cost of DBS for a patient with PD in 5 years is US$186,244. The quality-adjusted life year was higher in DBS compared with BMT after at least 2 years of treatment, with an average incremental cost utility ratio of US$41,932 per additional quality-adjusted life year gained. Costs in the first year are higher with DBS because of direct costs related to the surgical procedure, the device, and the more frequent controls. Studies show better results with a longer time horizon (up to 5 years). CONCLUSION DBS is a cost-effective intervention for patients with advanced PD, but it has a high initial cost compared with BMT. However, DBS reduces pharmacologic treatment costs and should also reduce direct, indirect, and social costs of PD on the long term.

**Database:** Medline

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**206. Resistance Training with Instability for Patients with Parkinson's Disease.**

**Author(s):** Silva-Batista, Carla; Corcos, Daniel M; Roschel, Hamilton; Kanegusuku, Hélcio; Gobbi, Lilian Teresa Bucken; Piemonte, Maria Elisa Pimentel; Mattos, Eugenia Casella Tavares; DE Mello, Marco Tuúlio; Forjaz, Cláudia L M; Tricoli, Valmor; Ugrinowitsch, Carlos

**Source:** Medicine and science in sports and exercise; Sep 2016; vol. 48 (no. 9); p. 1678-1687

**Publication Date:** Sep 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article
PURPOSE This randomized controlled trial compared the effects of resistance training (RT) and RT with instability (RTI) on the timed up and go test (TUG), on-medication Unified Parkinson’s Disease Rating Scale part III motor subscale score (UPDRS-III), Montreal Cognitive Assessment (MoCA) score, Parkinson’s Disease Questionnaire (PDQ-39) score, and muscle strength in the leg press exercise (one-repetition maximum) of patients with Parkinson’s disease (PD).

METHODS Thirty-nine patients with moderate to severe PD were randomly assigned to a nonexercising control group (C), RT group, and RTI group. The RT and RTI groups performed progressive RT twice a week for 12 wk. However, only the RTI group used high motor complexity exercises (i.e., progressive RT with unstable devices), for example, half squat exercise on the BOSU® device. The primary outcome was mobility (TUG). The secondary outcomes were on-medication motor signs (UPDRS-III), cognitive impairment (MoCA), quality of life (PDQ-39), and muscle strength (one-repetition maximum).

RESULTS There were no differences between RTI and RT groups for any of the outcomes at posttraining (P > 0.05). However, there were differences between RTI and C groups in the TUG, MoCA, and muscle strength values at posttraining (P < 0.05). Only the RTI group improved the TUG (-1.9 s), UPDRS-III score (-4.5 score), MoCA score (6.0 score), and PDQ-39 score (-5.2 score) from preto posttraining (P < 0.001). Muscle strength improved for both training groups (P < 0.001). No adverse events were reported during the trial.

CONCLUSIONS: Both training protocols improved mobility, motor signs, cognitive impairment, and quality of life, likely because of the usage of high motor complexity exercises. Thus, RTI may be recommended as an innovative adjunct therapeutic intervention for patients with PD.
were equally effective in improving balance, walking, and quality of life among community-dwelling patients with PD.

**Database:** Medline

208. **Effects of a balance-based exergaming intervention using the Kinect sensor on posture stability in individuals with Parkinson's disease: a single-blinded randomized controlled trial.**

**Author(s):** Shih, Meng-Che; Wang, Ray-Yau; Cheng, Shih-Jung; Yang, Yea-Ru

**Source:** Journal of neuroengineering and rehabilitation; Aug 2016; vol. 13 (no. 1); p. 78

**Publication Date:** Aug 2016

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 27568011

Available at [Journal of neuroengineering and rehabilitation](https://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=27568011) - from Europe PubMed Central - Open Access

**Abstract:**

**BACKGROUND**

The present study examined the effects of a balance-based exergaming intervention using the Kinect sensor on postural stability and balance in people with Parkinson's disease (PD).

**METHODS**

We conducted a subject-blinded, randomized controlled study. Twenty people with PD (Hoehn and Yahr stages I through III) were recruited and randomly assigned to either a balance-based exergaming group (N = 10) or a balance training group (N = 10) for an 8-week balance training period. Postural stability was assessed using the limits of stability (LOS) and one-leg stance (OLS) tests. Balance was assessed using the Berg Balance Scale (BBS) and the timed up and go (TUG) test. Participants were assessed pre- and post-training.

**RESULTS**

After training, participants in the balance-based exergaming group showed significant improvements in LOS performance, and in the eyes-closed condition of the OLS test. Both training programs led to improvements in BBS and TUG performance. Furthermore, balance-based exergaming training resulted in significantly better performance in directional control in the LOS test (78.9 ± 7.65 %) compared with conventional balance training (70.6 ± 9.37 %). CONCLUSIONS: Balance-based exergaming training resulted in a greater improvement in postural stability compared with conventional balance training. Our results support the therapeutic use of exergaming aided by the Kinect sensor in people with PD. TRIAL REGISTRATION: ClinicalTrials.gov. NCT02671396.

**Database:** Medline

209. **Cost-effectiveness of neurostimulation in Parkinson's disease with early motor complications.**

**Author(s):** Dams, Judith; Balzer-Geldsetzer, Monika; Siebert, Uwe; Deuschl, Günther; Schuepbach, W M Michael; Krack, Paul; Timmermann, Lars; Schnitzler, Alfons; Reese, Jens-Peter; Dodel, Richard; EARLYSTIM-investigators

**Source:** Movement disorders : official journal of the Movement Disorder Society; Aug 2016; vol. 31 (no. 8); p. 1183-1191

**Publication Date:** Aug 2016

**Publication Type(s):** Journal Article

**PubMedID:** 27506638

Available at [Movement disorders : official journal of the Movement Disorder Society](https://www.unpaywall.org) - from Unpaywall

**Abstract:**

**BACKGROUND**

Recent research efforts have focused on the effects of deep brain stimulation of the subthalamic nucleus (STN DBS) for selected patients with mild-to-moderate PD
OBJECTIVES

We assessed the cost utility of subthalamic DBS compared with the best medical treatment for German patients below the age of 61 with early motor complications of PD.

METHODS

We applied a previously published Markov model that integrated health utilities based on EuroQoL and direct costs over patients' lifetime adjusted to the German health care payer perspective (year of costing: 2013). Effectiveness was evaluated using the Parkinson's Disease Questionnaire 39 summary index. We performed sensitivity analyses to assess uncertainty.

RESULTS

In the base-case analysis, the incremental cost-utility ratio for STN DBS compared to best medical treatment was 22,700 Euros per quality-adjusted life year gained. The time to, and costs for, battery exchange had a major effect on the incremental cost-utility ratios, but never exceeded a threshold of 50,000 Euros per quality-adjusted life year.

CONCLUSIONS

Our decision analysis supports the fact that STN DBS at earlier stages of the disease is cost-effective in patients below the age of 61 when compared with the best medical treatment in the German health care system. This finding was supported by detailed sensitivity analyses reporting robust results. Whereas the EARLYSTIM study has shown STN DBS to be superior to medical therapy with respect to quality of life for patients with early motor complications, this further analysis has shown its cost-effectiveness.

Database: Medline

210. Comparative effects of unilateral and bilateral subthalamic nucleus deep brain stimulation on gait kinematics in Parkinson's disease: a randomized, blinded study.

Author[s]: Lizarraga, Karlo J; Jagid, Jonathan R; Luca, Corneliu C

Source: Journal of neurology; Aug 2016; vol. 263 (no. 8); p. 1652-1656

Publication Date: Aug 2016

Publication Type[s]: Randomized Controlled Trial Journal Article

PubMedID: 27278062

Available at Journal of neurology - from ProQuest (Health Research Premium) - NHS Version

Abstract: Gait dysfunction in Parkinson's disease (PD) does not always respond to bilateral subthalamic nucleus deep brain stimulation (STN-DBS). Since right hemisphere motor networks may be dominant for gait control, identical stimulation of asymmetric circuits could account for gait dysfunction. We compared the effects of bilateral and unilateral STN-DBS on gait kinematics in PD patients who developed gait impairment after STN-DBS. Twenty-two PD patients with >50% improvement in motor scores, but dopamine-resistant gait dysfunction 6-12 months after bilateral STN-DBS were blindly tested off dopaminergic effects in four randomly assigned DBS conditions: bilateral, right-sided, left-sided and off stimulation. Motor scores (MDS-UPDRS III), gait scores (MDS-UPRDS 2.11-2.13 + 3.9-3.13), turning time (seconds), stride length (meters) and velocity (meters/second) were measured 1 h after DBS changes. Motor and gait scores significantly improved with bilateral versus unilateral STN-DBS. Stride length and velocity (0.95 ± 0.06, 0.84 ± 0.07) significantly improved with bilateral (1.09 ± 0.04, 0.95 ± 0.05), right-sided (1.06 ± 0.04, 0.92 ± 0.05) and left-sided stimulation (1.01 ± 0.05, 0.90 ± 0.05) (p < 0.05). Stride length significantly improved with right-sided versus left-sided (0.05 ± 0.02) and bilateral versus left-sided stimulation (0.07 ± 0.02) (p < 0.05). Turning time (4.89 ± 0.6) tended to improve with bilateral (4.13 ± 0.5) (p = 0.15) and right-sided (4.27 ± 0.6) (p = 0.2) more than with left STN-DBS (4.69 ± 0.5) (p = 0.5). Bilateral STN-DBS yields greater improvement in motor and gait scores in PD patients. Yet, unilateral stimulation has similar effects on gait kinematics. Particularly, right-sided stimulation might produce slightly greater improvements. Although the clinical relevance of differential programming of right versus left-sided STN-DBS is unclear, this approach could be considered in the management of treatment-resistant gait dysfunction in PD.

Database: Medline
211. Postural motor learning in people with Parkinson’s disease.

**Author(s):** Peterson, Daniel S; Dijkstra, Bauke W; Horak, Fay B

**Source:** Journal of neurology; Aug 2016; vol. 263 (no. 8); p. 1518-1529

**Publication Date:** Aug 2016

**Publication Type(s):** Journal Article

**PubMedID:** 27193311

Abstract: Protective postural responses to external perturbations are hypokinetic in people with Parkinson's disease (PD), and improving these responses may reduce falls. However, the ability of people with PD to improve postural responses with practice is poorly understood. Our objective was to determine whether people with PD can improve protective postural responses similarly to healthy adults through repeated perturbations, and whether improvements are retained or generalize to untrained perturbations. Twelve healthy adults and 15 people with PD underwent 25 forward and 25 backward translations of the support surface, eliciting backward, and forward protective steps, respectively. We assessed whether: (1) performance improved over one day of practice, (2) changes were retained 24 h later, and (3) improvements generalized to untrained (lateral) postural responses. People with PD and healthy adults improved postural response characteristics, including center of mass displacement after perturbations ($p < 0.001$), margin of stability at first footfall ($p = 0.001$), step latency ($p = 0.044$), and number of steps ($p = 0.001$). However, unlike controls, improvements in people with PD occurred primarily in the first block of trials. Improvements were more pronounced during backward protective stepping than forward, and with the exception of step latency, were retained 24 h later. Improvements in forward-backward stepping did not generalize to lateral protective stepping. People with PD can improve protective stepping over the course of 1 day of perturbation practice. Improvements were generally similar to healthy adults, and were retained in both groups. Perturbation practice may represent a promising approach to improving protective postural responses in people with PD; however, additional research is needed to understand how to enhance generalization.

**Database:** Medline

212. Clinical effectiveness and cost-effectiveness of physiotherapy and occupational therapy versus no therapy in mild to moderate Parkinson’s disease: a large pragmatic randomised controlled trial (PD REHAB).

**Author(s):** Clarke, Carl E; Patel, Smitaa; Ives, Natalie; Rick, Caroline E; Woolley, Rebecca; Wheatley, Keith; Walker, Marion F; Zhu, Shihua; Kandiyali, Rebecca; Yao, Guiqing; Sackley, Catherine M

**Source:** Health technology assessment (Winchester, England); Aug 2016; vol. 20 (no. 63); p. 1-96

**Publication Date:** Aug 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 27580669

Abstract: Background: Cochrane reviews of physiotherapy (PT) and occupational therapy (OT) for Parkinson’s disease found insufficient evidence of effectiveness, but previous trials were methodologically flawed with small sample size and short-term follow-up. Objective: To evaluate the clinical effectiveness and cost-effectiveness of individualised PT and OT in Parkinson’s...
disease. DESIGN Large pragmatic randomised controlled trial. SETTING Thirty-eight neurology and geriatric medicine outpatient clinics in the UK. PARTICIPANTS Seven hundred and sixty-two patients with mild to moderate Parkinson’s disease reporting limitations in activities of daily living (ADL). INTERVENTION Patients were randomised online to either both PT and OT NHS services (n = 381) or no therapy (n = 381). Therapy incorporated a patient-centred approach with individual assessment and goal setting. MAIN OUTCOME MEASURES The primary outcome was instrumental ADL measured by the patient-completed Nottingham Extended Activities of Daily Living (NEADL) scale at 3 months after randomisation. Secondary outcomes were health-related quality of life [Parkinson’s Disease Questionnaire-39 (PDQ-39); European Quality of Life-5 Dimensions (EQ-5D)], adverse events, resource use and carer quality of life (Short Form questionnaire-12 items). Outcomes were assessed before randomisation and at 3, 9 and 15 months after randomisation. RESULTS Data from 92% of the participants in each group were available at the primary time point of 3 months, but there was no difference in NEADL total score [difference 0.5 points, 95% confidence interval (CI) -0.7 to 1.7; p = 0.4] or PDQ-39 summary index (0.007 points, 95% CI -1.5 to 1.5; p = 1.0) between groups. The EQ-5D quotient was of borderline significance in favour of therapy (-0.03, 95% CI -0.07 to -0.002; p = 0.04). Contact time with therapists was for a median of four visits of 58 minutes each over 8 weeks (mean dose 232 minutes). Repeated measures analysis including all time points showed no difference in NEADL total score, but PDQ-39 summary index (curves diverging at 1.6 points per annum, 95% CI 0.47 to 2.62; p = 0.005) and EQ-5D quotient (0.02, 95% CI 0.00007 to 0.03; p = 0.04) showed significant but small differences in favour of the therapy arm. Cost-effective analysis showed that therapy was associated with a slight but not significant gain in quality-adjusted life-years (0.027, 95% CI -0.010 to 0.065) at a small incremental cost (£164, 95% CI £141 to £468), resulting in an incremental cost-effectiveness ratio of under £4000 (£3493, 95% CI £169,371 to £176,358). There was no difference in adverse events or serious adverse events. CONCLUSIONS: NHS PT and OT did not produce immediate or long-term clinically meaningful improvements in ADL or quality of life in patients with mild to moderate Parkinson’s disease. This evidence does not support the use of low-dose, patient-centred, goal-directed PT and OT in patients in the early stages of Parkinson’s disease. Future research should include the development and testing of more structured and intensive PT and OT programmes in patients with all stages of Parkinson’s disease. TRIAL REGISTRATION Current Controlled Trials ISRCTN17452402. FUNDING This project was funded by the NIHR Health Technology Assessment programme and will be published in full in Health Technology Assessment; Vol. 20, No. 63. See the NIHR Journals Library website for further project information. The Birmingham Clinical Trials Unit, University of Birmingham, received support from the UK Department of Health up to March 2012. Catherine Sackley was supported by a NIHR senior investigator award, Collaboration for Leadership in Applied Health Research and Care East of England and West Midlands Strategic Health Authority Clinical Academic Training award.

Database: Medline

213. Transcranial direct current stimulation (tDCS) for idiopathic Parkinson’s disease.

Author(s): Elsner, Bernhard; Kugler, Joachim; Pohl, Marcus; Mehrholz, Jan

Source: The Cochrane database of systematic reviews; Jul 2016; vol. 7; p. CD010916

Publication Date: Jul 2016

Publication Type(s): Research Support, Non-u.s. Gov’t Meta-analysis Journal Article Review Systematic Review

PubMedID: 27425786

Available at The Cochrane database of systematic reviews - from Cochrane Collaboration (Wiley)

Abstract: BACKGROUND Idiopathic Parkinson's disease (IPD) is a neurodegenerative disorder, with the severity of the disability usually increasing with disease duration. IPD affects patients' health-
related quality of life, disability, and impairment. Current rehabilitation approaches have limited effectiveness in improving outcomes in patients with IPD, but a possible adjunct to rehabilitation might be non-invasive brain stimulation by transcranial direct current stimulation (tDCS) to modulate cortical excitability, and hence to improve these outcomes in IPD.OBJECTIVESTo assess the effectiveness of tDCS in improving motor and non-motor symptoms in people with IPD.SEARCH METHODSWe searched the following databases (until February 2016): the Cochrane Central Register of Controlled Trials (CENTRAL; the Cochrane Library; 2016, Issue 2), MEDLINE, EMBASE, CINAHL, AMED, Science Citation Index, the Physiotherapy Evidence Database (PEDro), Rehabdata, and Inspec. In an effort to identify further published, unpublished, and ongoing trials, we searched trial registers and reference lists, handsearched conference proceedings, and contacted authors and equipment manufacturers.SELECTION CRITERIAWe included only randomised controlled trials (RCTs) and randomised controlled cross-over trials that compared tDCS versus control in patients with IPD for improving health-related quality of life, disability, and impairment.DATACOLLECTION AND ANALYSISTwo review authors independently assessed trial quality (JM and MP) and extracted data (BE and JM). If necessary, we contacted study authors to ask for additional information. We collected information on dropouts and adverse events from the trial reports.MAIN RESULTSWe included six trials with a total of 137 participants. We found two studies with 45 participants examining the effects of tDCS compared to control (sham tDCS) on our primary outcome measure, impairment, as measured by the Unified Parkinson's Disease Rating Scale (UPDRS). There was very low quality evidence for no effect of tDCS on change in global UPDRS score (mean difference (MD) -7.10%, 95% confidence interval (-19.18 to 4.97; P = 0.25, I² = 21%, random-effects model). However, there was evidence of an effect on UPDRS part III motor subsection score at the end of the intervention phase (MD -14.43%, 95% CI -24.68 to -4.18; P = 0.006, I² = 2%, random-effects model; very low quality evidence). One study with 25 participants measured the reduction in off and on time with dyskinesia, but there was no evidence of an effect (MD 0.10 hours, 95% CI -0.14 to 0.34; P = 0.41, I² = 0%, random-effects model; and MD 0.00 hours, 95% CI -0.12 to 0.12; P = 1, I² = 0%, random-effects model, respectively; very low quality evidence). Two trials with a total of 41 participants measured gait speed using measures of timed gait at the end of the intervention phase, revealing no evidence of an effect (standardised mean difference (SMD) 0.50, 95% CI -0.17 to 1.18; P = 0.14, I² = 11%, random-effects model; very low quality evidence). Another secondary outcome was health-related quality of life and we found one study with 25 participants reporting on the physical health and mental health aspects of health-related quality of life (MD 1.00 SF-12 score, 95% CI -5.20 to 7.20; I² = 0%, inverse variance method with random-effects model; very low quality evidence; and MD 1.60 SF-12 score, 95% CI -5.08 to 8.28; I² = 0%, inverse variance method with random-effects model; very low quality evidence, respectively). We found no study examining the effects of tDCS for improving activities of daily living. In two of six studies, dropouts, adverse events, or deaths occurring during the intervention phase were reported. There was insufficient evidence that dropouts, adverse effects, or deaths were higher with intervention (risk difference (RD) 0.04, 95% CI -0.05 to 0.12; P = 0.40, I² = 0%, random-effects model; very low quality evidence). We found one trial with a total of 16 participants examining the effects of tDCS plus movement therapy compared to control (sham tDCS) plus movement therapy on our secondary outcome, gait speed at the end of the intervention phase, revealing no evidence of an effect (MD 0.05 m/s, 95% CI -0.15 to 0.25; inverse variance method with random-effects model; very low quality evidence). We found no evidence of an effect regarding differences in dropouts and adverse effects between intervention and control groups (RD 0.00, 95% CI -0.21 to 0.21; Mantel-Haenszel method with random-effects model; very low quality evidence).AUTHORS’ CONCLUSIONS: There is insufficient evidence to determine the effects of tDCS for reducing off time (when the symptoms are not controlled by the medication) and on time with dyskinesia (time that symptoms are controlled but the person still experiences involuntary muscle movements), and for improving health-related quality of life, disability, and impairment in patients with IPD. Evidence of very low quality indicates no difference in dropouts and adverse events between tDCS and control groups.

**Author(s):** Shen, Xia; Wong-Yu, Irene S K; Mak, Margaret K Y

**Source:** Neurorehabilitation and neural repair; Jul 2016; vol. 30 (no. 6); p. 512-527

**Publication Date:** Jul 2016

**Publication Type(s):** Meta-analysis Journal Article Review

**PubMedID:** 26493731

**Abstract:** Postural instability and falls are complex and disabling features of Parkinson's disease (PD) and respond poorly to anti-Parkinsonian medication. There is an imperative need to evaluate the effectiveness of exercise interventions in enhancing postural stability and decreasing falls in the PD population. The objectives of our study were to determine the effects of exercise training on the enhancement of balance and gait ability and reduction in falls for people with PD and to investigate potential factors contributing to the training effects on balance and gait ability of people with PD. We included 25 randomized control trials of a moderate methodological quality in our meta-analysis. The trials examined the effects of exercise training on balance and gait ability and falls against no intervention and placebo intervention. The results showed positive effects of exercise intervention on enhancing balance and gait performance (Hedges' g = 0.303 over the short-term in 24 studies and 0.419 over the long-term in 12 studies; P < .05) and reducing the fall rate (rate ratio = 0.485 over the short-term in 4 studies and 0.413 over the long-term in 5 studies; P < .05). The results of our metaregression and subgroup analysis showed that facility-based training produced greater training effects on improving PD participants' balance and gait ability (P < .05). The findings support the application of exercise training to improve balance and gait ability and prevent falls in people with PD.

**Database:** Medline

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215. Effects of Physical-Exercise-Based Rehabilitation Programs on the Quality of Life of Patients With Parkinson's Disease: A Systematic Review of Randomized Controlled Trials.

**Author(s):** Cascaes da Silva, Franciele; Iop Rda, Rodrigo; Domingos Dos Santos, Patrícia; Aguiar Bezerra de Melo, Lidia Mara; Barbosa Gutierres Filho, Paulo José; da Silva, Rudney

**Source:** Journal of aging and physical activity; Jul 2016; vol. 24 (no. 3); p. 484-496

**Publication Date:** Jul 2016

**Publication Type(s):** Journal Article Review Systematic Review

**PubMedID:** 26751626

**Abstract:** This study aimed to determine the effects of physical-exercise-based rehabilitation programs on quality of life of patients with Parkinson's disease through a systematic review of randomized clinical trials. For this purpose the following electronic databases were selected: Medline by PubMed, Cochrane, Web of Science, and PEDro. The search strategy included the proposed descriptors in the Medical Subject Headings (MeSH), associated with a sensitive list of terms to search for randomized controlled trials (RCTs), without year and language restrictions. Fourteen studies were potentially relevant, and these studies were included. Physical-exercise-based rehabilitation programs realized 2-4 times a week, 60 min each session, for 6-12 weeks, and follow-up of 3 months promotes significant positive effects on quality of life in Parkinson's disease patients at mild to moderate stages and disease duration around 6 years.

**Database:** Medline
216. Subthalamic nucleus deep brain stimulation induces impulsive action when patients with Parkinson's disease act under speed pressure.

Author(s): Pote, Inês; Torkamani, Mariam; Kefalopoulou, Zinovia-Maria; Zrinzo, Ludvic; Limousin-Dowsey, Patricia; Foltyne, Thomas; Speekenbrink, Maarten; Jahanshahi, Marjan

Source: Experimental brain research; Jul 2016; vol. 234 (no. 7); p. 1837-1848

Publication Date: Jul 2016
Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

PubMedID: 26892884

Abstract: The subthalamic nucleus (STN) is proposed to modulate response thresholds and speed-accuracy trade-offs. In situations of conflict, the STN is considered to raise response thresholds, allowing time for the accumulation of information to occur before a response is selected. Conversely, speed pressure is thought to reduce the activity of the STN and lower response thresholds, resulting in fast, errorful responses. In Parkinson's disease (PD), subthalamic nucleus deep brain stimulation (STN-DBS) reduces the activity of the nucleus and improves motor symptoms. We predicted that the combined effects of STN stimulation and speed pressure would lower STN activity and lead to fast, errorful responses, hence resulting in impulsive action. We used the motion discrimination 'moving-dots' task to assess speed-accuracy trade-offs, under both speed and accuracy instructions. We assessed 12 patients with PD and bilateral STN-DBS and 12 age-matched healthy controls. Participants completed the task twice, and the patients completed it once with STN-DBS on and once with STN-DBS off, with order counterbalanced. We found that STN stimulation was associated with significantly faster reaction times but more errors under speed instructions. Application of the drift diffusion model showed that stimulation resulted in lower response thresholds when acting under speed pressure. These findings support the involvement of the STN in the modulation of speed-accuracy trade-offs and establish for the first time that speed pressure alone, even in the absence of conflict, can result in STN stimulation inducing impulsive action in PD.

Database: Medline

217. Patients' experiences of deep brain stimulation for Parkinson's disease: a qualitative systematic review and synthesis.

Author(s): Mathers, J; Rick, C; Jenkinson, C; Garside, R; Pall, H; Mitchell, R; Bayliss, S; Jones, L L

Source: BMJ open; Jun 2016; vol. 6 (no. 6); p. e011525

Publication Date: Jun 2016
Publication Type(s): Meta-analysis Journal Article Review Systematic Review

PubMedID: 27338883

Abstract: OBJECTIVE To review and synthesise qualitative research studies that have explored patients' experience of deep brain stimulation (DBS) in advanced Parkinson's disease (PD). DESIGN Systematic review and meta-synthesis of 7 original papers, using metaethnography. SETTING Studies conducted in Denmark, France and Sweden. PARTICIPANTS 116 patients who had undergone DBS and 9 spouses of patients. RESULTS Prior to surgery, the experience
of advancing PD is one of considerable loss and a feeling of loss of control. There are significant hopes for what DBS can bring. Following surgery, a sense of euphoria is described by many, although this does not persist and there is a need for significant transitions following this. We suggest that normality as a concept is core to the experience of DBS and that a sense of control may be a key condition for normality. Experience of DBS for patients and spouses, and of the transitions that they must undertake, is influenced by their hopes of what surgery will enable them to achieve, or regain (ie, a new normality).

**CONCLUSION**

There is a need for further qualitative research to understand the nature of these transitions to inform how best patients and their spouses can be supported by healthcare professionals before, during and after DBS. In assessing the outcomes of DBS and other treatments in advanced PD, we should consider how to capture holistic concepts such as normality and control. Studies that examine the outcomes of DBS require longer term follow-up.

**Database:** Medline

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**Author(s):** Roper, Jaimie A; Kang, Nyeonju; Ben, Juliana; Cauraugh, James H; Okun, Michael S; Hass, Chris J

**Source:** Journal of neurology; Jun 2016; vol. 263 (no. 6); p. 1195-1203

**Publication Date:** Jun 2016

**Publication Type(s):** Meta-analysis Journal Article Review Systematic Review

**PubMedID:** 27126451

**Abstract:** In Parkinson's disease (PD), slow gait speed is significantly related to clinical ratings of disease severity, impaired performance of daily activities, as well as increased overall disability. Conducting a meta-analysis on gait speed is an objective and quantitative technique to summarize the effectiveness of DBS and to determine the effect sizes for future studies. We conducted a systematic review and meta-analysis that analyzed the effects of deep brain stimulation (DBS) surgery on gait speed in patients with PD to gain fundamental insight into the nature of therapeutic effectiveness. A random effects model meta-analysis on 27 studies revealed a significant overall standardized mean difference medium effect size equal to 0.60 (SE = 0.06; p < 0.0001; Z = 10.58). Based on our synthesis of the 27 studies, we determined the following: (1) a significant and medium effect size indicating DBS improves gait speed; (2) DBS improved gait speed regardless of whether the patients were tested in the on or off medication state; (3) both bilateral and unilateral DBS led to gait speed improvement; (4) the effects of DBS on gait speed in the data collection sessions after surgery (DBS on vs. off) were comparable with data collection before surgery (before surgery vs. DBS after surgery); and (5) when evaluating the effects of DBS and medication on gait speed suprathreshold doses were comparable to normal dosages of medication and DBS. The current analysis provides objective evidence that both unilateral and bilateral DBS provide a therapeutic benefit on gait speed in persons with PD.

**Database:** Medline

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**Author(s):** Van Lier, Sam; Batens, Katja; Santens, Patrick; Van Roost, Dirk; Van Herreweghe, Mieke; De Letter, Miet

**Source:** Acta neurologica Belgica; Jun 2016; vol. 116 (no. 2); p. 163-170
While the influence of deep brain stimulation (DBS) of the subthalamic nucleus (STN) on the comprehension of pragmatic language in Parkinson’s disease (PD) has been the focus of studies, its impact on production, however, has yet to be elucidated. (1) Investigating the influence of DBS STN on pragmatic language production in spontaneous speech by comparing different stimulation conditions and (2) evaluating the effect of asymmetric dopaminergic denervation. This paper included 18 patients with advanced idiopathic PD with STN DBS. [Ten PD patients with predominantly left hemispheric dopamine denervation (PD-left) and eight PD patients with predominantly right-hemispheric dopamine denervation (PD-right).] The pragmatic components 'communicative functions' and 'conversational skills' were evaluated by analysing the spontaneous language production in four stimulation conditions. STN stimulation did not appear to influence the pragmatic production skills. Only when asymmetric dopamine depletion was taken into account the parameter 'giving an explanation' interaction was detectable. STN DBS appears to have some influence on the production of pragmatic language depending on asymmetric dopaminergic denervation. Suggestions are made for further research of pragmatic production in Parkinson’s disease.

220. An external portable device for adaptive deep brain stimulation (aDBS) clinical research in advanced Parkinson’s Disease.

**Author(s):** Arlotti, Mattia; Rossi, Lorenzo; Rosa, Manuela; Marceglia, Sara; Priori, Alberto

**Source:** Medical engineering & physics; May 2016; vol. 38 (no. 5); p. 498-505

**Publication Date:** May 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article

**PubMedID:** 27029510

**Abstract:** Compared to conventional deep brain stimulation (DBS) for patients with Parkinson’s Disease (PD), the newer approach of adaptive DBS (aDBS), regulating stimulation on the basis of the patient’s clinical state, promises to achieve better clinical outcomes, avoid adverse-effects and save time for tuning parameters. A remaining challenge before aDBS comes into practical use is to prove its feasibility and its effectiveness in larger groups of patients and in more ecological conditions. We developed an external portable aDBS system prototype designed for clinical testing in freely-moving PD patients with externalized DBS electrodes. From a single-channel bipolar artifact-free recording, it analyses local field potentials (LFPs), during ongoing DBS for tuning stimulation parameters, independent from the specific feedback algorithm implemented. We validated the aDBS system in vitro, by testing both its sensing and closed-loop stimulation capabilities, and then tested it in vivo, focusing on the sensing capabilities. By applying the aDBS system prototype in a patient with PD, we provided evidence that it can track levodopa and DBS-induced LFP spectral power changes among different patient’s clinical states. Our system, intended for testing LFP-based feedback strategies for aDBS, should help understanding how and whether aDBS therapy works in PD and indicating future technical and clinical advances.

**Database:** Medline

221. Randomized Controlled Trial of a Home-Based Action Observation Intervention to Improve Walking in Parkinson Disease.
Abstract: OBJECTIVE To examine the feasibility and efficacy of a home-based gait observation intervention for improving walking in Parkinson disease (PD). DESIGN Participants were randomly assigned to an intervention or control condition. A baseline walking assessment, a training period at home, and a posttraining assessment were conducted. SETTING The laboratory and participants' home and community environments. PARTICIPANTS Nondemented individuals with PD (N=23) experiencing walking difficulty. INTERVENTION In the gait observation (intervention) condition, participants viewed videos of healthy and parkinsonian gait. In the landscape observation (control) condition, participants viewed videos of moving water. These tasks were completed daily for 8 days. MAIN OUTCOME MEASURES Spatiotemporal walking variables were assessed using accelerometers in the laboratory (baseline and posttraining assessments) and continuously at home during the training period. Variables included daily activity, walking speed, stride length, stride frequency, leg swing time, and gait asymmetry. Questionnaires including the 39-item Parkinson Disease Questionnaire (PDQ-39) were administered to determine self-reported change in walking, as well as feasibility. RESULTS At posttraining assessment, only the gait observation group reported significantly improved mobility (PDQ-39). No improvements were seen in accelerometer-derived walking data. Participants found the at-home training tasks and accelerometer feasible to use. CONCLUSIONS Participants found procedures feasible and reported improved mobility, suggesting that observational training holds promise in the rehabilitation of walking in PD. Observational training alone, however, may not be sufficient to enhance walking in PD. A more challenging and adaptive task, and the use of explicit perceptual learning and practice of actions, may be required to effect change.

Database: Medline

222. Comparative Effect of Power Training and High-Speed Yoga on Motor Function in Older Patients With Parkinson Disease.

Abstract: Objectives To compare the effects of power training (PWT) and a high-speed yoga program on physical performances in older patients with Parkinson disease (PD), and to test the hypothesis that both training interventions would attenuate PD symptoms and improve physical performance. Design Randomized controlled trial. Setting A laboratory of neuromuscular research and active aging. Participants Patients with PD (N=41; mean age ± SD, 72.2±6.5y). Interventions Two high-speed exercise interventions (specifically designed yoga program and PWT) were given for 12 weeks (twice a week), and 1 nonexercise control group. Main Outcome Measures Unified Parkinson Disease Rating Scale motor score (UPDRS MS), Berg Balance Scale (BBS), Mini-Balace Evaluation Systems Test (Mini-BESTest), Timed Up and Go, functional reach, single leg stance (SLS), postural sway test,
10-m usual and maximal walking speed tests, 1 repetition maximum (RM), and peak power (PPW) for leg press. Results For the posttests, both training groups showed significant improvements (P < .05) in all physical measurements except functional reach on the more affected side, SLS, and postural sway compared with the pretests, and significantly better scores for UPDRS MS, BBS, Mini-BESTest, Timed Up and Go, functional reach on the less affected side, 10-m usual and maximal walking speed tests, 1RM, and PPW than controls, with no differences detected between the yoga program and PWT. Conclusions Both the specially designed yoga program and PWT programs can significantly improve physical performance in older persons with PD.

Database: CINAHL


> **Author(s):** Smith, Beth A; Carlson-Kuhta, Patricia; Horak, Fay B

> **Source:** Physiotherapy research international : the journal for researchers and clinicians in physical therapy; Mar 2016; vol. 21 (no. 1); p. 36-46

> **Publication Date:** Mar 2016

> **Publication Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Comparative Study Journal Article

> **PubMedID:** 25431128

> Available at [Physiotherapy research international : the journal for researchers and clinicians in physical therapy](http://www.ncbi.nlm.nih.gov/pubmed/25431128) - from Unpaywall

> **Abstract:** BACKGROUND AND PURPOSEThe backward push and release test (PRT) is a standardized clinical test of postural responses elicited by perturbations. Our goal was to determine reliability of administration and response. This will inform clinical administration and determine whether to develop an instrumented version. METHODS One examiner administered 10 backward PRT trials to adults with Parkinson disease (12), multiple sclerosis (14) and controls (12). We used three-dimensional motion analysis, force plates and instrumented gloves to measure administration and response. Administration variables were angle of posterior trunk lean and the distance of the centre of mass (CoM) behind the ankle. Postural response variables were latency of postural response from release to step initiation and first compensatory step length. Reliability was measured using the range of variables across trials, comparison of first and later trials, intraclass correlations (ICCs) to measure consistency and correlations between administration and response. RESULTS There was inherent variability in administration, which affected postural response characteristics. Larger trunk angle and greater CoM-ankle distance were correlated with shorter postural response latencies and larger step lengths. Participant height also had an effect; taller participants had larger trunk angles prior to release resulting in longer latencies and larger step lengths. Using ICCs, consistency of trunk angle was likely acceptable and CoM-ankle distance was high. Consistency of latency was low, while step length was likely acceptable. DISCUSSION Despite variability in administration and inconsistency in response, different postural response characteristics were detected between patients with different disease states. Based on these results, we will create algorithms to instrument the PRT using inertial movement sensors to collect more sensitive measures of postural responses than observational clinical rating scales. Feedback for appropriate lean angle and calibration for participant height will improve consistency and usefulness of the instrumented PRT. Copyright © 2014 John Wiley & Sons, Ltd.

**Database:** Medline
224. Rehabilitation of hypomimia in Parkinson's disease: a feasibility study of two different approaches.

**Author(s):** Ricciardi, Lucia; Baggio, Paola; Ricciardi, Diego; Morabito, Bruno; Pomponi, Massimiliano; Bentivoglio, Anna Rita; Bernabei, Roberto; Maestri, Roberto; Frazzitta, Giuseppe; Volpe, Daniele

**Source:** Neurological sciences: official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology; Mar 2016; vol. 37 (no. 3); p. 431-436

**Publication Date:** Mar 2016

**Publication Type(s):** Comparative Study Randomized Controlled Trial Journal Article

**PubMedID:** 26590993

Abstract: Parkinson's disease (PD) patients frequently have an impairment of facial expression both in voluntary and spontaneous emotional expression. Aim of this study was to evaluate the feasibility of a rehabilitation program for hypomimia in patients with PD, comparing two different approaches. Thirty-six patients with PD were included: 20 patients received a rehabilitative intervention for hypomimia either with a DVD showing exercises focused on facial muscles (PD-group A) or with a therapist-guided facial rehabilitation with a proprioceptive/recognition approach (PD-group B). Sixteen patients (PD-Ctrl group) did not receive any treatment and served as control group. The feasibility of the proposed rehabilitation techniques was the main focus of this evaluation. We also evaluate the efficacy of the treatments by means of the sub-item 19 of the Unified Parkinson's disease Rating Scale motor score (UPDRS-III) and by a computerized analysis of facial expression (EMotion), which was assessed prior to (T0) and after therapy (T1). The proposed rehabilitative program for the treatment of hypomimia was shown to be feasible. Our data show a significant improvement in UPDRS-III sub-item 19 in PD-group-B compared to PD-group-A, (p = 0.005) and to PD-Ctrl (p = 0.003) and in expressivity of fear in PD-group-B compared to PD-Ctrl (p = 0.01). The proposed rehabilitative program showed to be feasible. A larger multi-center trial is now warranted to establish its efficacy to improve facial expression over long time period.

**Database:** Medline


**Author(s):** Boel, Judith A; Odekerken, Vincent J J; Geurtsen, Gert J; Schmand, Ben A; Cath, Danielle C; Figee, Martijn; van den Munckhof, Pepijn; de Haan, Rob J; Schuurman, P Richard; de Bie, Rob M A; NSTAPS study group

**Source:** Movement disorders: official journal of the Movement Disorder Society; Mar 2016; vol. 31 (no. 3); p. 409-413

**Publication Date:** Mar 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article

**PubMedID:** 26660279

Abstract: BACKGROUND The aim of this study was to assess psychiatric and social outcome 12 months after bilateral deep brain stimulation (DBS) of the globus pallidus pars interna (GPI) and subthalamic nucleus (STN) for advanced Parkinson's disease (PD). METHODS We randomly assigned patients to receive GPI DBS (n = 65) or STN DBS (n = 63). Standardized psychiatric and social
questionnaires were assessed at baseline and after 12 months. RESULTS No differences were found between GPI DBS and STN DBS on psychiatric evaluation. Within-group comparisons showed small but statistically significant changes on several measures in both groups. Descriptive statistics indicated slight changes in social functioning. Marital satisfaction of patients and partners remained relatively stable after GPI and STN DBS. CONCLUSIONS We found neither differences in psychiatric and social outcome between GPI DBS and STN DBS nor any relevant within-group differences. The decision for GPI DBS or STN DBS cannot be based on expected psychiatric or social effects.

Database: Medline

226. Physiotherapy and Occupational Therapy vs No Therapy in Mild to Moderate Parkinson Disease: A Randomized Clinical Trial.

Author(s): Clarke, Carl E; Patel, Smitaa; Ives, Natalie; Rick, Caroline E; Dowling, Francis; Woolley, Rebecca; Wheatley, Keith; Walker, Marion F; Sackley, Catherine M; PD REHAB Collaborative Group

Source: JAMA neurology; Mar 2016; vol. 73 (no. 3); p. 291-299

Publication Date: Mar 2016

Publication Type(s): Research Support, Non-u.s. Gov't Pragmatic Clinical Trial Multicenter Study Journal Article

PubMedID: 26785394

Available at JAMA neurology - from Unpaywall

Abstract: IMPORTANCE It is unclear whether physiotherapy and occupational therapy are clinically effective and cost-effective in Parkinson disease (PD). OBJECTIVE To perform a large pragmatic randomized clinical trial to evaluate the clinical effectiveness of individualized physiotherapy and occupational therapy in PD. DESIGN, SETTING, AND PARTICIPANTS The PD REHAB Trial was a multicenter, open-label, parallel group, controlled efficacy trial. A total of 762 patients with mild to moderate PD were recruited from 38 sites across the United Kingdom. Recruitment took place between October 2009 and June 2012, with 15 months of follow-up. INTERVENTIONS Participants with limitations in activities of daily living (ADL) were randomized to physiotherapy and occupational therapy or no therapy. MAIN OUTCOMES AND MEASURES The primary outcome was the Nottingham Extended Activities of Daily Living (NEADL) Scale score at 3 months after randomization. Secondary outcomes were health-related quality of life (assessed by Parkinson Disease Questionnaire-39 and EuroQol-5D); adverse events; and caregiver quality of life. Outcomes were assessed before trial entry and then 3, 9, and 15 months after randomization. RESULTS Of the 762 patients included in the study (mean [SD] age, 70 [9.1] years), 381 received physiotherapy and occupational therapy and 381 received no therapy. At 3 months, there was no difference between groups in NEADL total score (difference, 0.5 points; 95% CI, -0.7 to 1.7; P = .41) or Parkinson Disease Questionnaire-39 summary index (0.007 points; 95% CI, -1.5 to 1.5; P = .99). The EuroQol-5D quotient was of borderline significance in favor of therapy (-0.03; 95% CI, -0.07 to -0.002; P = .04). The median therapist contact time was 4 visits of 58 minutes over 8 weeks. Repeated-measures analysis showed no difference in NEADL total score, but Parkinson Disease Questionnaire-39 summary index (diverging 1.6 points per annum; 95% CI, 0.47 to 2.62; P = .005) and EuroQol-5D score (0.02; 95% CI, 0.00007 to 0.03; P = .04) showed small differences in favor of therapy. There was no difference in adverse events. CONCLUSIONS AND RELEVANCE: Physiotherapy and occupational therapy were not associated with immediate or medium-term clinically meaningful improvements in ADL or quality of life in mild to moderate PD. This evidence does not support the use of low-dose, patient-centered, goal-directed physiotherapy and occupational therapy in patients in the early stages of PD. Future research should explore the development and testing of more structured and intensive physical and occupational therapy programs in patients with all stages of PD. TRIAL REGISTRATION: isrctn.org Identifier: ISRCTN17452402.

**Author(s):** Tramontano, M.; Bonni, S.; Martino Cinnera, A.; Marchetti, F.; Caltagirone, C.; Koch, G.; Peppe, A.

**Source:** Parkinson's Disease (20420080); Feb 2016; p. 1-6

**Publication Date:** Feb 2016

**Publication Type(s):** Academic Journal

**Abstract:**

Aim. Recent evidence suggested that the use of treadmill training may improve gait parameters. Visual deprivation could engage alternative sensory strategies to control dynamic equilibrium and stabilize gait based on vestibulospinal reflexes (VSR). We aimed to investigate the efficacy of a blindfolded balance training (BBT) in the improvement of stride phase percentage reliable gait parameters in patients with Parkinson’s Disease (PD) compared to patients treated with standard physical therapy (PT).

Methods. Thirty PD patients were randomized in two groups of 15 patients, one group treated with BBT during two weeks and another group treated with standard PT during eight weeks. We evaluated gait parameters before and after BBT and PT interventions, in terms of double stance, swing, and stance phase percentage. Results. BBT induced an improvement of double stance phase as revealed (decreased percentage of double stance phase during the gait cycle) in comparison to PT. The other gait parameters swing and stance phase did not differ between the two groups. Discussion. These results support the introduction of complementary rehabilitative strategies based on sensory-motor stimulation in the traditional PD patient’s rehabilitation. Further studies are needed to investigate the neurophysiological circuits and mechanism underlying clinical and motor modifications.

**Database:** CINAHL

228. GPI vs STN deep brain stimulation for Parkinson disease: Three-year follow-up.

**Author(s):** Odekerken, Vincent J J; Boel, Judith A; Schmand, Ben A; de Haan, Rob J; Figee, M; van den Munckhof, Pepijn; Schuurman, P Richard; de Bie, Rob M A; NSTAPS study group

**Source:** Neurology; Feb 2016; vol. 86 (no. 8); p. 755-761

**Publication Date:** Feb 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Comparative Study Randomized Controlled Trial Journal Article

**PubMedID:** 26819458

**Abstract:**

OBJECTIVE: To compare motor symptoms, cognition, mood, and behavior 3 years after deep brain stimulation (DBS) of the globus pallidus pars interna (GPI) and subthalamic nucleus (STN) in advanced Parkinson disease (PD).

METHODS: Patients with PD eligible for DBS were randomized to bilateral GPI DBS and bilateral STN DBS (1:1). The primary outcome measures were (1) improvement in motor symptoms in off-drug phase measured with the Unified Parkinson Disease Rating Scale (UPDRS) and (2) a composite score for cognitive, mood, and behavioral effects, and inability to complete follow-up at 36 months after surgery. RESULTS: Of the 128 patients enrolled, 90 were able to complete the 3-year follow-up. We found significantly more improvement of motor symptoms after STN DBS (median [interquartile range (IQR)] at 3 years, GPI 33 [23-41], STN 28 [20-36], p = 0.04). No between-group differences were observed on the composite score (GPI 83%, STN 86%).
Secondary outcomes showed larger improvement in off-drug functioning in the AMC Linear Disability Scale score after STN DBS (mean ± SD, GPI 65.2 ± 20.1, STN 72.6 ± 18.0, p = 0.05). Medication was reduced more after STN DBS (median levodopa equivalent dose [IQR] at 3 years, GPI 1,060 [657-1,860], STN 605 [411-875], p < 0.001). No differences in adverse effects were recorded, apart from more reoperations to a different target after GPI DBS (GPI n = 8, STN n = 1).CONCLUSIONSOff-drug phase motor symptoms and functioning improve more after STN DBS than after GPI DBS. No between-group differences were observed on a composite score for cognition, mood, and behavior, and the inability to participate in follow-up.CLASSIFICATION OF EVIDENCEThis study provides Class II evidence that STN DBS provides more off-phase motor improvement than GPI DBS, but with a similar risk for cognitive, mood, and behavioral complications.

Database: Medline


**Author(s):** Mateos-Toset, Sara; Cabrera-Martos, Irene; Torres-Sánchez, Irene; Ortiz-Rubio, Araceli; González-Jiménez, Emilio; Valenza, Marie Carmen

**Source:** PM & R : the journal of injury, function, and rehabilitation; Feb 2016; vol. 8 (no. 2); p. 115-122

**Publication Date:** Feb 2016

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 26079867

**Abstract:** OBJECTIVE To evaluate the effects on manual dexterity, hand grip, and pinch strength of a single intervention focused on hand exercises. DESIGN Randomized, controlled, blinded study. PATIENTS Sixty people with Parkinson disease (PD) were recruited; 30 participants were allocated to a brief exercise session and 30 to a control group. INTERVENTIONS Participants randomized to the experimental group received a 15-minute exercise session focused on hand training using therapeutic putty. Participants allocated to the control group performed active upper limb exercises. MAIN OUTCOME MEASUREMENTS Measures of manual dexterity (assessed by the Purdue Pegboard Test and the Chessington Occupational Therapy Neurologic Assessment Battery dexterity task) and strength (hand grip and pinch strength) were recorded at baseline and after the intervention. RESULTS Participants had significantly improved manual dexterity values (P < .05) after the intervention. They also had increased hand grip (P < .001) and pinch strength (P < .05). CONCLUSIONS: A single hand-exercise session showed an improvement in manual dexterity and strength in persons with PD.

Database: Medline

230. Exercise Therapy for Parkinson's Disease: Pedaling Rate Is Related to Changes in Motor Connectivity.

**Author(s):** Shah, Chintan; Beall, Erik B; Frankemolle, Anneke M M; Penko, Amanda; Phillips, Michael D; Lowe, Mark J; Alberts, Jay L

**Source:** Brain connectivity; Feb 2016; vol. 6 (no. 1); p. 25-36

**Publication Date:** Feb 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Research Support, U.s. Gov't, Non-p.h.s. Journal Article

**PubMedID:** 26414696
Abstract: Forced-rate lower-extremity exercise has recently emerged as a potential safe and low-cost therapy for Parkinson’s disease (PD). The efficacy is believed to be dependent on pedaling rate, with rates above the subjects’ voluntary exercise rates being most beneficial. In this study, we use functional connectivity magnetic resonance imaging (MRI) to further elucidate the mechanism underlying this effect. Twenty-seven PD patients were randomized to complete 8 weeks of forced-rate exercise (FE) or voluntary-rate exercise (VE). Exercise was delivered using a specialized stationary bicycle, which can augment patients’ voluntary exercise rates. The FE group received assistance from the cycle. Imaging was conducted at baseline, end of therapy, and after 4 weeks of follow-up. Functional connectivity (FC) was determined via seed-based correlation analysis, using activation-based seeds in the primary motor cortex (M1). The change in FC after exercise was compared using linear correlation with pedaling rate. Results of the correlation analysis showed a strong positive correlation between pedaling rate and change in FC from the most affected M1 to the ipsilateral thalamus. This effect persisted after 4 weeks of follow-up. These results indicate that a plausible mechanism for the therapeutic efficacy of high-rate exercise in PD is that it improves thalamo-cortical connectivity.

Database: Medline

231. Progressive resistance training in Parkinson’s disease: a systematic review and meta-analysis.

Author(s): Saltychev, Mikhail; Bärlund, Esa; Paltamaa, Jaana; Katajapuu, Niina; Laimi, Katri

Source: BMJ open; Jan 2016; vol. 6 (no. 1); p. e008756

Publication Date: Jan 2016

Publication Type(s): Meta-analysis Journal Article Review Systematic Review

PubMedID: 26743698

Available at BMJ open - from Europe PubMed Central - Open Access

Abstract: OBJECTIVES To investigate if there is evidence on effectiveness of progressive resistance training in rehabilitation of Parkinson disease. DESIGN Systematic review and meta-analysis. DATA SOURCES Central, Medline, Embase, Cinahl, Web of Science, Pedro until May 2014. Randomised controlled or controlled clinical trials. The methodological quality of studies was assessed according to the Cochrane Collaboration’s domain-based evaluation framework. DATA SYNTHESIS Random effects meta-analysis with test for heterogeneity using the I² and pooled estimate as the raw mean difference. PARTICIPANTS Adults with primary/idiopathic Parkinson’s disease of any severity, excluding other concurrent neurological condition. INTERVENTIONS Progressive resistance training defined as training consisting of a small number of repetitions until fatigue, allowing sufficient rest between exercises for recovery, and increasing the resistance as the ability to generate force improves. COMPARISON Progressive resistance training versus no treatment, placebo or other treatment in randomised controlled or controlled clinical trials. PRIMARY AND SECONDARY OUTCOME MEASURES Any outcome. RESULTS Of 516 records, 12 were considered relevant. Nine of them had low risk of bias. All studies were randomised controlled trials conducted on small samples with none or 1 month follow-up after the end of intervention. Of them, six were included in quantitative analysis. Pooled effect sizes of meta-analyses on fast and comfortable walking speed, the 6 min walking test, Timed Up and Go test and maximal oxygen consumption were below the level of minimal clinical significance. CONCLUSIONS: There is so far no evidence on the superiority of progressive resistance training compared with other physical training to support the use of this technique in rehabilitation of Parkinson’s disease. SYSTEMATIC REVIEW REGISTRATION NUMBER PROSPERO 2014: CRD42014009844.
232. Spinal cord stimulation for Parkinson's disease: a systematic review.

**Author(s):** de Andrade, Emerson Magno; Ghilardi, Maria Gabriela; Cury, Rubens Gisbert; Barbosa, Egberto Reis; Fuentes, Romulo; Teixeira, Manoel Jacobsen; Fonoff, Erich Talamoni

**Source:** Neurosurgical review; Jan 2016; vol. 39 (no. 1); p. 27

**Publication Date:** Jan 2016

**Publication Type(s):** Meta-analysis Journal Article Review Systematic Review

**PubMedID:** 26219854

**Abstract:** Axial symptoms are a late-developing phenomenon in the course of Parkinson's disease (PD) and represent a therapeutic challenge given their poor response to levodopa therapy and deep brain stimulation. Spinal cord stimulation (SCS) may be a new therapeutic approach for the alleviation of levodopa-resistant motor symptoms of PD. Our purpose was to systematically review the effectiveness of SCS for the treatment of motor symptoms of PD and to evaluate the technical and pathophysiological mechanisms that may influence the outcome efficacy of SCS. A comprehensive literature search was conducted using electronic databases for the period from January 1966 through April 2014. The methodology utilized in this work follows a review process derived from evidence-based systematic review and meta-analysis of randomized trials described in the PRISMA statement. Reports examining SCS for the treatment of PD are limited. Eight studies with a total of 24 patients were included in this review. The overall motor score of the Unified Parkinson's Disease Rating Scale in the on/off-stimulation condition remained unchanged in 6 patients and improved in 18 patients after SCS. SCS appears to yield positive results for PD symptoms, especially for impairments in gait function and postural stability. However, evidence is limited and long-term prospective studies will be required to identify the optimal candidates for SCS and the best parameters of stimulation and to fully characterize the effects of stimulation on motor and nonmotor symptoms of PD.

**Database:** Medline


**Author(s):** Farag, Inez; Sherrington, Catherine; Hayes, Alison; Canning, Colleen G; Lord, Stephen R; Close, Jacqueline C T; Fung, Victor S C; Howard, Kirsten

**Source:** Movement disorders : official journal of the Movement Disorder Society; Jan 2016; vol. 31 (no. 1); p. 53-61

**Publication Date:** Jan 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 26395438

**Abstract:** OBJECTIVEThe aim of this study was to determine the cost-effectiveness of a 6-month minimally supervised exercise program for people with PD. METHODSAn economic analysis was conducted alongside a randomized, controlled trial in which 231 people age 40 years and over with PD were randomized into a usual care control group or an exercise group. Cost-effectiveness was estimated using incremental cost per fall prevented (using falls calendars) as the primary analysis and cost per extra person avoiding mobility deterioration (defined as an improvement or no change in the 12-point Short Physical Performance Battery Score between baseline and 6 month). A cost-utility analysis using the Short Form-6D was also performed. Uncertainty was represented using
cost-effectiveness scatter plots and acceptability curves. Planned subgroup analyses for the low-disease-severity group were also undertaken.

**RESULTS**

All results are reported in Australian dollars ($A). The average cost of the intervention was $A1,010 per participant. Incremental cost-effectiveness of the program relative to usual care was $A574 per fall prevented, $A9,570 per extra person avoiding mobility deterioration, and $A338,800 per quality-adjusted life year gained. The intervention had an 80% probability of being cost-effective, relative to the control, at a threshold of $A2,000 per fall prevented. Subgroup analyses for the low-disease-severity group indicate the program to be dominant, that is, less costly and more effective than usual care for all health outcomes.

**CONCLUSION**

The exercise intervention appeared cost-effective with regard to fall prevention in the whole sample and cost saving in the low disease severity group, when compared with usual care.

**Database:** Medline


**Author(s):** Ridgel, Angela L; Walter, Benjamin L; Tatsuoka, Curtis; Walter, Ellen M; Colón-Zimmermann, Kari; Welter, Elisabeth; Sajatovic, Martha

**Source:** Journal of science and medicine in sport; Jan 2016; vol. 19 (no. 1); p. 12-17

**Publication Date:** Jan 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Comparative Study Randomized Controlled Trial Journal Article

**PubMedID:** 25709055

Available at [Journal of science and medicine in sport](from ProQuest (Health Research Premium) - NHS Version)

Available at [Journal of science and medicine in sport](from Unpaywall)

**Abstract:**

**OBJECTIVE**

Exercise can improve motor function in people with Parkinson's disease but depression reduces the motivation to participate in regular exercise. The aim of this study was to develop a novel Enhanced Exercise Therapy program that uses manual-driven guided exercise and peer-facilitated psychoeducation for individuals with Parkinson's disease and depression.

**DESIGN**

24 week randomized controlled design.

**METHODS**

Thirty individuals were randomized to Enhanced Exercise Therapy or self-guided therapy, and evaluated at baseline, 12-weeks and at 24-weeks. Enhanced Exercise Therapy included group exercise and group psychoeducation for 12 weeks. Between 13 and 24 weeks, individuals had access to the fitness facility but group sessions were not held. Self-guided therapy included written guidelines for a self-paced exercise program and psychoeducation. Primary outcome measures included the number of exercise sessions and International Physical Activity Questionnaire score. Secondary measures included resting heart rate, supine blood pressure, estimated VO2max and incidence of orthostatic hypotension.

**RESULT**

Twenty four individuals completed the study (80% retention) and both groups attended similar number of exercise sessions. There were no significant changes in cardiovascular fitness measures but there was a significant increase in the amount of physical activity in the Enhanced Exercise Therapy group and a decrease in the self-guided therapy group during the post-intervention period.

**CONCLUSION**

Enhanced Exercise Therapy appears to promote engagement in an exercise program and more physical activity, even after group sessions were concluded in individuals with Parkinson's disease and depression.

**Database:** Medline

235. Highly Challenging Balance Program Reduces Fall Rate in Parkinson Disease.
**Author(s):** Sparrow, David; DeAngelis, Tamara R; Hendron, Kathryn; Thomas, Cathi A; Saint-Hilaire, Marie; Ellis, Terry

**Source:** Journal of neurologic physical therapy : JNPT; Jan 2016; vol. 40 (no. 1); p. 24-30

**Publication Date:** Jan 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Randomized Controlled Trial Journal Article

**PubMedID:** 26655100

Available at Journal of neurologic physical therapy : JNPT - from Unpaywall

**Abstract:**

**BACKGROUND AND PURPOSE**

There is a paucity of effective treatment options to reduce falls in Parkinson disease (PD). Although a variety of rehabilitative approaches have been shown to improve balance, evidence of a reduction in falls has been mixed. Prior balance trials suggest that programs with highly challenging exercises had superior outcomes. We investigated the effects of a theory-driven, progressive, highly challenging group exercise program on fall rate, balance, and fear of falling.

**METHODS**

Twenty-three subjects with PD participated in this randomized cross-over trial. Subjects were randomly allocated to 3 months of active balance exercises or usual care followed by the reverse. During the active condition, subjects participated in a progressive, highly challenging group exercise program twice weekly for 90 minutes. Outcomes included a change in fall rate over the 3-month active period and differences in balance (Mini-Balance Evaluation Systems Test [Mini-BESTest]) and fear of falling (Falls Efficacy Scale-International [FES-I]) between active and usual care conditions.

**RESULTS**

The effect of time on falls was significant (regression coefficient = -0.015 per day, P < 0.001). The estimated rate ratio comparing incidence rates at time points 1 month apart was 0.632 (95% confidence interval, 0.524-0.763). Thus, there was an estimated 37% decline in fall rate per month (95% confidence interval, 24%-48%). Improvements were also observed on the Mini-BESTest (P = 0.037) and FES-I (P = 0.059).

**DISCUSSION AND CONCLUSION**

The results of this study show that a theory-based, highly challenging, and progressive exercise program was effective in reducing falls, improving balance, and reducing fear of falling in PD. Video abstract available for more insights from the authors (see Supplemental Digital Content 1, http://links.lww.com/JNPT/A120).

**Database:** Medline

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**236. Effects of Exercise Therapy on Postural Instability in Parkinson Disease: A Meta-analysis.**

**Author(s):** Klamroth, Sarah; Steib, Simon; Devan, Surendar; Pfeifer, Klaus

**Source:** Journal of neurologic physical therapy : JNPT; Jan 2016; vol. 40 (no. 1); p. 3-14

**Publication Date:** Jan 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Meta-analysis Journal Article

**PubMedID:** 26655098

**Abstract:**

**BACKGROUND AND PURPOSE**

Exercise therapy is a common intervention for improving postural stability. The purpose of this meta-analysis was to assess the effect of exercise therapy on postural instability in persons with Parkinson disease (PD) based on the available literature, and to evaluate the efficacy across various types of exercise interventions.

**DATA SOURCES AND STUDY SELECTION**

In January 2015, electronic databases (PubMed, Scopus, PEDro) and study reference lists were searched for randomized controlled trials with moderate or high methodological quality (PEDro score ≥ 5), investigating the effect of exercise on postural instability in persons with PD.

**DATA EXTRACTION AND SYNTHESIS**

Three reviewers extracted data and assessed quality.

**MAIN OUTCOME AND MEASURE**

Postural stability as measured using the Berg Balance Scale, postural sway, Timed Up and Go, or Functional Reach test. Standardized mean differences (SMDs) with 95% confidence intervals (CIs) were calculated.

**RESULTS**

Twenty-two trials, with a total of 1072 participants, were
eligible for inclusion. The pooled estimates of effects showed significantly improved postural instability (SMD, 0.23; 95% CI, 0.10-0.36; P < 0.001) after exercise therapy, in comparison with no exercise or sham treatment. Exercise interventions specifically addressing components of balance dysfunction demonstrated the largest efficacy, with moderate to high effect sizes (SMD, 0.43; 95% CI, 0.21-0.66; P < 0.001). Little or no beneficial effects were observed for interventions not specifically targeted at postural stability (SMD, 0.20; 95% CI -0.04 to 0.44; P = 0.11) or for home-based, multicomponent exercise programs (SMD, 0.02; 95% CI -0.20 to 0.25; P = 0.86). DISCUSSION AND CONCLUSION Exercise therapies specifically addressing balance dysfunction are an important treatment option for improving postural stability in persons with PD. Future studies should investigate sustainability of the short-term effects and establish the dose-response relationship of balance training in persons with PD. Video abstract available for additional insights from the authors (see Video, Supplemental Digital Content 1, http://links.lww.com/JNPT/A121).

Database: Medline


Author(s): Landers, Merrill R; Hatlevig, Rebecca M; Davis, Alyssa D; Richards, Amanda R; Rosenlof, Leslee E

Source: Clinical rehabilitation; Jan 2016; vol. 30 (no. 1); p. 53-63

Publication Date: Jan 2016

Publication Type(s): Research Support, Non-u.s. Gov't Comparative Study Randomized Controlled Trial Journal Article

PubMedID: 25697454

Abstract: OBJECTIVITY To compare the effects of attentional focus to augment balance outcomes in individuals with Parkinson’s disease. DESIGN Randomised controlled clinical trial. SETTING University gait and balance research laboratory. PARTICIPANTS Forty-nine individuals with idiopathic Parkinson’s disease. INTERVENTIONS Participants were randomly assigned into one of four groups (three balance intervention groups and one control). The three intervention groups all received the same 4-week balance training program augmented with either external, internal, or no focus instructions. The control group did not receive any balance training. MAIN MEASURES Outcomes were measured at baseline, post intervention, 2-weeks post intervention, and 8-weeks post intervention and included: Sensory Organization Test, Berg Balance Scale, Self-Selected Gait Velocity, Dynamic Gait Index, Activities-Specific Balance Confidence Scale, and obstacle course completion time. RESULTSThere were no differences among the groups in trajectory over the course of the trial for all outcomes (ps ≥ .135). All groups improved from baseline to post intervention and from baseline to 2-weeks post intervention for all outcomes (ps ≤ .003), except Self-Selected Gait Velocity, which did not change over the course of the trial (P = .121). CONCLUSIONS Attentional focus instructions to augment a 4-week balance training program did not result in any change over and above a control group in measures of gait and balance in individuals with Parkinson’s disease. Additionally, while all four groups improved, there was no difference among the groups, including the control, suggesting that the 4-week balance training program in this trial was not effective.

Database: Medline

238. Effectiveness of resistance training on muscle strength and physical function in people with Parkinson’s disease: a systematic review and meta-analysis.

Author(s): Chung, Chloe Lau Ha; Thilarajah, Shamala; Tan, Dawn
OBJECTIVES To systematically review the evidence investigating the effectiveness of resistance training on strength and physical function in people with Parkinson's disease.

DATA SOURCES Seven electronic databases (COCHRANE, CINAHL, Medline ISI, Psycinfo, Scopus, Web of Science ISI and Embase) were systematically searched for full-text articles published in English between 1946 and November 2014 using relevant search terms.

REVIEW METHODS Only randomized controlled trials investigating the effects of resistance training on muscle strength and physical function in people with Parkinson's disease were considered. The PEDro scale was used to assess study quality. Studies with similar outcomes were pooled by calculating standardized mean differences (SMD) using fixed or random effects model, depending on study heterogeneity.

RESULTS Seven studies, comprising of 401 participants with early to advanced disease (Hoehn & Yahr stage 1 to 4), were included. The median quality score was 6/10. The meta-analyses demonstrated significant SMD in favour of resistance training compared to non-resistance training or no intervention controls for muscle strength (0.61; 95% CI, 0.35 to 0.87; P <0.001), balance (0.36; 95% CI, 0.08 to 0.64; P = 0.01) and parkinsonian motor symptoms (0.48; 95% CI, 0.21 to 0.75; P <0.001) but not for gait, balance confidence and quality of life.

CONCLUSION This review demonstrates that moderate intensity progressive resistance training, 2-3 times per week over 8-10 weeks can result in significant strength, balance and motor symptoms gains in people with early to moderate Parkinson's disease.

Database: Medline

239. Neuromuscular correlates of subthalamic stimulation and upper limb freezing in Parkinson's disease.

Author(s): Scholten, Marlieke; Klotz, Rosa; Plewnia, Christian; Wächter, Tobias; Mielke, Carina; Bloem, Bastiaan R; Braun, Christoph; Ziemann, Ulf; Govindan, Rathinaswamy B; Gharabaghi, Alireza; Krüger, Rejko; Weiss, Daniel

Source: Clinical neurophysiology : official journal of the International Federation of Clinical Neurophysiology; Jan 2016; vol. 127 (no. 1); p. 610-620

Publication Date: Jan 2016

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

PubMedID: 25792072

Available at Clinical neurophysiology : official journal of the International Federation of Clinical Neurophysiology - from Unpaywall

Abstract: OBJECTIVE The pathophysiology of deep brain stimulation mechanisms and resistant freezing phenomena in idiopathic Parkinson's disease (iPD) remains incompletely understood. Further studies on the neuromuscular substrates are needed.

METHODS We analyzed 16 patients with advanced iPD and bilateral subthalamic nucleus stimulation, and 13 age- and gender-matched healthy controls. Patients were tested after overnight withdrawal of medication with 'stimulation off' (StimOff) and 'stimulation on' (StimOn). Subjects performed continuous tapping of the right index finger with simultaneous recordings of biomechanical registration, EMG of finger flexors and extensors, and EEG. First, we analyzed EEG and EMG spectral measures comparing StimOff with healthy controls and StimOff with StimOn (irrespective of freezing). Second, we contrasted 'regular (unimpaired) tapping' and 'freezing' resistant to subthalamic neurostimulation as obtained in StimOn.

RESULTS iPD showed increased intermuscular coherence around 8Hz in StimOff that was
reduced in StimOn. This 8Hz muscular activity was not coherent to cortical activity. 'Freezing' episodes showed increased muscle activity of finger flexors and extensors at 6-9Hz, and increased cortical activity at 7-11Hz. During transition from regular tapping to ‘freezing’ the cortical activity first increased over the left sensorimotor area followed by a spread to the left frontal and right parietal areas.

CONCLUSIONS
We identified neuromuscular motor network features of subthalamic neurostimulation therapy and resistant upper limb freezing that point to increased low-frequency muscular and cortical activity.

SIGNIFICANCE
Together, our findings demonstrate several motor network abnormalities associated with upper limb freezing that may translate into future research on freezing of gait in iPD.

Database: Medline


Author(s): Arcolin, Ilaria; Pisano, Fabrizio; Delconte, Carmen; Godi, Marco; Schiappati, Marco; Mezzani, Alessandro; Picco, Daniele; Grasso, Margherita; Nardone, Antonio

Source: Restorative neurology and neuroscience; 2015; vol. 34 (no. 1); p. 125-138

Publication Date: 2015

Publication Type(s): Comparative Study Randomized Controlled Trial Journal Article

PubMedID: 26684265

Abstract:
PURPOSE
Cycle ergometer training improves gait in the elderly, but its effect in patients with Parkinson’s disease (PD) is not completely known.

METHOD
Twenty-nine PD inpatients were randomized to treadmill (n = 13, PD-T) or cycle ergometer (n = 16, PD-C) training for 3 weeks, 1 hour/day. Outcome measures were distance travelled during the 6-min walking test (6MWT), spatio-temporal variables of gait assessed by baropodometry, the Timed Up and Go (TUG) duration, the balance score through the Mini-BESTest, and the score of the Unified Parkinson's Disease Rating Scale (UPDRS).

RESULT
Sex, age, body mass index, disease duration, Hoehn-Yahr staging, comorbidity and medication did not differ between groups. At end of training, ANCOVA showed significant improvement, of similar degree, in both groups for 6MWT, speed, step length and cadence of gait, TUG, Mini-BESTest and UPDRS.

CONCLUSION
This pilot study shows that cycle ergometer training improves walking parameters and reduces clinical signs of PD, as much as treadmill training does. Gait velocity is accompanied by step lengthening, making the gait pattern close to that of healthy subjects. Cycle ergometer is a valid alternative to treadmill for improving gait in short term in patients with PD.

Database: Medline

241. Resistance versus Balance Training to Improve Postural Control in Parkinson's Disease: A Randomized Rater Blinded Controlled Study.

Author(s): Schlenstedt, Christian; Paschen, Steffen; Kruse, Annika; Raethjen, Jan; Weisser, Burkhard; Deuschl, Günther

Source: PloS one; 2015; vol. 10 (no. 10); p. e0140584

Publication Date: 2015

Publication Type(s): Research Support, Non-u.s. Gov't Comparative Study Randomized Controlled Trial Journal Article

PubMedID: 26501562

Available at PloS one - from Europe PubMed Central - Open Access
Abstract: BACKGROUND Reduced muscle strength is an independent risk factor for falls and related to postural instability in individuals with Parkinson's disease. The ability of resistance training to improve postural control still remains unclear. OBJECTIVE To compare resistance training with balance training to improve postural control in people with Parkinson's disease. METHODS 40 patients with idiopathic Parkinson's disease (Hoehn & Yahr: 2.5-3.0) were randomly assigned into resistance or balance training (2x/week for 7 weeks). Assessments were performed at baseline, 8- and 12-weeks follow-up: primary outcome: Fullerton Advanced Balance (FAB) scale; secondary outcomes: center of mass analysis during surface perturbations, Timed-up-and-go-test, Unified Parkinson's Disease Rating Scale, Clinical Global Impression, gait analysis, maximal isometric leg strength, PDQ-39, Beck Depression Inventory. Clinical tests were videotaped and analysed by a second rater, blind to group allocation and assessment time. RESULTS 32 participants (resistance training: n = 17, balance training: n = 15; 8 drop-outs) were analyzed at 8-weeks follow-up. No significant difference was found in the FAB scale when comparing the effects of the two training types (p = 0.14; effect size (Cohen's d) = -0.59). Participants from the resistance training group, but not from the balance training group significantly improved on the FAB scale (resistance training: +2.4 points, Cohen's d = -0.46; balance training: +0.3 points, Cohen's d = -0.08). Within the resistance training group, improvements of the FAB scale were significantly correlated with improvements of rate of force development and stride time variability. No significant differences were found in the secondary outcome measures when comparing the training effects of both training types. CONCLUSIONS The difference between resistance and balance training to improve postural control in people with Parkinson's disease was small and not significant with this sample size. There was weak evidence that freely coordinated resistance training might be more effective than balance training. Our results indicate a relationship between the enhancement of rate of force development and the improvement of postural control. TRIAL REGISTRATION ClinicalTrials.gov ID: NCT02253563.

Database: Medline


Author(s): Roeder, Luisa; Costello, Joseph T; Smith, Simon S; Stewart, Ian B; Kerr, Graham K

Source: PloS one; 2015; vol. 10 (no. 7); p. e0132135

Publication Date: 2015

Publication Type(s): Meta-analysis Journal Article Review Systematic Review

PubMedID: 26146840

Available at PloS one - from Europe PubMed Central - Open Access

Abstract: OBJECTIVE The aim of this systematic review and meta-analysis was to determine the overall effect of resistance training (RT) on measures of muscular strength in people with Parkinson's disease (PD). METHODS Controlled trials with parallel-group-design were identified from computerized literature searching and citation tracking performed until August 2014. Two reviewers independently screened for eligibility and assessed the quality of the studies using the Cochrane risk-of-bias-tool. For each study, mean differences (MD) or standardized mean differences (SMD) and 95% confidence intervals (CI) were calculated for continuous outcomes based on between-group comparisons using post-intervention data. Subgroup analysis was conducted based on differences in study design. RESULTS Nine studies met the inclusion criteria; all had a moderate to high risk of bias. Pooled data showed that knee extension, knee flexion and leg press strength were significantly greater in PD patients who undertook RT compared to control groups with or without interventions. Subgroups were: RT vs. control-without-intervention, RT vs. control-with-intervention, RT-with-other-form-of-exercise vs. control-without-intervention, RT-with-other-form-of-exercise vs. control-with-intervention. Pooled subgroup analysis showed that RT combined with
aerobic/balance/stretching exercise resulted in significantly greater knee extension, knee flexion and leg press strength compared with no-intervention. Compared to treadmill or balance exercise it resulted in greater knee flexion, but not knee extension or leg press strength. RT alone resulted in greater knee extension and flexion strength compared to stretching, but not in greater leg press strength compared to no-intervention.DISCUSSION: Overall, the current evidence suggests that exercise interventions that contain RT may be effective in improving muscular strength in people with PD compared with no exercise. However, depending on muscle group and/or training dose, RT may not be superior to other exercise types. Interventions which combine RT with other exercise may be most effective. Findings should be interpreted with caution due to the relatively high risk of bias of most studies.

Database: Medline


Author(s): Blumenfeld, Zack; Velisar, Anca; Miller Koop, Mandy; Hill, Bruce C; Shreve, Lauren A; Quinn, Emma J; Kilbane, Camilla; Yu, Hong; Henderson, Jaimie M; Brontë-Stewart, Helen

Source: PloS one; 2015; vol. 10 (no. 3); p. e0121067

Publication Date: 2015

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

PubMedID: 25807463

Available at PloS one - from Europe PubMed Central - Open Access

Abstract: High frequency subthalamic nucleus (STN) deep brain stimulation (DBS) improves the cardinal motor signs of Parkinson’s disease (PD) and attenuates STN alpha/beta band neural synchrony in a voltage-dependent manner. While there is a growing interest in the behavioral effects of lower frequency (60 Hz) DBS, little is known about its effect on STN neural synchrony. Here we demonstrate for the first time that during intra-operative 60 Hz STN DBS, one or more bands of resting state neural synchrony were amplified in the STN in PD. We recorded intra-operative STN resting state local field potentials (LFPs) from twenty-eight STNs in seventeen PD subjects after placement of the DBS lead (model 3389, Medtronic, Inc.) before and during three randomized neurostimulation sets (130 Hz/1.35V, 130 Hz/2V, 60 Hz/2V). During 130 Hz/2V DBS, baseline (no DBS) STN alpha (8-12 Hz) and beta (13-35 Hz) band power decreased (N=14, P < 0.001 for both), whereas during 60 Hz/2V DBS, alpha band and peak frequency power increased (P = 0.012, P = 0.007, respectively). The effect of 60 Hz/2V DBS opposed that of power-equivalent (130 Hz/1.35V) DBS (alpha: P < 0.001, beta: P = 0.006). These results show that intra-operative 60 Hz STN DBS amplified whereas 130 Hz STN DBS attenuated resting state neural synchrony in PD; the effects were frequency-specific. We demonstrate that neurostimulation may be useful as a tool to selectively modulate resting state resonant bands of neural synchrony and to investigate its influence on motor and non-motor behaviors in PD and other neuropsychiatric diseases.

Database: Medline

244. Efficacy of exercise intervention programs on cognition in people suffering from multiple sclerosis, stroke and Parkinson's disease: A systematic review and meta-analysis of current evidence.

Author(s): Kalron, Alon; Zeilig, Gabi

Source: NeuroRehabilitation; 2015; vol. 37 (no. 2); p. 273-289

Publication Date: 2015
Background: Cognitive impairment is a well-established sequela of people suffering from neurological pathologies. Objective: To examine the effects of exercise intervention programs on cognitive performance in participants suffering from stroke, multiple sclerosis and Parkinson’s disease. Methods: Four online databases (CINAHL, Cochrane Library, MEDLINE, PEDro) were comprehensively searched from their inception through December 2014. The search query was phrased as follows: In people suffering from MS, stroke or Parkinson’s disease, do exercise intervention programs improve cognitive performance? Results: Twelve controlled clinical trials met our inclusion criteria. Studies were classified according to three clinical subgroups: Parkinson’s disease (n = 3), stroke (n = 1) and multiple sclerosis (n = 8). Eight studies employed an aerobic intervention program; one used an active exercise program based on virtual reality systems, three reports examined the effect of yoga and one compared the intervention program with sport climbing. Significant improvements in cognition were found in nine out of the twelve studies. Nevertheless, the total effect size was non-significant (0.18 (95% CI, -4.1, 3.8)) for changes in executive functions.

Conclusion: Due to lack of commonality between measures of cognition, training sequences and intervention period, it remains unclear as to whether exercise training can be effective in improving the cognitive functions of neurological patients.

Database: Medline

245. Immediate effects of adding mental practice to physical practice on the gait of individuals with Parkinson’s disease: Randomized clinical trial.

Author(s): Santiago, Lorenna Marques de Melo; de Oliveira, Daniel Antunes; de Macêdo Ferreira, Louise Gabriella Lopes; de Brito Pinto, Hyanne Yasmim; Spaniol, Ana Paula; de Lucena Trigueiro, Larissa Coutinho; Ribeiro, Tatiana Souza; de Sousa, Angélica Vieira Cavalcanti; Piemonte, Maria Elisa Pimentel; Lindquist, Ana Raquel Rodrigues

Source: NeuroRehabilitation; 2015; vol. 37 (no. 2); p. 263-271

Publication Date: 2015

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 26484518

Abstract: Background: Mental practice has shown benefits in the rehabilitation of neurological patients, however, there is no evidence of immediate effects on gait of individuals with Parkinson’s disease. Objective: Determine the effects of mental practice activity added to physical practice on the gait of individuals with Idiopathic Parkinson’s Disease (IPD). Methods: 20 patients classified with stage 2 and 3, according to the Hoehn and Yahr scale were randomized into 2 groups. The experimental group (N = 10) was submitted to a single session of mental practice and physical practice gait protocol and the control group (N = 10) only to physical practice. The primary outcomes were stride length and total stance and swing time. Secondary outcomes were hip range of motion, velocity and mobility. Subjects were reassessed 10 minutes, 1 day and 7 days after the end of the session. Results: There was no statistically significant difference between the groups. An intragroup difference was observed in velocity, stride length, hip range of motion, and mobility, as well as total stance and swing time. These results were also observed on follow-ups. Conclusion: Mental practice did not have a greater effect on the gait of individuals with IPD than physical practice, after a single session.

Database: Medline
246. Transcutaneous tibial nerve stimulation in the treatment of lower urinary tract symptoms and its impact on health-related quality of life in patients with Parkinson disease: a randomized controlled trial.

Author(s): Perissinotto, Maria Carolina; D’Ancona, Carlos Arturo Levi; Lucio, Adélia; Campos, Renata Martins; Abreu, Anelyssa

Source: Journal of wound, ostomy, and continence nursing : official publication of The Wound, Ostomy and Continence Nurses Society; 2015; vol. 42 (no. 1); p. 94-99

Publication Date: 2015
Publication Type(s): Randomized Controlled Trial Journal Article
PubMedID: 25549314

Abstract: PURPOSEA randomized controlled trial study was performed to evaluate the efficacy of transcutaneous tibial nerve stimulation (TTNS) and sham TTNS, in patients with Parkinson disease (PD) with lower urinary tract symptoms (LUTS). DESIGNRandomized controlled trial. SUBJECTS AND SETTINGSThirteen patients with a diagnosis of PD and bothersome LUTS were randomly allocated to one of the following groups: Group I: TTNS group (n = 8) and group II: Sham group (n = 5). Both groups attended twice a week during 5 weeks; each session lasted 30 minutes. METHODSEight patients received TTNS treatment and 5 subjects allocated to group II were managed with sham surface electrodes that delivered no electrical stimulation. Assessments were performed before and after the treatment; they included a 3-day bladder diary, Overactive Bladder Questionnaire (OAB-V8), and the International Consultation on Incontinence Quality of Life Questionnaire Short Form (ICIQ-SF), and urodynamic evaluation. RESULTSFollowing 5 weeks of treatment, patients allocated to TTNS demonstrated statistically significant reductions in the number of urgency episodes (P = .004) and reductions in nocturia episodes (P < .01). Participants allocated to active treatment also showed better results after treatment in the OAB-V8 and ICIQ-SF scores (P < .01, respectively). Urodynamic testing revealed that patients in the active treatment group showed improvements in intravesical volume at strong desire to void (P < .05) and volume at urgency (P < .01) when compared to subjects in the sham treatment group. CONCLUSIONThese findings suggest that TTNS is effective in the treatment of LUTS in patients with PD, reducing urgency and nocturia episodes and improving urodynamic parameters as well as symptom scores measured by the OAB-V8 and health-related quality-of-life scores measured by the ICIQ-SF.

Database: Medline

247. Parkinson's disease and intensive exercise therapy--a systematic review and meta-analysis of randomized controlled trials.

Author(s): Uhrbrand, Anders; Stenager, Egon; Pedersen, Martin Sloth; Dalgas, Ulrik

Source: Journal of the neurological sciences; 2015; vol. 353 (no. 1-2); p. 9-19

Publication Date: 2015
Publication Type(s): Meta-analysis Journal Article Review Systematic Review
PubMedID: 25936252

Abstract: OBJECTIVETO evaluate and compare the effect of 3 intensive exercise therapy modalities - Resistance Training (RT), Endurance Training (ET) and Other Intensive Training Modalities (OITM) - in Parkinson's Disease (PD). Design A systematic review and meta-analysis of randomized controlled trials. METHODS A systematic literature search was conducted (Embase, Pubmed, Cinahl, SPORTDiscus, Cochrane, PEDro), which identified 15 studies that were categorized as RT, ET or OITM.
The different exercise modalities were reviewed and a meta-analysis evaluating the effect of RT on muscle strength was made. RESULTS In PD intensive exercise therapy (RT, ET and OITM) is feasible and safe. There is strong evidence that RT can improve muscle strength in PD, which is underlined by the meta-analysis (g=0.54 [95%CI 0.22;0.86]). There is moderate evidence that ET can improve cardio-respiratory fitness in PD. RT, ET and OITM may have beneficial effects on balance, walking performance, Unified Parkinson’s Disease Rating Scale-III (UPDRS-III) score and quality of life in PD, but findings are inconsistent. No studies find deterioration in any outcomes following exercise therapy. CONCLUSION: RT, ET and OITM all represent feasible, safe and beneficial adjunct rehabilitation therapies in PD.

Database: Medline


Author(s): Daneault, Jean-François; Sadikot, Abbas F; Barbat-Artigas, Sébastien; Aubertin-Leheudre, Mylène; Jodoin, Nicolas; Panisset, Michel; Duval, Christian

Source: Journal of Parkinson's disease; 2015; vol. 5 (no. 1); p. 85-93

Publication Date: 2015

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

PubMedID: 25361545

Abstract: BACKGROUND: Maintaining a physically active lifestyle promotes general health. Recent studies have demonstrated that patients with Parkinson’s disease (PD) fail to meet the suggested levels of physical activity and that targeted interventions do not always improve this behavior. One validated treatment for motor symptoms in PD is subthalamic stimulation (STN DBS). OBJECTIVE: Assess whether motor symptom improvement following STN DBS translated into increased physical activity behavior. METHODS: Twenty patients with PD scheduled for bilateral STN DBS filled-out the Phone-FITT physical activity questionnaire and the SF-36 quality of life questionnaire prior to surgery and 6 to 9 months postoperatively. Data were compared to age- and gender-matched healthy controls. RESULTS: Our results demonstrate that PD patients’ quality of life is significantly lower than healthy controls. While STN DBS improves motor symptoms in the intermediate term, it only improves some aspects of quality of life related to physical function. Furthermore, STN DBS does not modify physical activity behavior measured by the Phone-FITT, whether for household or recreational activities. CONCLUSION: The current study demonstrates that the motor improvements observed after STN DBS do not lead to systematic improvements in all aspects of quality of life or increased levels of physical activity. This highlights the need to develop and implement intervention strategies to promote an active lifestyle in this population, even if clinical improvement is evident following surgery.

Database: Medline

249. Crossover versus Stabilometric Platform for the Treatment of Balance Dysfunction in Parkinson's Disease: A Randomized Study.

Author(s): Frazzitta, G; Bossio, F; Maestri, R; Palamara, G; Bera, R; Ferrazzoli, D

Source: BioMed research international; 2015; vol. 2015 ; p. 878472

Publication Date: 2015

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 26583142
Abstract: Balance dysfunctions are a major challenge in the treatment of Parkinson's disease (PD). Previous studies have shown that rehabilitation can play a role in their treatment. In this study, we have compared the efficacy of two different devices for balance training: stabilometric platform and crossover. We have enrolled 60 PD patients randomly assigned to two groups. The first one (stabilometric group) performed a 4-week cycle of balance training, using the stabilometric platform, whereas the second one (crossover group) performed a 4-week cycle of balance training, using the crossover. The outcome measures used were Unified Parkinson's Disease Rating Scale (UPDRS) part II, Berg Balance Scale (BBS), Timed Up and Go (TUG), and Six Minutes Walking Test (6MWT). Results showed that TUG, BBS, and UPDRS II improved in both groups. There was not difference in the efficacy of the two balance treatments. Patients in both groups improved also the meters walked in the 6MWT at the end of rehabilitation, but the improvement was better for patients performing crossover training. Our results show that the crossover and the stabilometric platform have the same effect on balance dysfunction of Parkinsonian patients, while crossover gets better results on the walking capacity.

Database: Medline


Author(s): Teixeira-Machado, Lavinia; Araújo, Fernanda M; Cunha, Fabiane A; Menezes, Mayara; Menezes, Thainá; Melo DeSantana, Josimari

Source: Alternative therapies in health and medicine; 2015; vol. 21 (no. 1); p. 8-14

Publication Date: 2015

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 25599428

Abstract: CONTEXT Longevity results in changes to patterns of health, with an increased prevalence of chronic diseases. Parkinson's disease (PD) is described as a progressive neurodegenerative disease related to age that influences quality of life (QoL) and leads to depression. OBJECTIVE The study intended to assess changes in QoL and depression in older adults with PD through use of Feldenkrais method-based exercise. DESIGN The study was a controlled, blinded, and randomized clinical trial. SETTING The study occurred at the University Hospital of the Federal University of Sergipe in Aracaju, Sergipe, Brazil. PARTICIPANTS Participants were 30 patients, aged between 50 and 70 y, with idiopathic PD, who signed an informed consent form and were randomly assigned to 2 groups: treatment and control. INTERVENTION The treatment group underwent 50 sessions of an exercise program based on the Feldenkrais method. The control group received educational lectures during this period. The treatment group's 50 sessions, given 2 ×/wk on alternate days and lasting 60 min, were conducted in an appropriate room at the hospital. OUTCOME MEASURES Two surveys, the Parkinson's Disease Quality of Life (PDQL) questionnaire and the Beck Depression Inventory (BDI), were administered before and after the sessions for both groups. RESULTS After the exercises based on the Feldenkrais method, the treated group showed improvement in QoL scores (P = .004) as well as a reduction in the level of depression (P = .05) compared with the control group. CONCLUSION The findings in the current study indicate that it is likely that the practice of a program based on the Feldenkrais method can contribute greatly to the QoL of patients with PD, suggesting the importance of interventions that promote wellness for this population.

Database: Medline
251. Clinical impact of gait training enhanced with visual kinematic biofeedback: Patients with Parkinson’s disease and patients stable post stroke.

**Author(s):** Byl, Nancy; Zhang, Wenlong; Coo, Sophia; Tomizuka, Masayoshi

**Source:** Neuropsychologia; Dec 2015; vol. 79; p. 332-343

**Publication Date:** Dec 2015

**Publication Type(s):** Research Support, U.s. Gov't, Non-p.h.s. Randomized Controlled Trial Journal Article

**PubMedID:** 25912760

**Abstract:** As the world’s population ages, falls, physical inactivity, decreased attention and impairments in balance and gait arise as a consequence of decreased sensation, weakness, trauma and degenerative disease. Progressive balance and gait training can facilitate postural righting, safe ambulation and community participation. This small randomized clinical trial evaluated if visual and kinematic feedback provided during supervised gait training would interfere or enhance mobility, endurance, balance, strength and flexibility in older individuals greater than one year post stroke (Gobbi et al., 2009) or Parkinson's disease (PD) (Gobbi et al., 2009). Twenty-four individuals consented to participate. The participants were stratified by diagnosis and randomly assigned to a control (usual gait training (Gobbi et al., 2009)) or an experimental group (usual gait training plus kinematic feedback (Gobbi et al., 2009)). At baseline and 6 weeks post training (18 h), subjects completed standardized tests (mobility, balance, strength, range of motion). Gains were described across all subjects, by treatment group and by diagnosis. Then they were compared for significance using nonparametric statistics. Twenty-three subjects completed the study with no adverse events. Across all subjects, by diagnosis (stroke and PD) and by training group (control and experimental), there were significant gains in mobility (gait speed, step length, endurance, and quality), balance (Berg Balance), range of motion and strength. There were no significant differences in the gain scores between the control and experimental groups. Subjects chronic post stroke made greater strength gains on the affected side than subjects with PD but otherwise there were no significant differences. In summary, during supervised gait training, dynamic visual kinematic feedback from wireless pressure and motion sensors had similar, positive effects as verbal, therapist feedback. A wireless kinematic feedback system could be used at home, to provide feedback and motivation for self correction of gait while simultaneously providing data to the therapist (at a distance).

**Database:** Medline


**Author(s):** Alves Da Rocha, P; McClelland, J; Morris, M E

**Source:** European journal of physical and rehabilitation medicine; Dec 2015; vol. 51 (no. 6); p. 693-704

**Publication Date:** Dec 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Meta-analysis Journal Article Review Systematic Review

**PubMedID:** 26138090

**Abstract:** BACKGROUND The growth and popularity of complementary physical therapies for Parkinson’s disease (PD) attempt to fill the gap left by conventional exercises, which does not always
directly target wellbeing, enjoyment and social participation. AIM To evaluate the effects of complementary physical therapies on motor performance, quality of life and falls in people living with PD. DESIGN Systematic review with meta-analysis. POPULATION Outpatients--adults diagnosed with idiopathic PD, male or female, modified Hoehn and Yahr scale I-IV, any duration of PD, any duration of physical treatment or exercise. METHODS Randomized controlled trials, non-randomized controlled trials and case series studies were identified by systematic searching of health and rehabilitation electronic databases. A standardized form was used to extract key data from studies by two independent researchers. RESULTS 1210 participants from 20 randomized controlled trials, two non-randomized controlled trials and 13 case series studies were included. Most studies had moderately strong methodological quality. Dancing, water exercises and robotic gait training were an effective adjunct to medical management for some people living with PD. Virtual reality training, mental practice, aerobic training, boxing and Nordic walking training had a small amount of evidence supporting their use in PD. CONCLUSION On balance, alternative physical therapies are worthy of consideration when selecting treatment options for people with this common chronic disease. CLINICAL REHABILITATION IMPACT: Complementary physical therapies such as dancing, hydrotherapy and robotic gait training appear to afford therapeutic benefits, increasing mobility and quality of life, in some people living with PD.

Database: Medline

253. Argentine tango in Parkinson disease--a systematic review and meta-analysis.

Author(s): Lötze, Désirée; Ostermann, Thomas; Büsing, Arndt

Source: BMC neurology; Nov 2015; vol. 15 ; p. 226

Publication Date: Nov 2015

Publication Type(s): Meta-analysis Journal Article Review Systematic Review

PubMedID: 26542475

Available at BMC neurology - from Europe PubMed Central - Open Access

Abstract: BACKGROUND Parkinson's Disease (PD) is a neurodegenerative disease with increasing motor and non-motor symptoms in advanced stages. In addition to conventional exercise therapy and drug treatment, Argentine Tango (AT) is discussed as an appropriate intervention for patients to improve physical functioning and health-related quality of life. This review aimed to summarize the current research results on the effectiveness of AT for individuals with PD. METHODS The global literature search with the search terms "(Parkinson OR Parkinson's disease) AND tango" was conducted in PubMed, AMED, CAMbase, and Google Scholar for publications in English and German. There were no limitations on the study design, year of publication, stage of disease, considered outcome or the age of participants. RESULTS Thirteen studies met the inclusion criteria. These included 9 randomized-controlled trials, one non-randomized trial, two case studies and one uncontrolled pre-post study. Our meta-analysis revealed significant overall effects in favor of tango for motor severity measured with the Unified Parkinson's Disease Rating Scale 3 (ES = -0.62, 95% CI [-1.04, -0.21]), balance as measured with the Mini-BESTest (ES = 0.96 [0.60, 1.31]) or Berg Balance Scale (ES = 0.45 [0.01, 0.90]), and gait with the Timed Up and Go Test (ES = -0.46 [-0.72, -0.20]). However, gait as measured with a 6-Minute Walk Test did not demonstrate statistical significance (ES = 0.36 [-0.06, 0.77]). For freezing of gait, no significant effects were observed in favor of AT (ES = 0.16 [-0.62, 0.31]). Further, our systematic review revealed a tendency for positive effects on fatigue, activity participation and Parkinson-associated quality of life. A limitation of the studies is the small number of participants in each study (maximum 75). Moreover, most studies are from the same research groups, and only a few are from other researchers. CONCLUSIONS Future studies should enroll more individuals and should also focus on long-term effects. In addition, future research
should address more closely the effects of AT on personal relationships, the individual social network as well as on aspects of quality of life.

Database: Medline


Author(s): Collomb-Clerc, A; Welter, M-L

Source: Neurophysiologie clinique = Clinical neurophysiology; Nov 2015; vol. 45 (no. 4-5); p. 371-388

Publication Date: Nov 2015

Publication Type(s): Journal Article Review

PubMedID: 26319759

Abstract: Deep brain stimulation (DBS) of the subthalamic nucleus (STN) and internal globus pallidus (GPI) deep brain stimulation (DBS) provides an efficient treatment for the alleviation of motor signs in patients with Parkinson's disease. The effects of DBS on gait and balance disorders are less successful and may even lead to an aggravation of freezing of gait and imbalance. The identification of a substantia nigra pars reticulata (SNr)-mesencephalic locomotor region (MLR) network in the control of locomotion and postural control and of its dysfunction/lesion in PD patients with gait and balance disorders led to suggestion that DBS should be targeting the SNr and the pedunculopontine nucleus (part of the MLR) for PD patients with these disabling axial motor signs. However, the clinical results to date have been disappointing. In this review, we discuss the effects of DBS of these basal ganglia and brainstem structures on the neurophysiological parameters of gait and balance control in PD patients. Overall, the data suggest that both STN and GPI-DBS improve gait parameters and quiet standing postural control in PD patients, but have no effect or may even aggravate dynamic postural control, in particular with STN-DBS. Conversely, DBS of the SNr and PPN has no effect on gait parameters but improves anticipatory postural adjustments and gait postural control.

Database: Medline

255. The Effects of Highly Challenging Balance Training in Elderly With Parkinson's Disease: A Randomized Controlled Trial.

Author(s): Conradsson, David; Löfgren, Niklas; Nero, Håkan; Hagströmer, Maria; Ståhle, Agneta; Lökk, Johan; Franzén, Erika

Source: Neurorehabilitation and neural repair; Oct 2015; vol. 29 (no. 9); p. 827-836

Publication Date: Oct 2015

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 25608520

Abstract: BACKGROUND: Highly challenging exercises have been suggested to induce neuroplasticity in individuals with Parkinson's disease (PD); however, its effect on clinical outcomes remains largely unknown. OBJECTIVE: To evaluate the short-term effects of the HiBalance program, a highly challenging balance-training regimen that incorporates both dual-tasking and PD-specific balance components, compared with usual care in elderly with mild to moderate PD. METHODS: Participants with PD (n = 100) were randomized, either to the 10-week HiBalance program (n = 51) or to the control group (n = 49). Participants were evaluated before and after the intervention. The main
outcomes were balance performance (Mini-BESTest), gait velocity (during normal and dual-task gait), and concerns about falling (Falls Efficacy Scale-International). Performance of a cognitive task while walking, physical activity level (average steps per day), and activities of daily living were secondary outcomes.

RESULTS A total of 91 participants completed the study. After the intervention, the between group comparison showed significantly improved balance and gait performance in the training group. Moreover, although no significant between group difference was observed regarding gait performance during dual-tasking; the participants in the training group improved their performance of the cognitive task while walking, as compared with the control group. Regarding physical activity levels and activities of daily living, in comparison to the control group, favorable results were found for the training group. No group differences were found for concerns about falling.

CONCLUSIONS: The HiBalance program significantly benefited balance and gait abilities when compared with usual care and showed promising transfer effects to everyday living. Long-term follow-up assessments will further explore these effects.

Database: Medline


Author(s): David, Fabian J; Robichaud, Julie A; Leurgans, Sue E; Poon, Cynthia; Kohrt, Wendy M; Goldman, Jennifer G; Comella, Cynthia L; Vaillancourt, David E; Corcos, Daniel M

Source: Movement disorders : official journal of the Movement Disorder Society; Oct 2015; vol. 30 (no. 12); p. 1657-1663

Publication Date: Oct 2015

Publication Type(s): Research Support, N.i.h., Extramural Randomized Controlled Trial Journal Article

PubMedID: 26148003

Available at Movement disorders : official journal of the Movement Disorder Society - from Unpaywall

Abstract: BACKGROUND This article reports on the findings of the effect of two structured exercise interventions on secondary cognitive outcomes that were gathered as part of the Progressive Resistance Exercise Training in Parkinson's disease (PD) randomized, controlled trial. METHODS This study was a prospective, parallel-group, single-center trial. Fifty-one nondemented patients with mild-to-moderate PD were randomly assigned either to modified Fitness Counts (mFC) or to Progressive Resistance Exercise Training (PRET) and were followed for 24 months. Cognitive outcomes were the Digit Span, Stroop, and Brief Test of Attention (BTA). RESULTS Eighteen patients in mFC and 20 patients in PRET completed the trial. At 12 and at 24 months, no differences between groups were observed. At 12 months, relative to baseline, mFC improved on the Digit Span (estimated change: 0.3; interquartile range: 0, 0.7; P = 0.04) and Stroop (0.3; 0, 0.6; P = 0.04), and PRET improved only on the Digit Span (0.7; 0.3, 1; P < 0.01). At 24 months, relative to baseline, mFC improved on the Digit Span (0.7; 0.3, 1.7; P < 0.01) and Stroop (0.3; 0.1, 0.5; P = 0.03), whereas PRET improved on the Digit Span (0.5; 0.2, 0.8; P < 0.01), Stroop (0.2; -0.1, 0.6; P = 0.048), and BTA (0.3; 0, 0.8; P = 0.048). No neurological or cognitive adverse events were observed. CONCLUSION This study provides class IV level of evidence that 24 months of PRET or mFC may improve attention and working memory in nondemented patients with mild-to-moderate Parkinson's disease.

Database: Medline

257. Effects of Group, Individual, and Home Exercise in Persons With Parkinson Disease: A Randomized Clinical Trial.
Author(s): King, Laurie A; Wilhelm, Jennifer; Chen, Yiyi; Blehm, Ron; Nutt, John; Chen, Zunqiu; Serdar, Andrea; Horak, Fay B
Source: Journal of neurologic physical therapy : JNPT; Oct 2015; vol. 39 (no. 4); p. 204-212
Publication Date: Oct 2015
Publication Type(s): Research Support, N.i.h., Extramural Randomized Controlled Trial Journal Article
PubMedID: 26308937
Available at Journal of neurologic physical therapy : JNPT - from Unpaywall

Abstract: BACKGROUND AND PURPOSE Comparative studies of exercise interventions for people with Parkinson disease (PD) rarely considered how one should deliver the intervention. The objective of this study was to compare the success of exercise when administered by (1) home exercise program, (2) individualized physical therapy, or (3) a group class. We examined if common comorbidities associated with PD impacted success of each intervention.

METHODS Fifty-eight people (age = 63.9 ± 8 years) with PD participated. People were randomized into (1) home exercise program, (2) individual physical therapy, or (3) group class intervention. All arms were standardized and based on the Agility Boot Camp exercise program for PD, 3 times per week for 4 weeks. The primary outcome measure was the 7-item Physical Performance Test. Other measures of balance, gait, mobility, quality of life, balance confidence, depressions, apathy, self-efficacy and UPDRS-Motor, and activity of daily living scores were included.

RESULTS Only the individual group significantly improved in the Physical Performance Test. The individual exercise showed the most improvements in functional and balance measures, whereas the group class showed the most improvements in gait. The home exercise program improved the least across all outcomes. Several factors affected success, particularly for the home group.

DISCUSSION AND CONCLUSIONS: An unsupervised, home exercise program is the least effective way to deliver exercise to people with PD, and individual and group exercises have differing benefits. Furthermore, people with PD who also have other comorbidities did better in a program directly supervised by a physical therapist. Video Abstract available for additional insights from the authors (see Video, Supplemental Digital Content 1, http://links.lww.com/JNPT/A112).

Database: Medline

258. Deep brain stimulation as a treatment for Parkinson's disease related camptocormia.
Author(s): Chieng, Lee Onn; Madhavan, Karthik; Wang, Michael Y
Source: Journal of clinical neuroscience : official journal of the Neurosurgical Society of Australasia; Oct 2015; vol. 22 (no. 10); p. 1555-1561
Publication Date: Oct 2015
Publication Type(s): Journal Article Review Systematic Review
PubMedID: 26321306

Abstract: In this systematic review, we aimed to profile the various reported interventions for camptocormia in Parkinson's disease (PD) and give an overview of the benefits of deep brain stimulation (DBS). Currently, there is no consensus in the literature regarding this. PD manifests in several ways and camptocormia is one of the commonly encountered problems for both spine and functional neurosurgeons. It is a significant forward flexion of the thoracolumbar spine which resolves in the recumbent position. DBS was introduced in 2002 in the USA, and since then its efficacy and applications have tremendously increased. We reviewed the PubMed and Medical Subject Headings database using the phrases "Parkinson's disease" or "Parkinson" in combination with "spinal deformity" or "camptocormia" or "bent spine syndrome" and "deep brain stimulation". Our review was limited to English language literature and we excluded camptocormia of non-PD
origin. Our search yielded 361 articles with 131 patients in the pooled data. The majority (59%) of patients were women and the age range was 48-76 years. While half the patients on levodopa (n=42) saw no improvement of their camptocormia, 71% of the lidocaine group (n=27) and 68% of the DBS group (n=32) showed significant improvement. For mean flexion angle, the spinal surgery and DBS group demonstrated profound improvement in the bending angle, 89.9% and 78.2%, respectively. However, major complications following spinal surgery were noted. Although the results are from a small group of patients, DBS has achieved sustained improvement in camptocormia with low postoperative morbidity, and appears to be a promising treatment option. A larger, long term study is necessary to establish comprehensive outcome data.

Database: Medline

259. **Speech intelligibility in Parkinson's disease patients with zona incerta deep brain stimulation.**

**Author(s):** Sandström, Linda; Hägglund, Patricia; Johansson, Louise; Blomstedt, Patric; Karlsson, Fredrik

**Source:** Brain and behavior; Oct 2015; vol. 5 (no. 10); p. e00394

**Publication Date:** Oct 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 26516614

Available at [Brain and behavior](https://brainbehavior.lww.com)- from Europe PubMed Central - Open Access

**Abstract:** OBJECTIVES: To investigate the effects of l-dopa (Levodopa) and cZi-DBS (deep brain stimulation in caudal zona incerta) on spontaneous speech intelligibility in patients with PD (Parkinson's disease).

**MATERIALS AND METHODS:** Spontaneous utterances were extracted from anechoic recordings from 11 patients with PD preoperatively (off and on l-dopa medication) and 6 and 12 months post bilateral cZi-DBS operation (off and on stimulation, with simultaneous l-dopa medication). Background noise with an amplitude corresponding to a clinical setting was added to the recordings. Intelligibility was assessed through a transcription task performed by 41 listeners in a randomized and blinded procedure.

**RESULTS:** Group-level worsening in spontaneous speech intelligibility was observed on cZi stimulation compared to off 6 months postoperatively (8 adverse, 1 positive, 2 no change). Twelve months postoperatively, adverse effects of cZi-DBS were not frequently observed (2 positive, 3 adverse, 6 no change). L-dopa administered preoperatively as part of the evaluation for DBS operation provided the overall best treatment outcome (1 adverse, 4 positive, 6 no change).

**CONCLUSIONS:** CZi-DBS was shown to have smaller negative effects when evaluated from spontaneous speech compared to speech effects reported previously. The previously reported reduction in word-level intelligibility 12 months postoperatively was not transferred to spontaneous speech for most patients. Reduced intelligibility due to cZi stimulation was much more prominent 6 months postoperatively than at 12 months.

**Database: Medline**

260. **Effects of Tai Chi and Multimodal Exercise Training on Movement and Balance Function in Mild to Moderate Idiopathic Parkinson Disease.**

**Author(s):** Zhang, Tian-Yu; Hu, Yong; Nie, Zhi-Yu; Jin, Rong-Xiang; Chen, Fei; Guan, Qiang; Hu, Bin; Gu, Chun-Ya; Zhu, Ling; Jin, Ling-Jing

**Source:** American journal of physical medicine & rehabilitation; Oct 2015; vol. 94 (no. 10)

**Publication Date:** Oct 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article
OBJECTIVE: The primary aim of this study was to investigate the effects of two different patterns of rehabilitation training on movement and balance function in patients with idiopathic Parkinson disease.

DESIGN: Forty patients with Parkinson disease were randomized into the tai chi group (n = 20) or the multimodal exercise training group (n = 20). Outcome measures were assessed at baseline and after 12 wks of exercise. Balance was assessed using the Berg Balance Scale, and movement was assessed by the Unified Parkinson's Disease Rating Scale-Motor Examination, stride length, gait velocity, and Timed Up and Go Test.

RESULTS: The multimodal exercise training group improved significantly in movement from baseline, and a reduction in balance impairment was observed for the multimodal exercise training group. The questionnaire results after training showed that the multimodal exercise training is easy to learn and adhere to. No major adverse events were noted in both groups.

CONCLUSIONS: This multimodal exercise training could improve motion function and benefit balance function in patients with Parkinson disease. The multimodal exercise training is easy to learn and practice.

Database: Medline

261. Effects of Treadmill Training with Load on Gait in Parkinson Disease: A Randomized Controlled Clinical Trial.

Author(s): Trigueiro, Larissa Coutinho de Lucena; Gama, Gabriela Lopes; Simão, Camila Rocha; Sousa, Angélica Vieira Cavalcanti de; Godeiro Júnior, Clécio de Oliveira; Lindquist, Ana Raquel Rodrigues

Source: American journal of physical medicine & rehabilitation; Oct 2015; vol. 94 (no. 10)

Publication Date: Oct 2015

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 25741619

Abstract: The aim of this study was to assess the effects of 3% of body weight loads (0%, 5%, and 10%) on treadmill gait training in subjects with Parkinson disease. DESIGN: This study used a randomized controlled single-blind trial. RESULTS: Spatiotemporal variables demonstrated significant intragroup alterations in all three groups at pretraining and posttraining, with an increase in speed (m/sec; F = 4.73, P = 0.04), stride length (m; F = 12.00, P = 0.002), and step length (m; F = 16.16, P = 0.001) and a decrease in the double-stance phase (%; F = 6.59, P = 0.02) and stance phase (%; F = 4.77, P = 0.04). Intergroup pretraining and posttraining did not exhibit significant differences (F < 0.14). Angular variables showed significant intragroup alterations, with an increase in knee range of motion (F = 5.18, P = 0.03), and intergroup comparison revealed no significant changes (F = 1.87, P = 0.17). CONCLUSIONS: Posttraining improvements in speed, stride length, step length, double-stance, stance phase, and knee range of motion were observed in all groups, where no load (0%, 5%, or 10%) had any significant effect, suggesting that the influence of load did not make one experimental condition better than another. All participants benefitted from treadmill gait training, irrespective of the use of load.

Database: Medline

262. Treadmill training for patients with Parkinson's disease.

Author(s): Mehrholz, Jan; Kugler, Joachim; Storch, Alexander; Pohl, Marcus; Hirsch, Kathleen; Elsner, Bernhard

Source: The Cochrane database of systematic reviews; Sep 2015 (no. 9); p. CD007830

Publication Date: Sep 2015
**Publication Type(s):** Research Support, Non-u.s. Gov't Meta-analysis Journal Article Review Systematic Review

**PubMedID:** 26363646

Available at The Cochrane database of systematic reviews - from Cochrane Collaboration (Wiley)

**Abstract:**
BACKGROUND: Treadmill training is used in rehabilitation and is described as improving gait parameters of patients with Parkinson's disease. OBJECTIVES: To assess the effectiveness of treadmill training in improving the gait of patients with Parkinson's disease and the acceptability and safety of this type of therapy. SEARCH METHODS: We searched the Cochrane Movement Disorders Group Specialised Register (see Review Group details for more information) (last searched September 2014), Cochrane Central Register of Controlled Trials (The Cochrane Library 2014, Issue 10), MEDLINE (1950 to September 2014), and EMBASE (1980 to September 2014). We also handsearched relevant conference proceedings, searched trials and research registers, and checked reference lists (last searched September 2014). We contacted trialists, experts and researchers in the field and manufacturers of commercial devices. SELECTION CRITERIA: We included randomised controlled trials comparing treadmill training with no treadmill training in patients with Parkinson's disease. DATA COLLECTION AND ANALYSIS: Two review authors independently selected trials for inclusion, assessed trial quality and extracted data. We contacted the trialists for additional information. We analysed the results as mean differences (MDs) for continuous variables and relative risk differences (RD) for dichotomous variables. MAIN RESULTS: We included 18 trials (633 participants) in this update of this review. Treadmill training improved gait speed (MD = 0.09 m/s; 95% confidence interval (CI) 0.03 to 0.14; P = 0.001; I(2) = 24%; moderate quality of evidence), stride length (MD = 0.05 metres; 95% CI 0.01 to 0.09; P = 0.01; I(2) = 0%; low quality of evidence), but walking distance (MD = 48.9 metres; 95% CI -1.32 to 99.14; P = 0.06; I(2) = 91%; very low quality of evidence) and cadence did not improve (MD = 2.16 steps/minute; 95% CI -0.13 to 4.46; P = 0.07; I(2) = 28%; low quality of evidence) at the end of study. Treadmill training did not increase the risk of patients dropping out from intervention (RD = -0.02; 95% CI -0.06 to 0.02; P = 0.32; I(2) = 13%; moderate quality of evidence). Adverse events were not reported in included studies. AUTHORS' CONCLUSIONS: This update of our systematic review provides evidence from eighteen trials with moderate to low risk of bias that the use of treadmill training in patients with PD may improve clinically relevant gait parameters such as gait speed and stride length (moderate and low quality of evidence, respectively). This apparent benefit for patients is, however, not supported by all secondary variables (e.g. cadence and walking distance). Comparing physiotherapy and treadmill training against other alternatives in the treatment of gait hypokinesia such as physiotherapy without treadmill training this type of therapy seems to be more beneficial in practice without increased risk. The gain seems small to moderate clinically relevant. However, the results must be interpreted with caution because it is not known how long these improvements may last and some studies used no intervention in the control group and underlie some risk of bias. Additionally the results were heterogenous and we found variations between the trials in patient characteristics, the duration and amount of training, and types of treadmill training applied.

**Database:** Medline

263. A Randomized Controlled Trial to Reduce Falls in People With Parkinson's Disease.

**Author(s):** Morris, Meg E; Menz, Hylton B; McGinley, Jennifer L; Watts, Jennifer J; Huxham, Frances E; Murphy, Anna T; Danoudis, Mary E; Iansek, Robert

**Source:** Neurorehabilitation and neural repair; Sep 2015; vol. 29 (no. 8); p. 777-785

**Publication Date:** Sep 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Comparative Study Randomized Controlled Trial Journal Article
PubMedID: 25567121

Abstract: BACKGROUND Falls are common and disabling in people with Parkinson's disease (PD). There is a need to quantify the effects of movement rehabilitation on falls in PD. OBJECTIVE To evaluate 2 physical therapy interventions in reducing falls in PD. METHODS We randomized 210 people with PD to 3 groups: progressive resistance strength training coupled with falls prevention education, movement strategy training combined with falls prevention education, and life-skills information (control). All received 8 weeks of out-patient therapy once per week and a structured home program. The primary end point was the falls rate, recorded prospectively over a 12 month period, starting from the completion of the intervention. Secondary outcomes were walking speed, disability, and quality of life. RESULT SA total of 1547 falls were reported for the trial. The falls rate was higher in the control group compared with the groups that received strength training or strategy training. There were 193 falls for the progressive resistance strength training group, 441 for the movement strategy group and 913 for the control group. The strength training group had 84.9% fewer falls than controls (incidence rate ratio [IRR] = 0.151, 95% CI 0.071-0.322, P < .001). The movement strategy training group had 61.5% fewer falls than controls (IRR = 0.385, 95% CI 0.184-0.808, P = .012). Disability scores improved in the intervention groups following therapy while deteriorating in the control group. CONCLUSIONS Rehabilitation combining falls prevention education with strength training or movement strategy training reduces the rate of falls in people with mild to moderately severe PD and is feasible.

Database: Medline

264. Impact of deep brain stimulation on pharyngo-esophageal motility: a randomized cross-over study.

Author(s): Derrey, S; Chastan, N; Maltete, D; Verin, E; Dechelotte, P; Lefaucheur, R; Proust, F; Freger, P; Leroi, A M; Weber, J; Gourcerol, G

Source: Neurogastroenterology and motility : the official journal of the European Gastrointestinal Motility Society; Sep 2015; vol. 27 (no. 9); p. 1214-1222

Publication Date: Sep 2015

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Clinical Trial Journal Article

PubMedID: 26053217

Available at Neurogastroenterology and motility : the official journal of the European Gastrointestinal Motility Society - from Wiley Online Library Free Content - NHS

Abstract: BACKGROUND Bilateral subthalamic nucleus (STN) stimulation is used to alleviate Parkinson's disease (PD) motor symptoms. Recently, it has been shown that this therapeutic also increased gut cholinergeric contractions. We therefore investigated the effect of STN stimulation on esophageal motility in an interventional randomized study. METHODS Sixteen humans PD patients (4 women, 12 men; age: 62.4 ± 9.3-years old) who underwent STN stimulation for at least 6 months were randomly evaluated with either stimulator turned OFF then ON, or inversely. Esophageal high resolution manometry was performed at the end of each ON and OFF period, with a 5 min resting period followed by ten swallows of 5 mL. KEY RESULTS During the ON, an increase in the distal contractility index was found (OFF: 1750 ± 629 vs ON: 2171 ± 755 mmHg/cm/s; p = 0.03), with no difference in the distal front velocity. A decrease in the integrative relaxation pressure of the lower esophageal sphincter (LES) was noted (OFF: 11.1 ± 1.8 mmHg vs ON: 7.2 ± 1.8 mmHg; p < 0.05) in ON. The LES resting pressure remained unchanged during the two periods. This resulted in a decrease in the intrabolus pressure (p = 0.03). No difference was observed for the upper esophageal sphincter, nor the pharyngeal contraction amplitude and velocity. CONCLUSIONS & INFERENCES In conclusion, STN stimulation in PD patients increased esophageal body contractions and enhanced...
the LES opening. This suggests that the nigrostriatal-striatonigral loop is involved in the control of esophageal motility.

Database: Medline

265. **Compensatory stepping in Parkinson’s disease is still a problem after deep brain stimulation randomized to STN or GPI.**

**Author(s):** St George, R J; Carlson-Kuhta, P; King, L A; Burchiel, K J; Horak, F B

**Source:** Journal of neurophysiology; Sep 2015; vol. 114 (no. 3); p. 1417-1423

**Publication Date:** Sep 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Randomized Controlled Trial Journal Article

**PubMedID:** 26108960

Available at [Journal of neurophysiology](https://www.journals.aps.org/jnphys) - from HighWire - Free Full Text

**Abstract:** The effects of deep brain stimulation (DBS) on balance in people with Parkinson’s disease (PD) are not well established. This study examined whether DBS randomized to the subthalamic nucleus (STN; n = 11) or globus pallidus interna (GPI; n = 10) improved compensatory stepping to recover balance after a perturbation. The standing surface translated backward, forcing subjects to take compensatory steps forward. Kinematic and kinetic responses were recorded. PD-DBS subjects were tested off and on their levodopa medication before bilateral DBS surgery and retested 6 mo later off and on DBS, combined with off and on levodopa medication. Responses were compared with PD-control subjects (n = 8) tested over the same timescale and 17 healthy control subjects. Neither DBS nor levodopa improved the stepping response. Compensatory stepping in the best-treated state after surgery (DBS+DOPA) was similar to the best-treated state before surgery (DOPA) for the PD-GPI group and the PD-control group. For the PD-STN group, there were more lateral weight shifts, a delayed foot-off, and a greater number of steps required to recover balance in DBS+DOPA after surgery compared with DOPA before surgery. Within the STN group five subjects who did not fall during the experiment before surgery fell at least once after surgery, whereas the number of falls in the GPI and PD-control groups were unchanged. DBS did not improve the compensatory step response needed to recover from balance perturbations in the GPI group and caused delays in the preparation phase of the step in the STN group.

Database: Medline

266. **Long-term effects of automated mechanical peripheral stimulation on gait patterns of patients with Parkinson's disease.**

**Author(s):** Stocchi, Fabrizio; Sale, Patrizio; Kleiner, Ana F R; Casali, Miriam; Cimolin, Veronica; de Pandis, Francesca; Albertini, Giorgio; Galli, Manuela

**Source:** International journal of rehabilitation research. Internationale Zeitschrift fur Rehabilitationsforschung. Revue internationale de recherches de readaptation; Sep 2015; vol. 38 (no. 3); p. 238-245

**Publication Date:** Sep 2015

**Publication Type(s):** Clinical Trial Journal Article

**PubMedID:** 26164797

Abstract: New treatments based on peripheral stimulation of the sensory-motor system have been inspiring new rehabilitation approaches in Parkinson's disease (PD), especially to reduce gait impairment, levodopa washout effects, and the incidence of falls. The aim of this study was to evaluate the change in gait and the clinical status of PD patients after six sessions of a treatment based on automated mechanical peripheral stimulation (AMPS). Eighteen patients with PD and 15 age-matched healthy individuals (control group) participated in this study. A dedicated medical device delivered the AMPS. PD patients were treated with AMPS six times once every 4 days. All PD patients were treated in the off-levodopa phase and were evaluated with gait analysis before and after the first intervention (acute phase), after the sixth intervention, 48 h after the sixth intervention, and 10 days after the end of the treatment. To compare the differences among the AMPS interventions (pre, 6 AMPS, and 10 days) in terms of clinical scales, a t-test was used (α≤0.05). In addition, to compare the differences among the AMPS interventions (pre, post, 6 AMPS, 48 h and 10 days), the gait spatiotemporal parameters were analyzed using the Friedman test and the Bonferroni post-hoc test (α≤0.05). Also, for comparisons between the PD group and the control group, the gait spatiotemporal parameters were analyzed using the Mann-Whitney test and the Bonferroni post-hoc test (α≤0.05). The results of the study indicate that the AMPS treatment has a positive effect on bradykinesia because it improves walking velocity, has a positive effect on the step and stride length, and has a positive effect on walking stability, measured by the increase in stride length. These results are consistent with the improvements measured with clinical scales. These findings indicate that AMPS treatment seems to generate a more stable walking pattern in PD patients, reducing the well-known gait impairment that is typical of PD; regular repetition every 4 days of AMPS treatment appears to be able to improve gait parameters, to restore rhythmicity, and to reduce the risk of falls, with benefits maintained up to 10 days after the last treatment. The trial was registered online at ClinicalTrials.gov (number identifier: NCT0181528).

Database: Medline


Author(s): Ganesan, Mohan; Sathyaprabha, Talakad N; Pal, Pramod Kumar; Gupta, Anupam

Source: Archives of physical medicine and rehabilitation; Sep 2015; vol. 96 (no. 9); p. 1557-1565

Publication Date: Sep 2015

Publication Type(s): Randomized Controlled Trial Journal Article

PubMedID: 26008873

Abstract: OBJECTIVE To evaluate the effect of conventional gait training (CGT) and partial weight-supported treadmill training (PWSTT) on gait and clinical manifestation. DESIGN Prospective experimental research design. SETTING Hospital. PARTICIPANTS Patients with idiopathic Parkinson disease (PD) (N=60; mean age, 58.15±8.7y) on stable dosage of dopaminomimetic drugs were randomly assigned into the 3 following groups (20 patients in each group): (1) nonexercising PD group, (2) CGT group, and (3) PWSTT group. INTERVENTIONS The interventions included in the study were CGT and PWSTT. The sessions of the CGT and PWSTT groups were given in patient's self-reported best on status after regular medications. The interventions were given for 30min/d, 4d/wk, for 4 weeks (16 sessions). MAIN OUTCOME MEASURES Clinical severity was measured by the Unified Parkinson Disease Rating Scale (UPDRS) and its subscores. Gait was measured by 2 minutes of treadmill walking and the 10-m walk test. Outcome measures were evaluated in their best on status at baseline and after the second and fourth weeks. RESULTS Four weeks of CGT and PWSTT gait training showed significant improvements of UPDRS scores, its subscores, and gait performance measures. Moreover, the effects of PWSTT were significantly better than CGT on most
measures. CONCLUSIONS: PWSTT is a promising intervention tool to improve the clinical and gait outcome measures in patients with PD.

Database: Medline

268. Multiple-source current steering in subthalamic nucleus deep brain stimulation for Parkinson's disease (the VANTAGE study): a non-randomised, prospective, multicentre, open-label study.

Author(s): Timmermann, Lars; Jain, Roshini; Chen, Lilly; Maarouf, Mohamed; Barbe, Michael T; Allert, Niels; Brücke, Thomas; Kaiser, Iris; Beirer, Sebastian; Sejio, Fernando; Suarez, Esther; Lozano, Beatriz; Haegele, Claire; Vérin, Marc; Porta, Mauro; Servello, Domenico; Gill, Steven; Whone, Alan; Van Dyck, Nic; Alesch, François

Source: The Lancet. Neurology; Jul 2015; vol. 14 (no. 7); p. 693-701

Publication Date: Jul 2015

Publication Type(s): Research Support, Non-u.s. Gov't Multicenter Study Journal Article

PubMedID: 26027940

Available at The Lancet Neurology - from ProQuest (Health Research Premium) - NHS Version

Abstract: BACKGROUND: High-frequency deep brain stimulation (DBS) with a single electrical source is effective for motor symptom relief in patients with Parkinson's disease. We postulated that a multiple-source, constant-current device that permits well defined distribution of current would lead to motor improvement in patients with Parkinson's disease.

METHODS: We did a prospective, multicentre, non-randomised, open-label intervention study of an implantable DBS device (the VANTAGE study) at six specialist DBS centres at universities in six European countries. Patients were judged eligible if they were aged 21-75 years, had been diagnosed with bilateral idiopathic Parkinson's disease with motor symptoms for more than 5 years, had a Hoehn and Yahr score of 2 or greater, and had a Unified Parkinson's disease rating scale part III (UPDRS III) score in the medication-off state of more than 30, which improved by 33% or more after a levodopa challenge. Participants underwent bilateral implantation in the subthalamic nucleus of a multiple-source, constant-current, eight-contact, rechargeable DBS system, and were assessed 12, 26, and 52 weeks after implantation. The primary endpoint was the mean change in UPDRS III scores (assessed by site investigators who were aware of the treatment assignment) from baseline (medication-off state) to 26 weeks after first lead implantation (stimulation-on, medication-off state). This study is registered with ClinicalTrials.gov, number NCT01221948.

FINDINGS: Of 53 patients enrolled in the study, 40 received a bilateral implant in the subthalamic nucleus and their data contributed to the primary endpoint analysis. Improvement was noted in the UPDRS III motor score 6 months after first lead implantation (mean 13.5 [SD 6.8], 95% CI 11.3-15.7) compared with baseline (37.4 [8.9], 34.5-40.2), with a mean difference of 23.8 (SD 10.6; 95% CI 20.3-27.3; p<0.0001). One patient died of pneumonia 24 weeks after implantation, which was judged to be unrelated to the procedure. 125 adverse events were reported, the most frequent of which were dystonia, speech disorder, and apathy. 18 serious adverse events were recorded, three of which were attributed to the device or procedure (one case each of infection, migration, and respiratory depression). All serious adverse events resolved without residual effects and stimulation remained on during the study.

INTERPRETATION: The multiple-source, constant-current, eight-contact DBS system suppressed motor symptoms effectively in patients with Parkinson's disease, with an acceptable safety profile. Future trials are needed to investigate systematically the potential benefits of this system on postoperative outcome and its side-effects.

FUNDING: Boston Scientific.

Database: Medline
Economic evaluation of occupational therapy in Parkinson's disease: A randomized controlled trial.

**Author(s):** Sturkenboom, Ingrid H W M; Hendriks, Jan C M; Graff, Maud J L; Adang, Eddy M M; Munneke, Marten; Nijhuis-van der Sanden, Maria W G; Bloem, Bastiaan R

**Source:** Movement disorders : official journal of the Movement Disorder Society; Jul 2015; vol. 30 (no. 8); p. 1059-1067

**Publication Date:** Jul 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

**PubMedID:** 25854809

**Abstract:** BACKGROUND large randomized clinical trial (the Occupational Therapy in Parkinson's Disease [OTiP] study) recently demonstrated that home-based occupational therapy improves perceived performance in daily activities of people with Parkinson's disease (PD). The aim of the current study was to evaluate the cost-effectiveness of this intervention. METHODS We performed an economic evaluation over a 6-month period for both arms of the OTiP study. Participants were 191 community-dwelling PD patients and 180 primary caregivers. The intervention group (n = 124 patients) received 10 weeks of home-based occupational therapy; the control group (n = 67 patients) received usual care (no occupational therapy). Costs were assessed from a societal perspective including healthcare use, absence from work, informal care, and intervention costs. Health utilities were evaluated using EuroQol-5d. We estimated cost differences and cost utility using linear mixed models and presented the net monetary benefit at different values for willingness to pay per quality-adjusted life-year gained. RESULTS In our primary analysis, we excluded informal care hours because of substantial missing data for this item. The estimated mean total costs for the intervention group compared with controls were €125 lower for patients, €29 lower for caregivers, and €122 higher for patient-caregiver pairs (differences not significant). At a value of €40,000 per quality-adjusted life-year gained (reported threshold for PD), the net monetary benefit of the intervention per patient was €305 (P = 0.74), per caregiver €866 (P = 0.01) and per patient-caregiver pair €845 (P = 0.24). CONCLUSION: In conclusion, occupational therapy did not significantly impact on total costs compared with usual care. Positive cost-effectiveness of the intervention was only significant for caregivers.

**Database:** Medline

In-patient multidisciplinary rehabilitation for Parkinson's disease: A randomized controlled trial.

**Author(s):** Monticone, Marco; Ambrosini, Emilia; Laurini, Alessandro; Rocca, Barbara; Foti, Calogero

**Source:** Movement disorders : official journal of the Movement Disorder Society; Jul 2015; vol. 30 (no. 8); p. 1050-1058

**Publication Date:** Jul 2015

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 26095443

**Abstract:** PURPOSE This study was undertaken to evaluate the effects of an inpatient 2-month multidisciplinary rehabilitative program of task-oriented exercises, cognitive-behavioral training, and occupational therapy on motor impairment, activities of daily living, and quality of life (QoL) in subjects with long-duration Parkinson's disease (PD). METHODS Subjects were randomly selected for an experimental (multidisciplinary rehabilitative care) and a control group (general physiotherapy) and were assessed before treatment, after 8 weeks (post-treatment), and 12 months after the end of treatment. Medications were not adjusted during treatment. Outcome measures were the
Movement Disorder Society Unified Parkinson’s Disease Rating Scale, Part III (primary outcome), the Berg Balance Scale, the Functional Independence Measure, and the 39-Parkinson’s Disease Questionnaire. A linear mixed model for repeated measures was used for each outcome. RESULTSSeventy subjects with PD (46 females; mean age, 74 ± 7 years; mean disease duration, 15 ± 3 years, modified Hoehn & Yahr stage, 2.5-4) were randomized, 64 completed the study (experimental = 32; control = 32). A significant effect of time, group, and time by group interaction were noted for all outcomes. The primary outcome showed a between-group difference in favor of the experimental group of 25 points after training, which was maintained at follow-up. After training, the Berg Balance Scale score of the experimental group was greater than 43.5, a value previously identified as a cutoff between fallers and nonfallers for subjects with PD. CONCLUSIONOur findings suggest that multidisciplinary rehabilitative care is useful in changing the course of motor impairment, balance, activities of daily living, and QoL. The effects lasted for at least 1 y after the intervention.

Database: Medline


Author(s): Wong-Yu, Irene S K; Mak, Margaret K Y

Source: Parkinsonism & related disorders; Jun 2015; vol. 21 (no. 6); p. 615-621

Publication Date: Jun 2015

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 25899544

Abstract:INTRODUCTIONPrevious studies have demonstrated that exercise interventions can improve balance and gait performance in people with Parkinson’s disease (PD), but most training did not target all balance domains and was conducted mainly indoors. OBJECTIVESTo investigate the short- and long-term effects of a multi-dimensional indoor and outdoor exercise programme on balance, balance confidence and gait performance in people with PD. METHODSEligible subjects with PD were randomly assigned to an eight-week indoor and outdoor balance training (EXP, N = 41) group or upper limb exercise (CON, N = 43) group. Outcome measures included BESTest total and subsection scores, gait speed, dual-task timed-up-and-go (dual-task TUG) time and Activities-specific Balance Confidence (ABC) score. All outcomes were assessed before training (Pre), immediately after intervention (Post) and at six-month (FU6m) and twelve-month (FU12m) follow-ups. RESULTSImmediately after training, EXP group showed more significant improvements than CON group in BESTest total and subsection scores, gait speed and dual-task TUG time (p < 0.05). At both FU6m and FU12m, EXP group showed significantly greater gains than CON group in BESTest total and subsection scores and dual-task TUG time (p < 0.05). EXP group also showed significantly greater increase in the gait speed than CON group at FU6m (p < 0.05). CONCLUSIONThe positive findings of this study provide evidence that this multi-dimensional balance training programme can enhance balance and dual-task gait performance up to 12-month follow-up in people with PD.

Database: Medline

272. Low-frequency versus high-frequency stimulation of the pedunculopontine nucleus area in Parkinson’s disease: a randomised controlled trial.

Author(s): Nosko, D; Ferraye, M U; Fraix, V; Goetz, L; Chabardès, S; Pollak, P; Debû, B

Source: Journal of neurology, neurosurgery, and psychiatry; Jun 2015; vol. 86 (no. 6); p. 674-679
OBJECTIVE To compare the influence of low-frequency (10-25 Hz) versus higher (60-80 Hz) frequency stimulation of the pedunculopontine nucleus area (PPNa) on akinaesia, freezing of gait and daytime sleepiness.

METHOD We included nine patients with Parkinson's disease (PD) and severe gait disorders. In this double-blind randomised cross-over study, patients were assessed after 24 h of PPNa stimulation. Assessments included the motor part of the Unified Parkinson's Disease Rating Scale, the Epworth Sleepiness Scale and a behavioural gait assessment.

RESULT Compared with 60-80 Hz, 10-25 Hz PPNa stimulation led to decreased akinaesia, gait difficulties and daytime sleepiness in 7/9 patients. In one patient, these symptoms were aggravated under 10-25 Hz stimulation compared with 60-80 Hz.

CONCLUSION These results are in keeping with the benefits of chronic PPNa stimulation for gait and postural difficulties in patients with PD, and with regard to the influence of patients' clinical characteristics, differential neuronal loss in the PPNa and electrode location. We conclude that in patients with PPNa stimulation, low frequency provides a better outcome than high-frequency stimulation.

Database: Medline

273. Tango for treatment of motor and non-motor manifestations in Parkinson's disease: a randomized control study.

Author(s): Rios Romenets, Silvia; Anang, Julius; Fereshtehnejad, Seyed-Mohammad; Pelletier, Amelie; Postuma, Ronald

Source: Complementary therapies in medicine; Apr 2015; vol. 23 (no. 2); p. 175-184

Publication Date: Apr 2015

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 25847555

Abstract: OBJECTIVE To determine effects of Argentine tango on motor and non-motor manifestations of Parkinson's disease. DESIGN Randomized control trial. PARTICIPANTS Forty patients with idiopathic Parkinson's disease. SETTING Movement disorder clinic and dance studio. INTERVENTION Two randomized groups: group (N=18) with 24 partnered tango classes, and control self-directed exercise group (N=15). MAIN OUTCOMES MEASURES The primary outcome was overall motor severity. Secondary outcomes included other motor measures, balance, cognition, fatigue, apathy, depression and quality of life. RESULT Son the primary intention-to-treat analysis there was no difference in motor severity between groups MDS-UPDRS-3 (1.6 vs. 1.2-point reduction, p=0.85). Patient-rated clinical impression of change did not differ (p=0.33), however examiner rating improved in favor of tango (p=0.02). Mini-BESTest improved in the tango group compared to controls (0.7±2.2 vs. -2.7±5.9, p=0.032). Among individual items, tango improved in both simple TUG time (1.3±1.6 vs. 0.1±2.3, p=0.042) and TUG Dual Task score (0.4±0.9 vs. -0.2±0.4, p=0.012), with borderline improvement in walk with pivot turns (0.2±0.5 vs. -0.1±0.5, p=0.066). MoCa (0.4±1.6 vs. -0.6±1.5, p=0.080) and FSS (-3.6±10.5 vs. 2.5±6.2, p=0.057) showed a non-significant trend toward
improvement in the tango group. Tango participants found the activity more enjoyable (p<0.001) and felt more "overall" treatment satisfaction (p<0.001). We found no significant differences in other outcomes or adverse events.

**CONCLUSION:** Argentine tango can improve balance, and functional mobility, and may have modest benefits upon cognition and fatigue in Parkinson's disease. These findings must be confirmed in longer-term trials explicitly powered for cognition and fatigue.

**Database:** Medline

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**274. Robot-assisted gait training is not superior to balance training for improving postural instability in patients with mild to moderate Parkinson's disease: a single-blind randomized controlled trial.**

**Author(s):** Picelli, Alessandro; Melotti, Camilla; Origano, Francesca; Neri, Roberta; Verzè, Elisa; Gandolfi, Marialuisa; Waldner, Andreas; Smania, Nicola

**Source:** Clinical rehabilitation; Apr 2015; vol. 29 (no. 4); p. 339-347

**Publication Date:** Apr 2015

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 25082957

Available at Clinical rehabilitation - from ProQuest (Health Research Premium) - NHS Version

**Abstract:**

**OBJECTIVE**
The main aim was to compare robotic gait training vs. balance training for reducing postural instability in patients with Parkinson's disease. The secondary aim was to compare their effects on the level of confidence during activities of daily living requiring balance, functional mobility and severity of disease.

**DESIGN**
Randomized controlled trial.

**SETTING**
University hospital.

**SUBJECTS**
A total of 66 patients with Parkinson's disease at Hoehn and Yahr Stage 3.

**INTERVENTION**
After balanced randomization, all patients received 12, 45-minute treatment sessions, three days a week, for four consecutive weeks. A group underwent robot-assisted gait training with progressive gait speed increasing and body-weight support decreasing. The other group underwent balance training aimed at improving postural reactions (self and externally induced destabilization, coordination, locomotor dexterity exercises).

**MAIN MEASURES**
Patients were evaluated before, after and one month posttreatment.

**MAIN OUTCOME MEASURE**
Berg Balance Scale.

**SECONDARY OUTCOMES**
Activities-Specific Balance Confidence Scale; Timed Up and Go Test; Unified Parkinson's Disease Rating Scale.

**RESULTS**
No significant differences were found between the groups for the Berg Balance Scale either immediately after intervention (mean score in the robotic training group 51.58 ±3.94; mean score in the balance training group 51.15 ±3.46), or one-month follow-up (mean score in the robotic training group 51.03 ±4.63; mean score in the balance training group 50.97 ±4.28). Similar results were found for all the secondary outcome measures.

**CONCLUSIONS**
Our findings indicate that robotic gait training is not superior to balance training for improving postural instability in patients with mild to moderate Parkinson's disease.

**Database:** Medline

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**275. Cortico-muscular coherence in advanced Parkinson's disease with deep brain stimulation.**

**Author(s):** Airaksinen, Katja; Mäkelä, Jyrki P; Nurminen, Jussi; Luoma, Jarkko; Taulu, Samu; Ahonen, Antti; Pekkonen, Eero

**Source:** Clinical neurophysiology : official journal of the International Federation of Clinical Neurophysiology; Apr 2015; vol. 126 (no. 4); p. 748-755

**Publication Date:** Apr 2015
OBJECTIVE: Cortico-muscular coherence (CMC) is thought to reflect the interplay between cortex and muscle in motor coordination. In Parkinson's disease (PD) patients, levodopa has been shown to enhance CMC. This study examined whether subthalamic nucleus (STN) deep brain stimulation (DBS) affects the CMC in advanced PD.

METHODS: Magnetoencephalography (MEG) and electromyography (EMG) measurements were done simultaneously both with DBS on and off to determine the CMC during wrist extension. The spatiotemporal signal space separation (tSSS) was used for artifact suppression.

RESULTS: CMC peaks between 13 and 25 Hz were found in 15 out of 19 patients. The effect of DBS on CMC was variable. Moreover, the correlation between CMC and motor performance was inconsistent; stronger CMC did not necessarily indicate better function albeit tremor and rigidity may diminish the CMC. Patients having CMC between 13 and 25 Hz had the best motor scores at the group level. CONCLUSION: DBS modifies the CMC in advanced PD with large interindividual variability.

SIGNIFICANCE: DBS does not systematically modify CMC amplitude in advanced PD. The results suggest that some components of the CMC may be related to the therapeutic effects of DBS.

Database: Medline


Author(s): Katz, Maya; Luciano, Marta San; Carlson, Kimberly; Luo, Ping; Marks, William J; Larson, Paul S; Starr, Philip A; Follett, Kenneth A; Weaver, Frances M; Stern, Matthew B; Reda, Domenic J; Ostrem, Jill L; CSP 468 study group

Source: Annals of neurology; Apr 2015; vol. 77 (no. 4); p. 710-719

Publication Date: Apr 2015

Publication Type(s): Research Support, Non-u.s. Gov't Comparative Study Randomized Controlled Trial Multicenter Study Journal Article

PubMedID: 25627340

Abstract: OBJECTIVE: The Veterans Administration Cooperative Studies Program #468, a multicenter study that randomized Parkinson's disease (PD) patients to either subthalamic nucleus (STN) or globus pallidus internus (GPI) deep brain stimulation (DBS), found that stimulation at either target provided similar overall motoric benefits. We conducted an additional analysis of this data set to evaluate whether PD motor subtypes responded differently to the 2 stimulation targets.

METHODS: We classified 235 subjects by motor subtype: tremor dominant (TD), intermediate (I), or postural instability gait difficulty (PIGD), based on pre-DBS baseline Unified Parkinson's Disease Rating Scale (UPDRS) scores off-medication. The primary outcome was change in UPDRS part III (UPDRS-III) off-medication scores from baseline to 24 months post-DBS, compared among subjects with particular PD motor subtypes and by DBS target (STN vs GPI). Changes in tremor, rigidity, akinesia, and gait scores were also assessed using the UPDRS. RESULT: Subjects had greater mean overall motor improvement, measured by UPDRS-III, after GPI DBS, compared to STN DBS (17.5 ± 13.0 vs 14.6 ± 14.9, p = 0.02), with improvement in gait accounting for this difference. Regardless of stimulation target, PIGD subjects had lower mean overall improvement in UPDRS-III scores compared with I or TD subjects (8.7 ± 12.2 vs 21.7 ± 11.2 vs 16.3 ± 13.8, p = 0.001). INTERPRETATION: Our results suggest that responsiveness to both GPI and STN DBS is similar among different PD motor subtypes, although the TD motor subtype may have a greater response to GPI DBS with respect to gait. PIGD patients obtained less overall benefit from stimulation.

Database: Medline
277. Immediate effects of high-speed cycling intervals on bradykinesia in Parkinson's disease.

**Author(s):** Uygur, Mehmet; Bellumori, Maria; LeNoir, Kevin; Poole, Kendall; Pretzer-Aboff, Ingrid; Knight, Christopher A.

**Source:** Physiotherapy Theory & Practice; Feb 2015; vol. 31 (no. 2); p. 77-82

**Publication Date:** Feb 2015

**Publication Type(s):** Academic Journal

**Abstract:** There is growing evidence that speed-based exercise training benefits people with Parkinson's disease (PD). The present study investigates the effects of a single session of volitional, high-speed cycling intervals on a battery of timed functional tests selected for their relevance to the symptom of bradykinesia. Ten subjects with PD (Hoehn-Yahr stage ≤ 3.0) participated in a familiarization session and three test sessions. Functional testing occurred before and after 30 minute sessions in which subjects performed no exercise (NO), pedaled at their preferred cadence (PC), or performed 20, 15-second intervals of high-speed low-resistance cycling (HS-LR). In addition to testing the exercise effects in a within-subjects design, we provide test-retest reliability data, minimal detectable change scores, and correlations among the selected functional tests. Despite the relatively low dose of speed-based exercise, HS-LR elicited significant (p < 0.05) improvements in the four square step test and 10 m walk test. Excepting reaction times, there was high reliability and adequate sensitivity to detect moderate and small differences. Strong correlations among tests of mobility inform the future selection of measures in the experimental design. In addition to what is known about continuous exercise sessions involving high-speed exercise, the present results suggest that brief intervals of HS-LR bicycling are promising and should be examined in a longer duration exercise program.

**Database:** CINAHL

278. Intensive rehabilitation treatment in early Parkinson's disease: a randomized pilot study with a 2-year follow-up.

**Author(s):** Frazzitta, Giuseppe; Maestri, Roberto; Bertotti, Gabriella; Riboldazzi, Giulio; Boveri, Natalia; Perini, Michele; Uccellini, Davide; Turla, Marinella; Comi, Cristoforo; Pezzoli, Gianni; Ghilardi, M Felice

**Source:** Neurorehabilitation and neural repair; Feb 2015; vol. 29 (no. 2); p. 123-131

**Publication Date:** Feb 2015

**Publication Type(s):** Randomized Controlled Trial Journal Article

**PubMedID:** 25038064

**Abstract:** BACKGROUND Although physical exercise improves motor aspects of Parkinson's disease (PD), it is not clear whether it may also have a neuroprotective effect. Objective. In this 2-year follow-up study, we determined whether intensive exercise in the early stages of the disease slows down PD progression. METHODS Forty newly diagnosed patients with PD were treated with rasagiline and randomly assigned to 2 groups: MIRT Group (two 28-day multidisciplinary intensive rehabilitation treatments [MIRT], at 1-year interval) and Control Group (only drug). In both groups, Unified Parkinson's Disease Rating Scale Section II (UPDRS II), UPDRS III, 6-minute walking test (6MWT), Timed Up-and-Go test (TUG); PD Disability Scale (PDDS), and L-dopa equivalents were assessed at baseline (T0), 6 months (T1), 1 year (T2), 18 months (T3), and 2 years (T4) later. RESULTS Over 2 years, UPDRS II, UPDRS III, TUG, and PDDS differentially progressed in the 2 groups: In the MIRT Group, all scores at T4 were better than at T0 (all Ps < .03). No changes were noted in the Control Group. L-dopa equivalent dosages increased significantly only in the Control
Group (P = .0015), with a decrease in the percentages of patients in monotherapy (T1 40%; T2, T3, and T4 20%). In the MIRT Group, the percentages of such patients remained higher (T1 and T2 100%; T3 89%; T4 75%).

CONCLUSION
These results suggest that MIRT might slow down the progression of motor decay, it might delay the need for increasing drug treatment, and thus, it might have a neuroprotective effect.

Database: Medline

279. Two-year exercise program improves physical function in Parkinson's disease: the PRET-PD randomized clinical trial.

Author(s): Prodoehl, Janey; Rafferty, Miriam R; David, Fabian J; Poon, Cynthia; Vaillancourt, David E; Comella, Cynthia L; Leurgans, Sue E; Kohrt, Wendy M; Corcos, Daniel M; Robichaud, Julie A

Source: Neurorehabilitation and neural repair; Feb 2015; vol. 29 (no. 2); p. 112-122

Publication Date: Feb 2015

Publication Type(s): Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Randomized Controlled Trial Journal Article

PubMedID: 24961994

Available at Neurorehabilitation and neural repair - from Unpaywall

Abstract: Background. The progressive resistance exercise (PRE) in Parkinson's disease trial (PRET-PD) showed that PRE improved the motor signs of PD compared to a modified Fitness Counts (mFC) program. It is unclear how long-term exercise affects physical function in these individuals.

Objective. To examine the effects of long-term PRE and mFC on physical function outcome measures in individuals with PD. Methods. A preplanned secondary analysis was conducted using data from the 38 patients with idiopathic PD who completed the PRET-PD trial. Participants were randomized into PRE or mFC groups and exercised 2 days/week up to 24 months. Blinded assessors obtained functional outcomes on and off medication at baseline, 6 and 24 months with the Modified Physical Performance Test, 5 times sit to stand test, Functional Reach Test, Timed Up and Go, Berg Balance Scale, 6 minute walk test (6MWT), and 50-ft walking speed (walk speed). Results. The groups did not differ on any physical function measure at 6 or 24 months (Ps > .1). Across time, all physical function measures improved from baseline to 24 months when tested on medication (Ps < .0001), except for 6MWT (P = .068). Off medication results were similar except that the 6MWT was now significant.

Conclusions. Twenty-four months of supervised and structured exercise (either PRE or mFC) is effective at improving functional performance outcomes in individuals with moderate PD. Clinicians should strive to include structured and supervised exercise in the long-term plan of care for individuals with PD.

Database: Medline

280. Technology-assisted balance and gait training reduces falls in patients with Parkinson's disease: a randomized controlled trial with 12-month follow-up.

Author(s): Shen, Xia; Mak, Margaret K Y

Source: Neurorehabilitation and neural repair; Feb 2015; vol. 29 (no. 2); p. 103-111

Publication Date: Feb 2015

Publication Type(s): Research Support, Non-u.s. Gov't Randomized Controlled Trial Journal Article

PubMedID: 24961993

Abstract: Objective. To examine the effects of technology-assisted balance and gait training on reducing falls in patients with Parkinson's disease (PD). Methods. Eligible subjects were randomly
allocated to an experimental group given technology-assisted balance and gait training (BAL, n = 26) and an active control group undertaking strengthening exercises (CON, n = 25). The training in each group lasted for 3 months. The number of fallers and fall rate were used as primary outcomes, and single-leg-stance-time, latency of postural response to perturbation, self-selected gait velocity, and stride length as secondary outcomes. Fall incidence was recorded over 15 months after the baseline assessment (Pre). Other tests were performed at Pre, after 3-month intervention (Post(3m)), at 3 months (Post(6m)), and 12 months (Post(15m)) after treatment completion. Results. Forty-five subjects who completed the 3-month training were included in the data analysis. There were fewer fallers in the BAL than in the CON group at Post(3m), Post(6m), and Post(15m) (P < .05). In addition, the BAL group had lower fall rate than the CON group at Post(3m) and Post(6m) (incidence rate ratio: 0.111–0.188, P < .05), and marginally so at Post(15m) (incidence rate ratio: 0.407, P = .057). Compared with the CON subjects, the BAL subjects demonstrated greater reduction in the postural response latency and increase in the stride length against baseline at each assessment interval (P < .05), and marginally more increases of single-leg-stance-time at Post(3m) (P = .064), Post(6m) (P = .041) and Post(15m) (P = .087). Conclusions. Our positive findings provide evidence for the clinical use of technology-assisted balance and gait training in reducing falls in people with PD.

Database: Medline

281. A systematic review and meta-analysis of strength training in individuals with multiple sclerosis or Parkinson disease.

Author(s): Cruickshank, Travis M; Reyes, Alvaro R; Ziman, Melanie R

Source: Medicine; Jan 2015; vol. 94 (no. 4)

Publication Date: Jan 2015

Publication Type(s): Academic Journal

PubMedID: NLM25634170

Available at Medicine - from Europe PubMed Central - Open Access

Abstract: Strength training has, in recent years, been shown to be beneficial for people with Parkinson disease and multiple sclerosis. Consensus regarding its utility for these disorders nevertheless remains contentious among healthcare professionals. Greater clarity is required, especially in regards to the type and magnitude of effects as well as the response differences to strength training between individuals with Parkinson disease or multiple sclerosis. This study examines the effects, magnitude of those effects, and response differences to strength training between patients with Parkinson disease or multiple sclerosis. A comprehensive search of electronic databases including Physiotherapy Evidence Database scale, PubMed, EMBASE, Cochrane Central Register of Controlled Trials, and CINAHL was conducted from inception to July 2014. English articles investigating the effect of strength training for individuals with neurodegenerative disorders were selected. Strength training trials that met the inclusion criteria were found for individuals with Parkinson disease or multiple sclerosis. Individuals with Parkinson disease or multiple sclerosis were included in the study. Strength training interventions included traditional (free weights/machine exercises) and nontraditional programs (eccentric cycling). Included articles were critically appraised using the Physiotherapy Evidence Database scale. Of the 507 articles retrieved, only 20 articles met the inclusion criteria. Of these, 14 were randomized and 6 were nonrandomized controlled articles in Parkinson disease or multiple sclerosis. Six randomized and 2 nonrandomized controlled articles originated from 3 trials and were subsequently pooled for systematic analysis. Strength training was found to significantly improve muscle strength in people with Parkinson disease (15%-83.2%) and multiple sclerosis (4.5%-36%). Significant improvements in mobility (11.4%) and disease progression were also reported in people with Parkinson disease after strength training. Furthermore, significant improvements in fatigue (8.2%), functional capacity (21.5%), quality of life (8.3%), power (17.6%),
and electromyography activity (24.4%) were found in individuals with multiple sclerosis after strength training. The limitations of the study were the heterogeneity of interventions and study outcomes in Parkinson disease and multiple sclerosis trials. Strength training is useful for increasing muscle strength in Parkinson disease and to a lesser extent multiple sclerosis.

**Database:** CINAHL

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