VII CONGRESSO NAZIONALE B&M 2018

II SESSIONE

Dott.ssa Francesca del Sorbo
Medico Neurologo
FERB Onlus Riabilitazione Specialistica c/o Cernusco S/N

BRAIN AND MALNUTRITION
Chronic Diseases Association ONLUS

Approccio multidisciplinare nella malattia di Parkinson

Francesca Del Sorbo, MD, PhD

FERB FONDAZIONE EUROPEA RICERCA BIOMEDICA

BRAIN AND MALNUTRITION
Chronic Diseases Association

AIP FP

Parkinson disease: a chronic and progressive neurodegenerative disorder

MDS clinical diagnostic criteria for PD (Postuma et al. 2015) disease

- Parkinsonism – bradykinesia plus either rigidity or rest tremor[1]

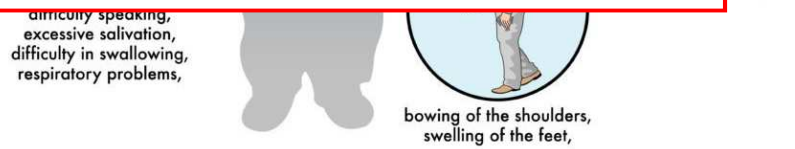
80% of true PD cases diagnosed

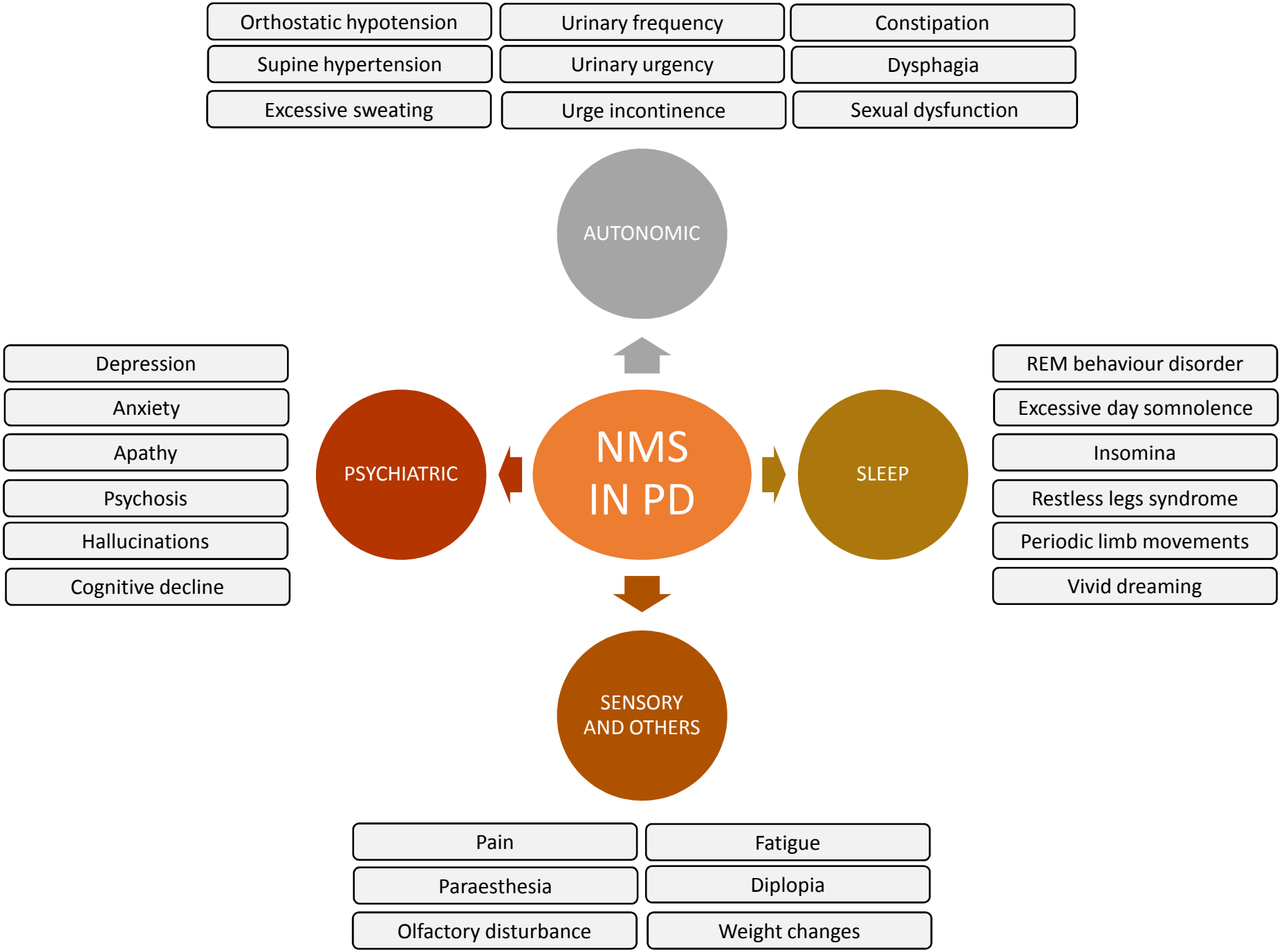
- **Clinically probable PD:[1]**
  - **Absence of absolute exclusion criteria; presence of 1 or 2 'red flags' counterbalanced by equal number of supportive criteria**

Absolute exclusion criteria[1]
- Cerebellar signs
- Supranuclear gaze palsy
- Established diagnosis of BVFTD
- Parkinsonism restricted to the lower limbs only for >3 years
- Treatment with an antidopaminergic, or with dopamine-depletion agents
- Absence of response to levodopa
- Sensory–cortical loss
- No evidence for dopaminergic deficiency on functional imaging
- Other parkinsonism-inducing condition

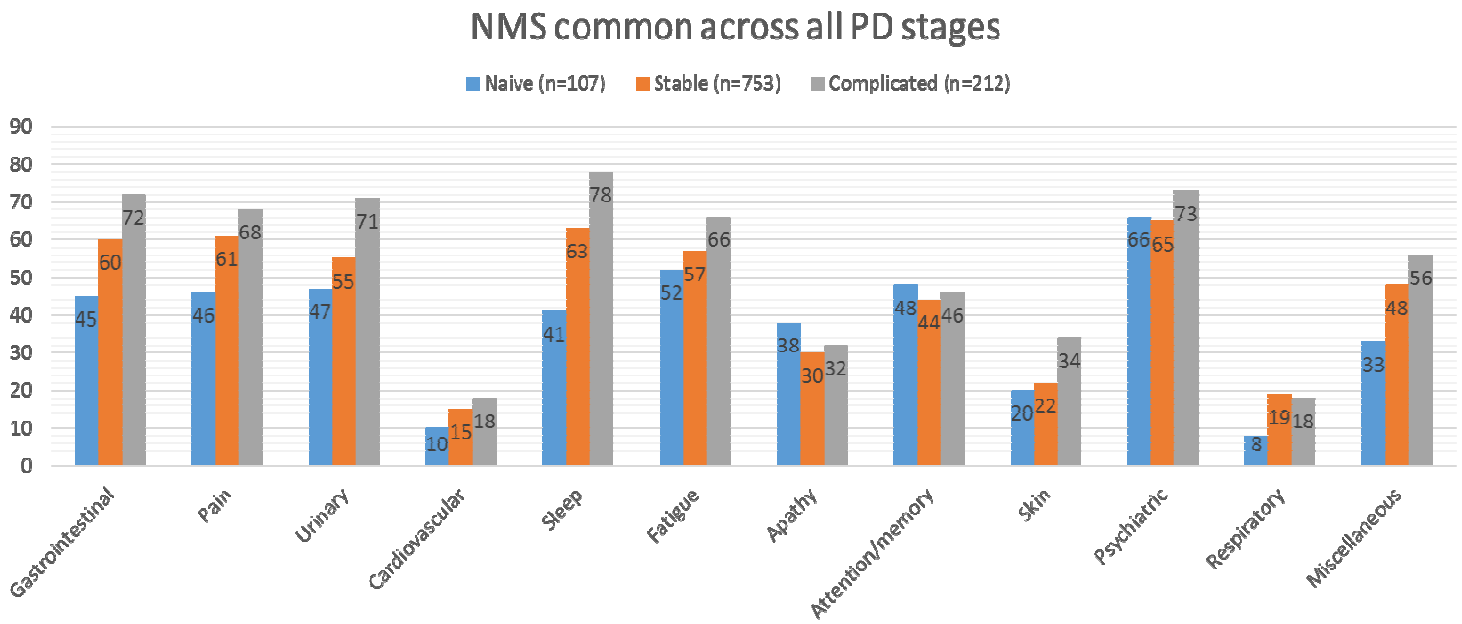
Red flags[1]
- Rapid deterioration of gait
- Absence of motor symptom progression over 5 years
- Early bulbar dysfunction
- Respiratory dysfunction
- Early severe autonomic failure
- Early recurrent falls due to misbalance
- Disproportionate anterocollis
- Absence of common non-motor features of disease during >5 years
- Pyramidal tract signs
- Bilateral symmetric presentation

Supportive criteria[1]
- A clear and dramatic positive response to dopaminergic therapy
- Levodopa-induced dyskinesia
- Documentation of resting tremor of a limb
- A positive diagnostic test of either olfactory loss or cardiac sympathetic denervation on scintigraphy




Orthostatic hypotension
Urinary frequency
Constipation
Supine hypertension
Urinary urgency
Dysphagia
Excessive sweating
Urge incontinence
Sexual dysfunction
AUTONOMIC
Depression
Anxiety
Apathy
Psychosis
Hallucinations
Cognitive decline
PSYCHIATRIC
NMS IN PD
SLEEP
REM behaviour disorder
Excessive day somnolence
Insomina
Restless legs syndrome
Periodic limb movements
Vivid dreaming
SENSORY AND OTHERS
Pain
Fatigue
Paraesthesia
Diplopia
Olfactory disturbance
Weight changes

An Italian multicenter assessment of NMS and their impact on QoL in PD



- 98.6% PD reported the presen of NMS
- The mean number of NMS per patient was 7.8 (range, 0-32)
- Frequency of NMS increased along with the disease duratio and severity
- NMS were associated with poo QoL - mainly
  apathy, fatigue, attention, mer ry, and psychiatric symptoms

Data from PRIAMO study: Barone P. et al. Mov Disord. 2009

Current medical approach of PD

- Often **m**
- Focus or
- Therapy
- Therape
  duodena
  advance

Drawbacks to current pharmacotherapy in PD:

- Unable to alleviate all motor symptoms (**freezing**, **postural instability, posture, falling**)
- Few **NMS** are responsive to dopaminergic treatment
- Dopaminergic treatment is often complicated by **dose-limiting side effects** (e.g., motor fluctuations, dyskinesias)

severity

tment

and

ed for

Complementary non-pharmacological therapies in PD

Intervention[a]	
Exercise	Aerobic exercise, dancing, t'ai chi, strength training
Cognitive training	Cognitive training, computer-based cognitive training, cognitive gaming
Diet	Personalized treatment aiming to improve nutritional status (e.g. avoiding malnutrition, managing protein intake relative to levodopa intake)
Non-invasive brain stimulation	Transcranial magnetic stimulation, transcranial direct current stimulation
Occupational therapy	Personalized treatment aiming to enable patients to engage in meaningful roles and activities and to support self-management
Physiotherapy	Personalized treatment aiming to maximize movement quality, functional independence and general fitness; minimizing secondary complications; optimizing safety; supporting self-management and participation.
Speech and language therapy	Personalized treatment aiming to improve communication, language therapy, swallowing training
Complementary interventions	Wide range, including music therapy, mindfulness training, yoga

[a] In alphabetical order.

Van de Weijer S.C.F. et al. Parkinsonism and Related Disorders 2018

Differences betw…nd nonpharmacolog…ent in PD

Key rehabilitation strategies in PD

- Use of external *cues* to help initiate and maintain movement or action
- *Avoidance of multitasking* during tasks
- *Breaking complex activities* into a series of simpler components

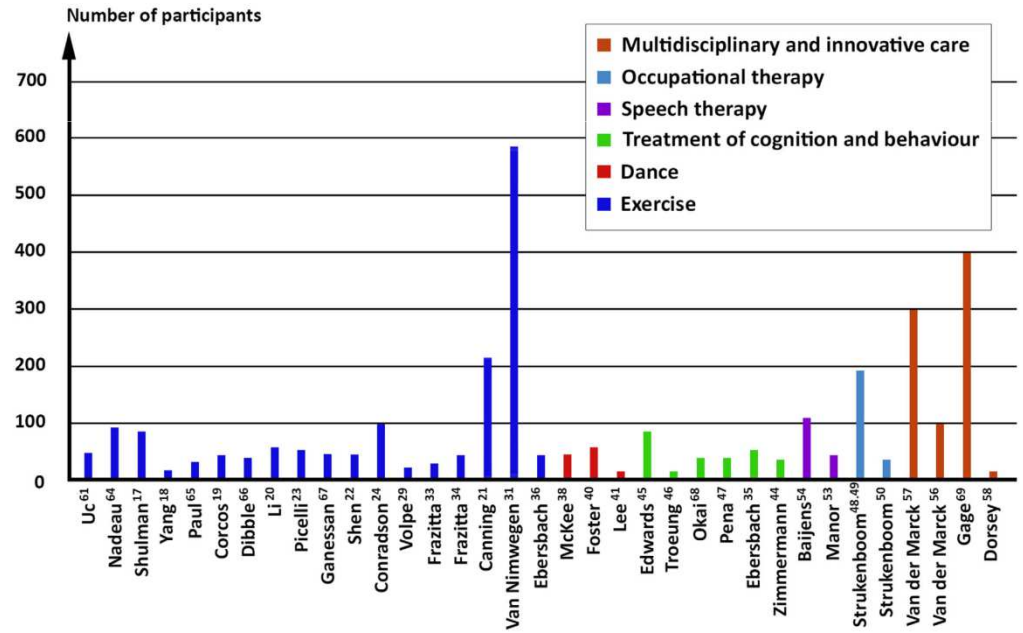
Differences between medical management (pharmacothera…

	Medical management	Allied health car…
Focus	• Disease process	• Impact of diseas… daily functioning
Treatment goals	• Reduce symptoms • Minimise disease severity	• Reduce disab… and non-motor symptoms • Improve particip… s and activities in daily live • Improve level of act…
Working mechanism	• Correct nigrostriatal dysfunction	• Support compensatory (movement) strategies
Scientific evidence	• Moderate to strong	• Limited (occupational therapy) to moderate or strong(physiotherapy, speech therapy)

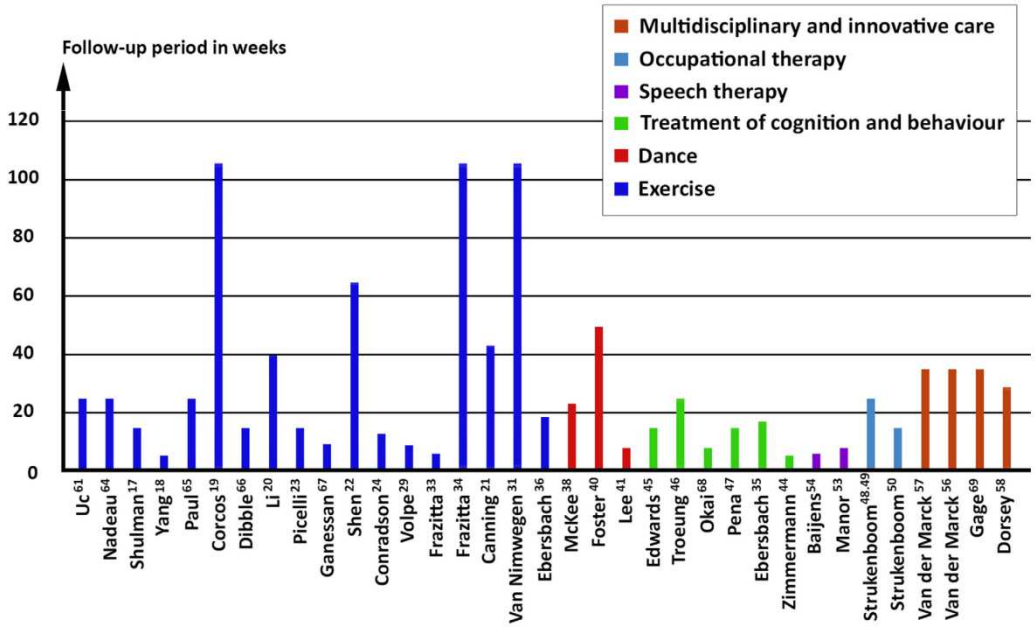
van der Marck M.A. et al. Parkinsonism and Related Disorders 2009

Current knowledge

N° of participants in individual studies



Follow-up period in individual studies



Bloem BR. et al. Mov Disord. 2015

Physiotherapy in PD

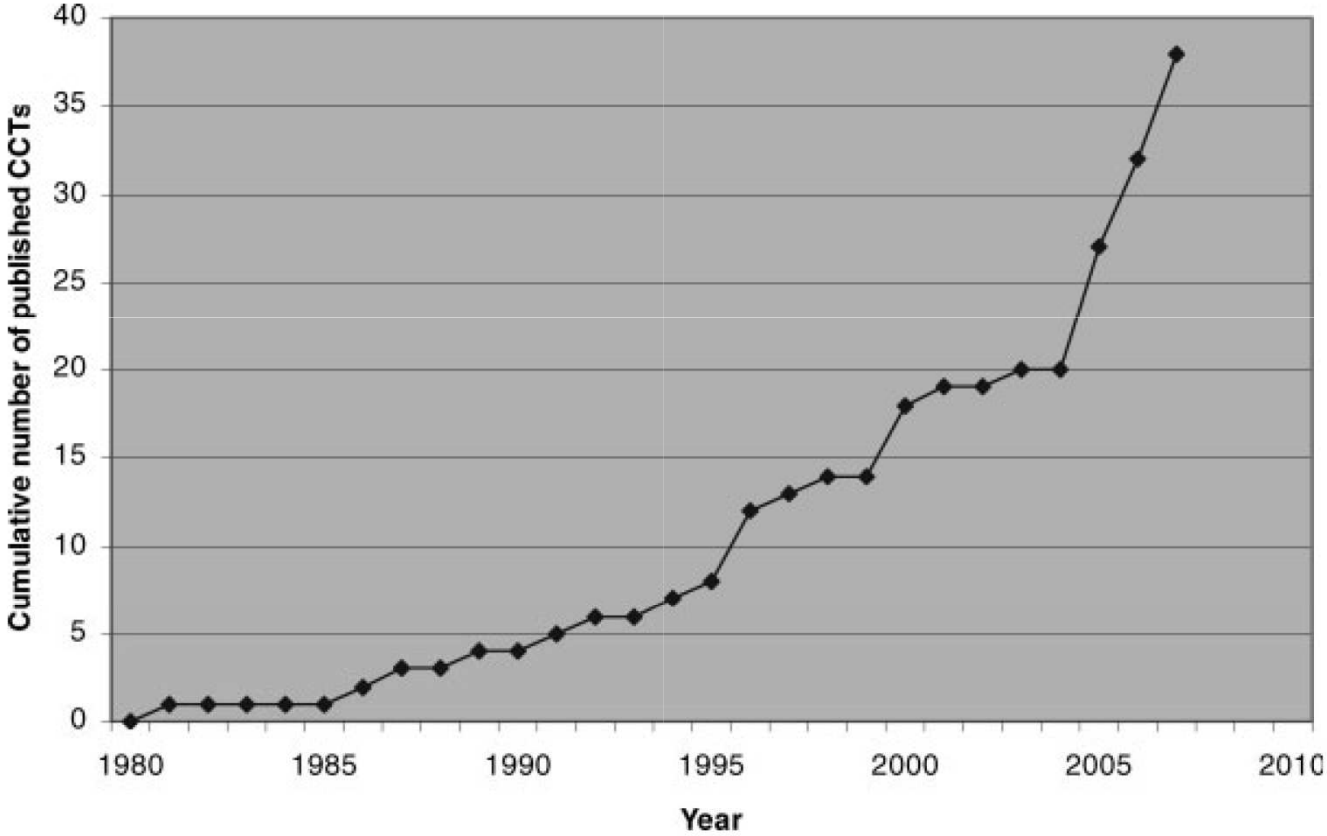


FIG. 1. Cumulative number of randomized and controlled clinical trials on the efficacy of physical therapy in PD.

Keus S.H.J et al. Movement Disorders 2009

Physical therapy in PD: Evidence-based guideline for clinical practice

- Strong recommendations (based on evidence from ≥ 2 randomized controlled trials, “level 2”)
  I. Application of cueing strategies to improve **gait**
  II. Application of cognitive movement strategies to improve **transfers** (e.g. turning around in bed, and rising from a chair)
  III. Specific exercises to improve **balance** (mainly strength and balance training)
  IV. Training of joint mobility and muscle power to improve **physical capacity**

Keus S.H.J et al. Movement Disorders 2007

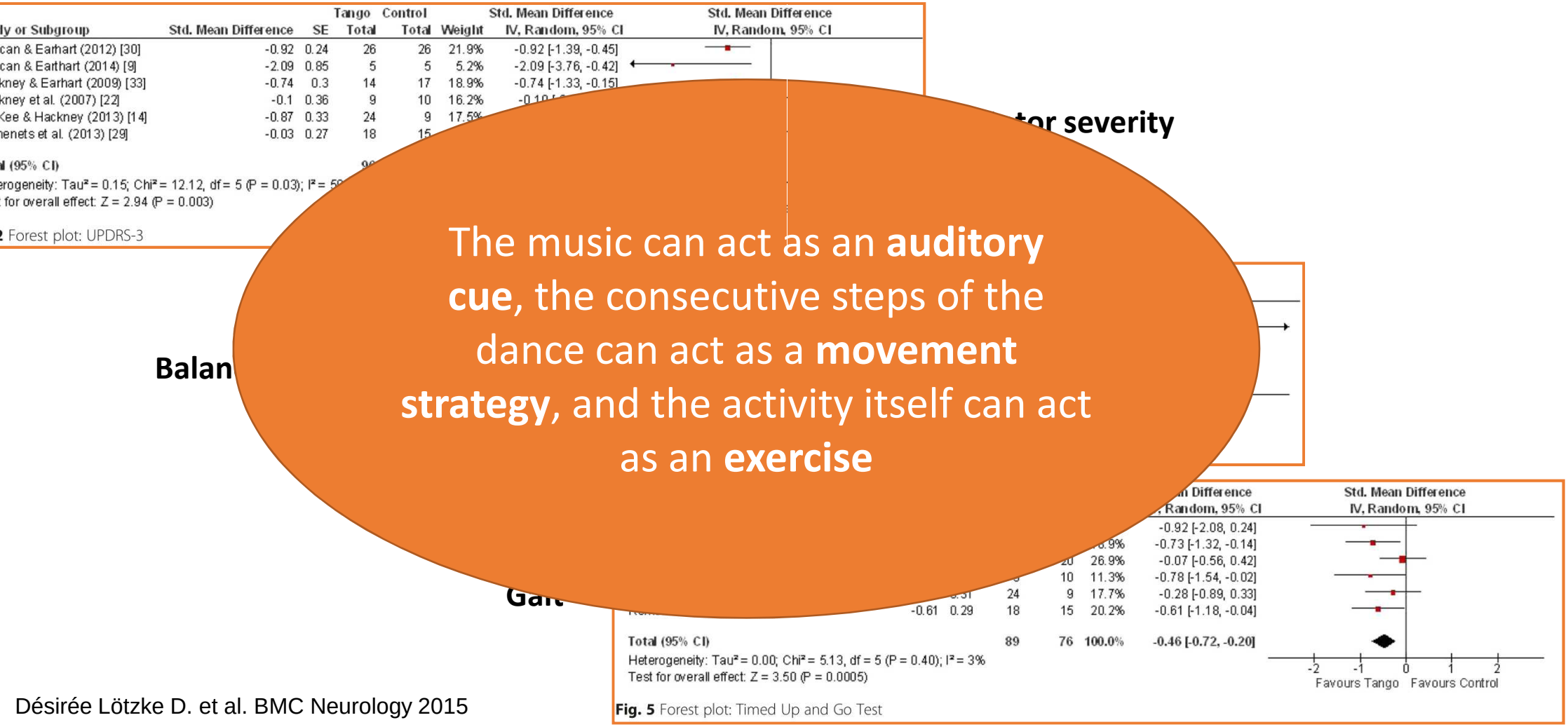
Physical therapy in PD guideline: *update*

TABLE 1. *Update guideline recommendations (October 2003 to December 2007)*

Study	New recommendation	Level
Nieuwboer[48]	Cueing strategies improve posture and gait, and the confidence to carry out functional activities without falling.	3
Nieuwboer[48]	Cueing strategies have no long-term effects at 6-weeks follow-up (duplicating evidence found by Thaut et al.[84]).[a]	2
Rochester[85,86]	Auditory cues, more than visual cues, improve gait during performance of a secondary motor task.	3
Dibble[31]	A high-force, eccentric resistance training of the lower extremities improves stair descent, the 6-minute walk, and muscle volume.	3
Mak[43]	Audiovisual cues enhance the performance of sit-to-stand.	3

Keus S.H.J et al. Movement Disorders 2009

Argentine tango in PD



The music can act as an **auditory cue**, the consecutive steps of the dance can act as a **movement strategy**, and the activity itself can act as an **exercise**

Désirée Lötzke D. et al. BMC Neurology 2015

frontiers in Medicine

MINI REVIEW
published: 17 August 2016
doi: 10.3389/fmed.2016.00035

The Impact of Physical Activity on Non-Motor Symptoms in Parkinson's Disease: A Systematic Review

Melanie E. Cusso[1], Kenneth J. Donald[1] and Tien K. Khoo[1,2]*

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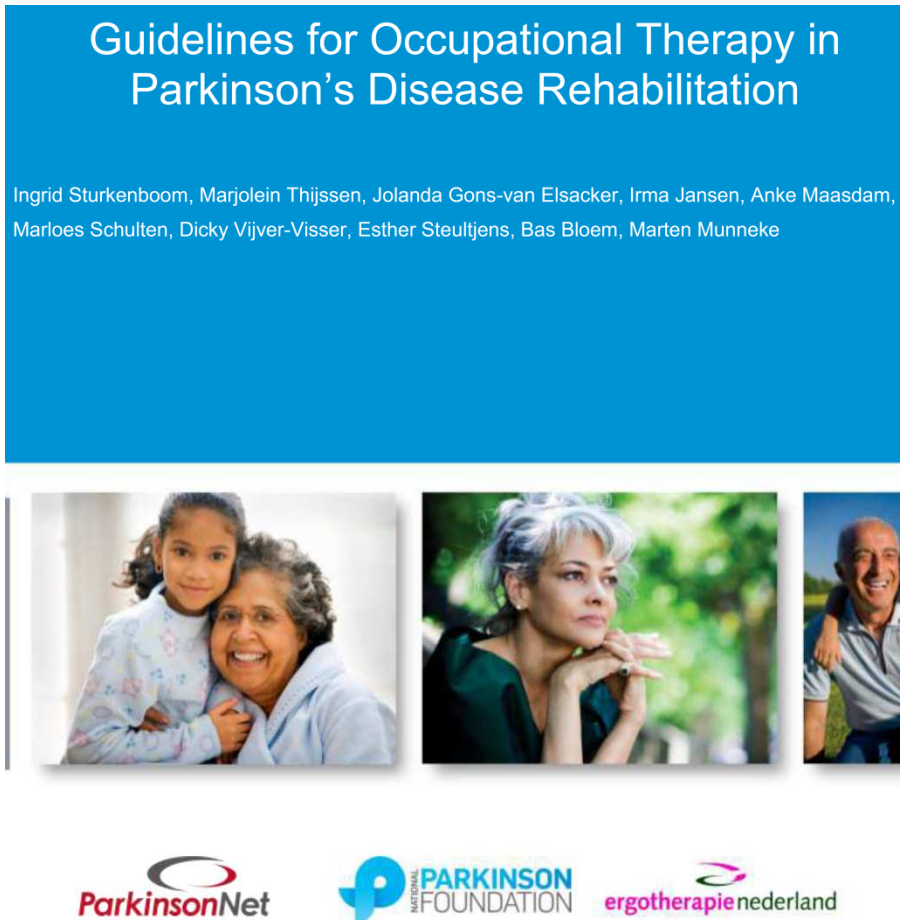
Parkinson's disease (PD) is a neurological disorder that is associated with both motor and non-motor symptoms (NMS). The management of PD is primarily *via* pharmaceutical treatment; however, non-pharmaceutical interventions have become increasingly recognized in the management of motor and NMS. In this review, the efficacy of physical activity, including physiotherapy and occupational therapy, as an intervention in NMS will be assessed. The papers were extracted between the 20th and 22nd of June 2016 from PubMed, Web of Science, Medline, Ovid, SportsDiscuss, and Scopus using the MeSH search terms "Parkinson's," "Parkinson," and "Parkinsonism" in conjunction with "exercise," "physical activity," "physiotherapy," "occupational therapy," "physical therapy," "rehabilitation," "dance," and "martial arts." Twenty studies matched inclusion criteria of having 10 or more participants with diagnosed idiopathic PD participating in the intervention as well as having to evaluate the effects of physical activity on NMS in PD as controlled, randomized intervention studies. The outcomes of interest were NMS, including depression, cognition, fatigue, apathy, anxiety, and sleep. Risk of bias in the studies was evaluated using the Cochrane Collaboration's tool for assessing risk of bias. Comparability of the various intervention methods, however, was challenging due to demographic variability and methodological differences. Nevertheless, physical activity can positively impact the global NMS burden including depression, apathy, fatigue, day time sleepiness, sleep, and cognition, thus supporting its therapeutic potential in neurodegenerative conditions such as PD. It is recommended that further adequately powered studies are conducted to assess the therapeutic role of physical activity on both motor and non-motor aspects of PD. These studies should be optimally designed to assess non-motor elements of disease using instruments validated in PD.

TANGO IMPROVES NON MOTOR SYMPTOMS

A small sample of PD participants who danced tango for two years demonstrated improved NMS compared to controls (Duncan RP et al. 2014)

Improvement in fatigue specifically a twelve week tango intervention (Rios RS et al. 2015)



AIM	• Enable patients to engage in meaningful roles and activities and to support self-management • Enable caregiver to solve problems related to supporting patient in daily activity
TREATMENT STRATEGIES	• Adopting compensatory strategies in activities (i.e. movement and cognitive strategies, planning) • Optimizing day structure and routine • Adaptation of the physical environment

Speech-swallowing therapy in PD

- **DYSARTHRIA**: Specific intensive speech treatments improve loudness and intelligibility of speech (Lee Silverman Voice Treatment or Pitch Limiting Voice Treatment) (Ramig et al 1995, Swart et al 2003)
- **DYSPHAGIA**: The daily use of effortful swallowing (assisted with biofeedback) is helpful in reducing dysphagia in PD (Felix et al 2008, Manor et al 2013). Expiratory muscle strength training can reduce the incidence of aspiration (Pitts et al 2009)


Parkinsonism and Related Disorders 20 (2014) 1382–1387

Contents lists available at ScienceDirect

Parkinsonism and Related Disorders

journal homepage: www.elsevier.com/locate/parkreldis

Swallowing disturbances in Parkinson's disease: A multivariate analysis of contributing factors

Emanuele Cereda [a,*], Roberto Cilia [b], Catherine Klersy [c], Margherita Canesi [b], Anna Lena Zecchinelli [b], Claudio Bruno Mariani [b], Silvana Tesei [b], Giorgio Sacilotto [b], Nicoletta Meucci [b], Michela Zini [b], Ioannis Ugo Isaias [b], Erica Cassani [b], Stefano Goldwurm [b], Michela Barichella [b], Gianni Pezzoli [b]

Original article

Dietary habits and neurological features of Parkinson's disease patients: Implications for practice

Michela Barichella [a], Emanuele Cereda [b, *], Erica Cassani [a], Giovanna Pinelli [a], Laura Iorio [a], Valentina Ferri [a], Giulia Privitera [a], Marianna Pasqua [a], Angela Valentino [a], Fatemeh Monajemi [a], Serena Caronni [a], Caterina Lignola [a], Chiara Pusani [a], Carlotta Bolliri [a], Samanta A. Faierman [a], Alessandro Lubisco [c], Giuseppe Frazzitta [d], Maria L. Petroni [e], Gianni Pezzoli [a]

Clinical Nutrition 36 (2017) 1054–1061

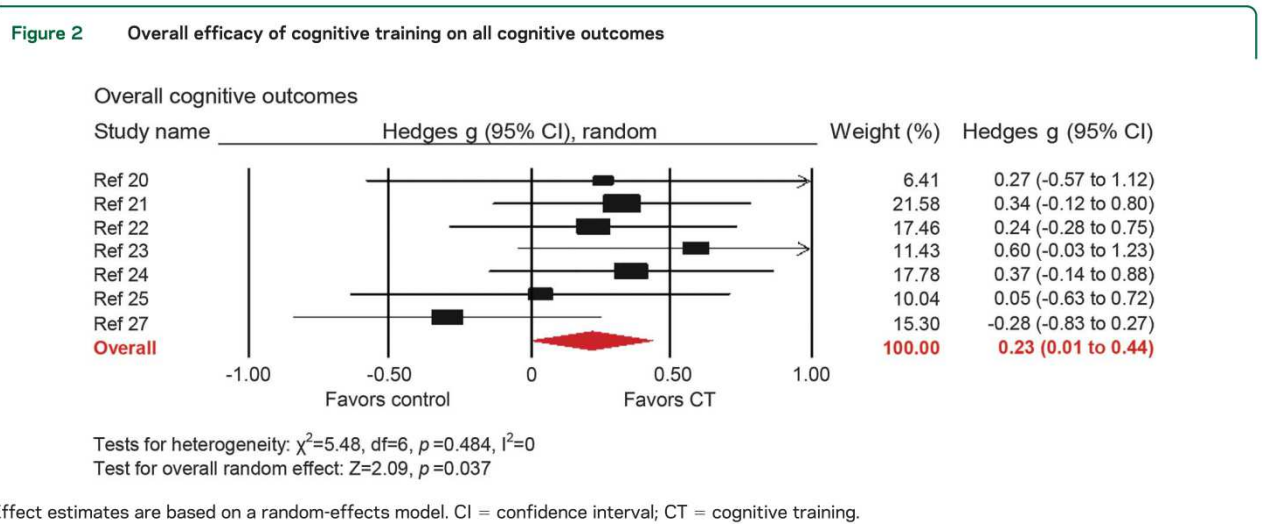
Contents lists available at ScienceDirect

Clinical Nutrition

This study outlined three cardinal goals of nutrition in PD

1. Calorie intake
   - Results: BMI was inversely associated with disease duration and severity, and levodopa-related motor complications
   - Strategy: **Calorie-rich food supplements**
2. Protein intake
   - Results: An increase in protein intake by 10 g over physiological requirements (0.8 g/kg/day) corresponded to a mean increase in levodopa dose of 0.7 mg/kg/day
   - Strategy: **Protein redistribution diet**
3. Constipation
   - Results: Constipation was associated with higher levodopa dosages
   - Strategy: **High fiber diet** associated with **correct hydration**

Cognitive training in PD



- Larger effect sizes were noted on **working memory** (4 studies: g = 0.74, CI 0.32–1.17, p = 0.001), **processing speed** (4 studies: g = 0.31, CI 0.01–0.61, p = 0.04), and **executive function** (5 studies: g = 0.30, CI 0.01–0.58, p = 0.042)
- While effects on memory, visuospatial skills, and attention were not statistically significant

Leung I.H.K et al. Neurology 2015

CME ARTICLE

Long-term effects of cognitive rehabilitation on brain, functional outcome and cognition in Parkinson's disease

M. Díez-Cirarda[a], N. Ojeda[a], J. Peña[a], A. Cabrera-Zubizarreta[b], O. Lucas-Jiménez[a], J. C. Gómez-Esteban[c], M. Á. Gómez-Beldarrain[d] and N. Ibarretxe-Bilbao[a]

[a]*Department of Methods and Experimental Psychology, Faculty of Psychology and Education, University of Deusto, Bilbao, Biscay;* [b]*OSATEK, MR Unit, Hospital of Galdakao, Galdakao, Biscay;* [c]*Neurodegenerative Unit, Biocruces Research Institute, Neurology Service, Cruces University Hospital, Barakaldo, Biscay; and* [d]*Neurology Service, Hospital of Galdakao, Galdakao, Biscay, Spain*

Keywords:
brain changes, brain plasticity, cognitive rehabilitation, functional disability, longitudinal, Parkinson's disease

Received 19 May 2017
Accepted 20 September 2017

European Journal of Neurology 2018, **25:** 5–12

doi:10.1111/ene.13472

Background and purpose: Cognitive rehabilitation has demonstrated efficacy in producing short-term cognitive and brain changes in patients with Parkinson's disease (PD). To date, no study has assessed the long-term effects of cognitive rehabilitation using neuroimaging techniques in PD. The aim was to assess the longitudinal effects of a 3-month cognitive rehabilitation programme evaluating the cognitive, behavioural and neuroimaging changes after 18 months.

Methods: Fifteen patients with PD underwent a cognitive, behavioural and neuroimaging assessment at pre-treatment (T_0), post-treatment (T_1) and after 18 months (T_2). This study examined the long-term effects (from T_0 to T_2) and the maintenance of the changes (from T_1 to T_2). T1-weighted, diffusion-weighted, functional magnetic resonance imaging during both a resting-state and a memory paradigm were acquired. Voxel-based morphometry and tract-based spatial statistics were used for grey and white matter analyses. A region-of-interest-to-region-of-interest approach was used for resting-state functional connectivity (FC) and a model-based approach was used for brain activation during the memory paradigm.

Results: Patients with PD showed increased cognitive performance, decreased functional disability, increased brain FC and activation at T_2 compared with T_0 ($P < 0.05$, FDR). Moreover, patients showed maintenance of the improvements in cognition and functionality, and maintenance of the increased brain FC and activation at T_2 compared with T_1. However, significant grey matter reduction and alterations of white matter integrity were found at T_2 ($P < 0.05$, FWE).

Conclusions: Findings suggest that the improved cognitive performance and increased brain FC and activation after cognitive rehabilitation were significantly maintained after 18 months in patients with PD, despite the structural brain changes, consistent with a progression of neurodegenerative processes.

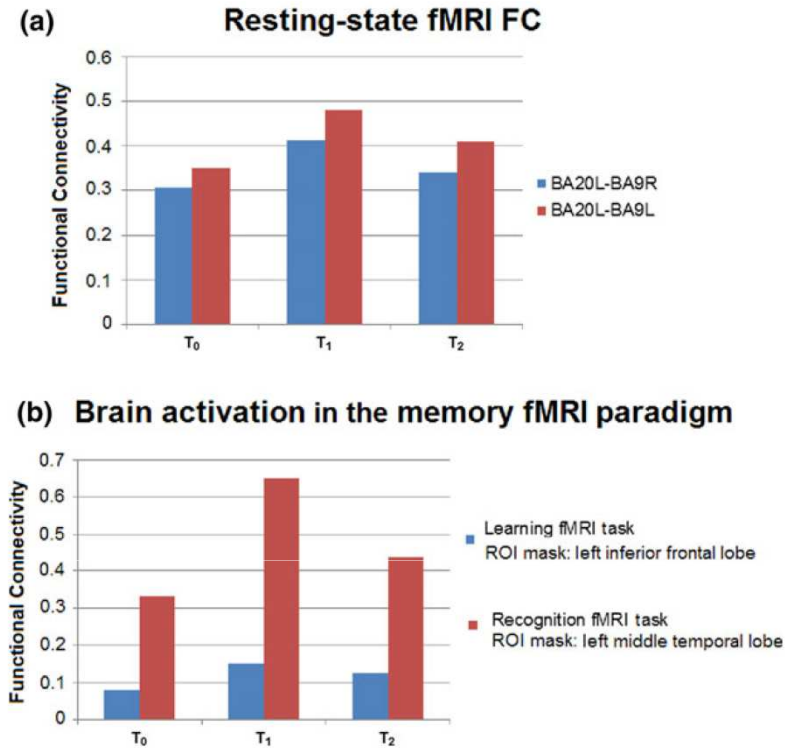


Figure 3 Neuroimaging changes with region of interest (ROI) analyses from patients with Parkinson's disease (PD) at three time points. (a) Values represent the functional connectivity of patients with PD between the two ROIs at the three time points. ■, BA20L–BA9R; ■, BA20L–BA9L. (b) Values represent the brain activation of patients with PD in the ROI mask at the three time points. ■, learning fMRI task, ROI mask: left inferior frontal lobe; ■, recognition fMRI task, ROI mask: left middle temporal lobe. [Colour figure can be viewed at wileyonlinelibrary.com].

Innovative rehabilitation approaches for PD

Computer-based cognitive training – COGNITIVE GAMES –

van de Weijer *et al. BMC Neurology* (2016) 16:209
DOI 10.1186/s12883-016-0731-z

BMC Neurology

STUDY PROTOCOL Open Access

The Parkin'Play study: protocol of a phase II randomized controlled trial to assess the effects of a health game on cognition in Parkinson's disease

Sjors C. F. van de Weijer[1], Annelien A. Duits[2], Bastiaan R. Bloem[3,5], Roy P. Kessels[4,5], Jacobus F. A. Jansen[6,7], Sebastian Köhler[7], Gerrit Tissingh[8] and Mark L. Kuijf[1*]

Barry *et al. Journal of NeuroEngineering and Rehabilitation* 2014, **11**:33
http://www.jneuroengrehab.com/content/11/1/33

JNER JOURNAL OF NEUROENGINEERING AND REHABILITATION

REVIEW Open Access

The role of exergaming in Parkinson's disease rehabilitation: a systematic review of the evidence

Gillian Barry, Brook Galna and Lynn Rochester*

Virtual reality

Cochrane Library

Cochrane Database of Systematic Reviews

Virtual reality for rehabilitation in Parkinson's disease (Review)

Dockx K, Bekkers EMJ, Van den Bergh V, Ginis P, Rochester L, Hausdorff JM, Mirelman A, Nieuwboer A

Transcranial direct current stimulatio

American Journal of Physical Medicine & Rehabilitation. 97(1):7–15, JAN 2018
DOI: 10.1097/PHM.0000000000000783, , PMID: 28650857
Issn Print: 0894-9115
Publication Date: 2018/01/01

Share

Effects of Transcranial Direct Current Stimulation Plus Physical Ther on Gait in Patients With Parkinson Disease: A Randomized Controlle Trial

Pattarapol Yotnuengnit; Roongroj Bhidayasiri; Rattana Donkhan; Juthamas Chaluaysrimuang; Krisna Piravej

Movement Disorders
Official Journal of the International Parkinson and Movement Disorder Society

Research Article

Mild cognitive impairment in Parkinson's disease is improved by transcranial direct current stimulation combined with physical therapy

Rosa Manenti PhD, Michela Brambilla MSc, Alberto Benussi MD, Sandra Rosini MSc, Chiara Cobelli MS
Clarissa Ferrari PhD, Michela Petesi MSc, Italo Orizio MSc, Alessandro Padovani MD PhD,
Barbara Borroni MD, Maria Cotelli PhD

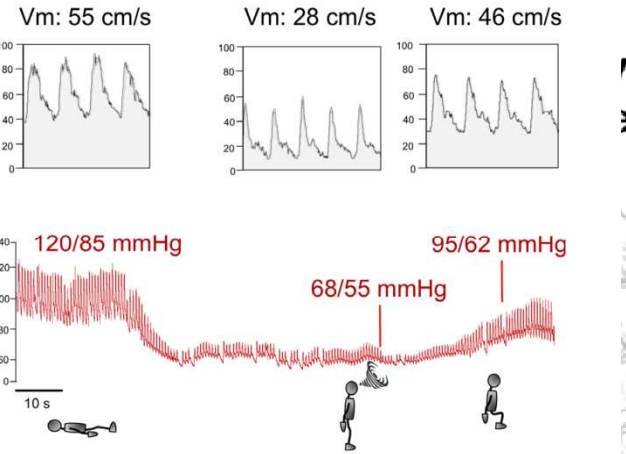
First published: 16 February 2016 | https://doi.org/10.1002/mds.26561 | Cited by: 18

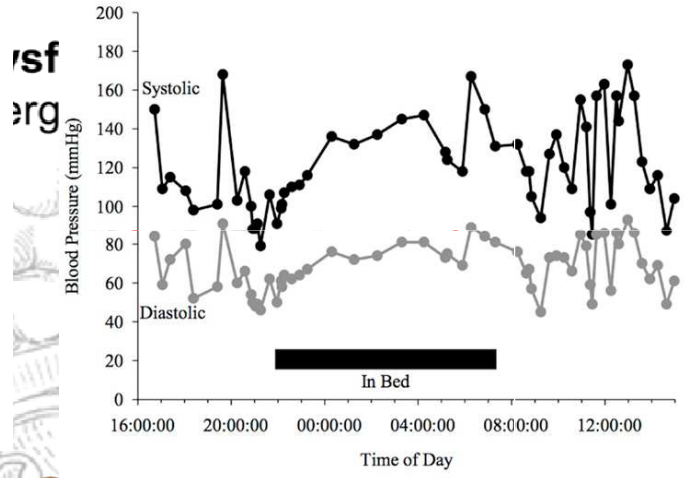
dical doctors

NEUROLOGIST

CARDIOLOGIST

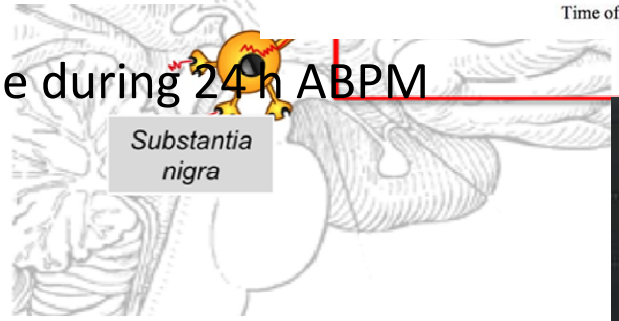
Cardiovascular autonomic tes

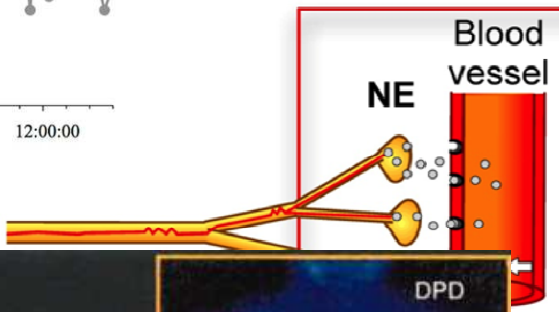


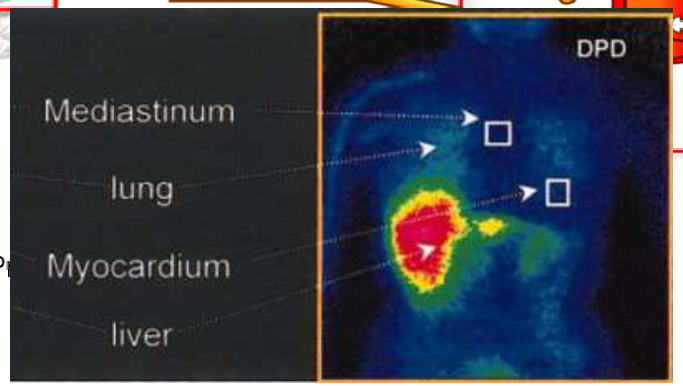


urogenic OH: Disorder
drenergic neurotransmis

BP profile during 24 h ABPM







Palma JA. & Kaufmann H. Mov Disord Clinical P

MIBG cardiac scintigraphy

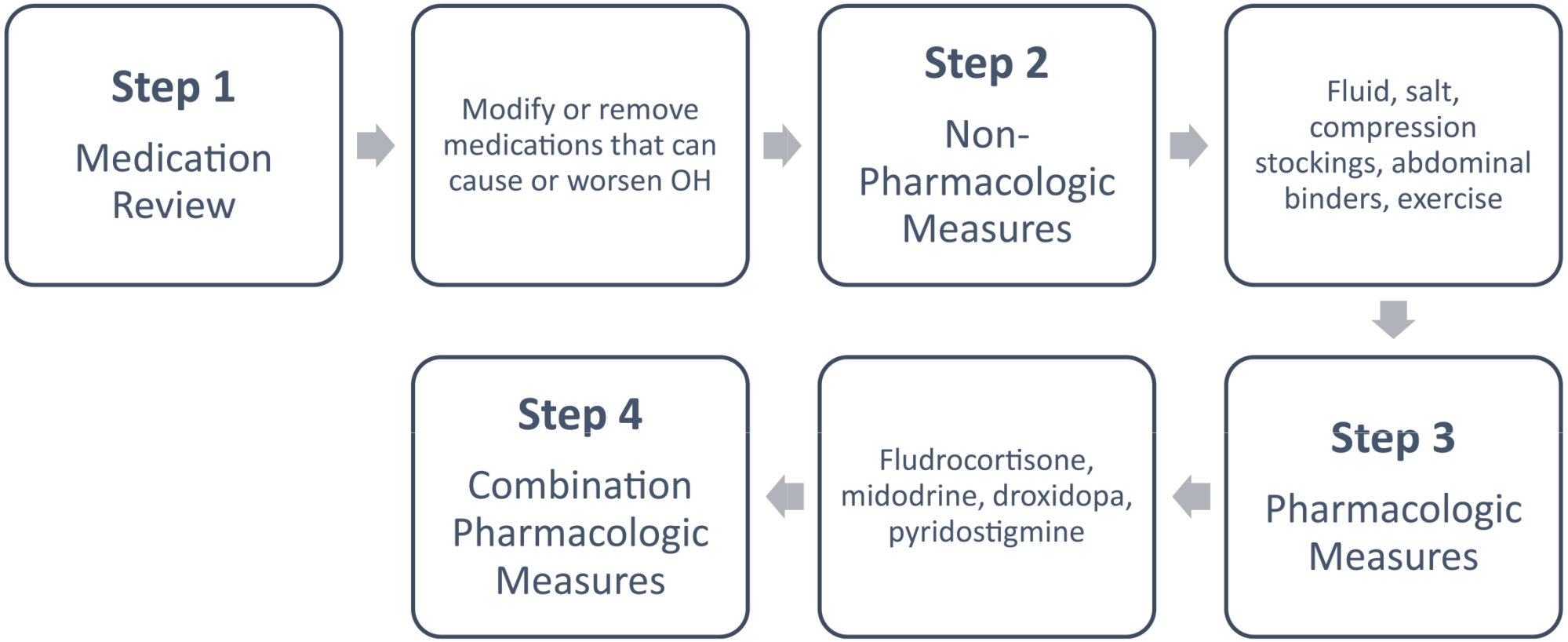


Fig. 2 A 4-step process for treating nOH

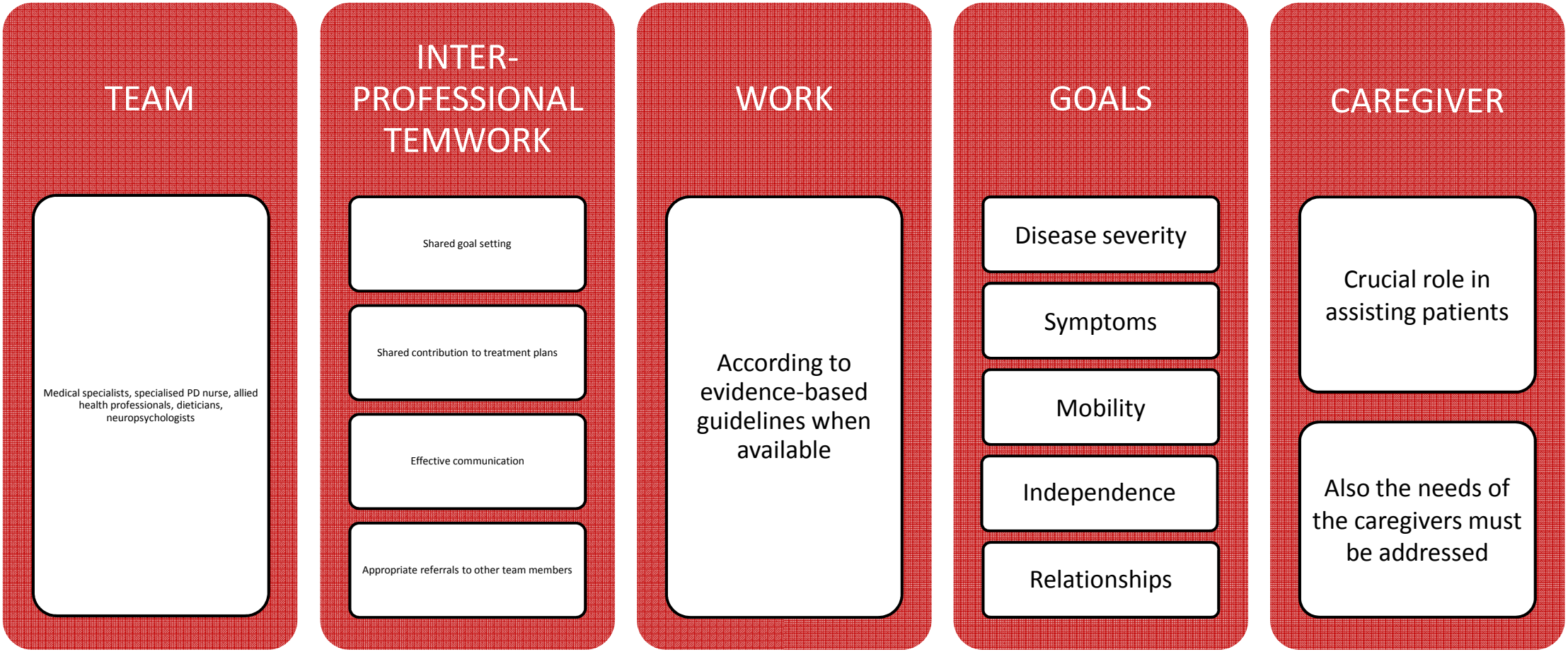
J Neurol (2017) 264:1567–1582
DOI 10.1007/s00415-016-8375-x

REVIEW

The recommendations of a consensus panel for the screening, diagnosis, and treatment of neurogenic orthostatic hypotensio and associated supine hypertension

Christopher H. Gibbons[1] · Peter Schmidt[2] · Italo Biaggioni[3] · Camille Frazier-Mills[4] · Roy Freeman[1] · Stuart Isaacson[5] · Beverly Karabin[6] · Louis Kuritzky[7] · Mark Lew[8] · Phillip Low[9] · Ali Mehdirad[10] · Satish R. Raj[11] · Steven Vernino[12] · Horacio Kaufmann[13]

Multidisciplinary treatment of PD



Evidence for multidisciplinary care in PD

Study	Arm 1	Arm 2	Follow-up	Outcomes	Summary of the results
Van der Marck et al. (2013)	Multidisciplinary PD team in a clinic (**neurologist**, **nurse**, **social worker**) (n = 51)	Usual care (**general neurologist**) (n = 49)	8 m	Symptoms, QofL, depression, psychosocial functioning, caregiver strain	Between group difference for multidisciplinary care group on **QofL** and **symptoms**
Van der Marck et al. (2013)	Multidisciplinary care by **allied health professionals** specialised in PD based on the **assessment by an expert PD team** (n = 150)	Usual care (**general neurologist**) (n = 151)	4 m 6 m 8 m	Disability, QofL Motor functioning, symptoms, caregiver burden, costs	Between group difference in favor of integrated care on disability and QofL. **Differences disappeared after correction for disease severity**
Dorsey et al. (2014)	**Specialist care** remotely at home with **telemedicine** (n = 11)	Usual care (**general neurologist**) in the clinic (n = 9)	7 m	Feasibility, QofL, costs	**No between-group differences** on clinical outcomes. **Telemedicine** was feasible and **reduced costs** (time and travel)
Eggers et al. (2018)	**Individually tailored care plan** and additional **home visits by PD nurse expert** (n = 150)	Usual care (**general neurologist**) (n = 150)	6 m	QofL, mood, motor/non-motor functioning, and cognition	Between group difference in favor of integrated care on **QofL**, **motor** and **nonmotor symptoms**

n, number of participants; m, months

Next steps for an integrated multidisciplinary approach in PD

Future trials need to address:

- Who should be part of the team
- Which is the best treatment plan: ‘One size fits all treatment’ or an individually tailored approach?
- Whether positive effects can be maintained beyond intervention
- The cost–benefit ratio of the multidisciplinary care in PD