BRAIN AND MALNUTRITION
Chronic Diseases Association ONLUS

VI Congresso Nazionale B&M
Nutrizione e Neurodegenerazione

SESSIONE II: RELATORI

•Riabilitazione motoria nella Malattia di Parkinson

Dott. Giuseppe Frazzitta
Direttore Dipartimento di Riabilitazione Malattia di Parkinson – Ospedale "Moriggia-Pelascini" Gravedona ed Uniti (Como)

MILANO | 11-12 MAGGIO | 2017

La riabilitazione nella Malattia di Parkinson

Giuseppe Frazzitta

Parkinson's Disease and Brain Injury Rehabilitation Department

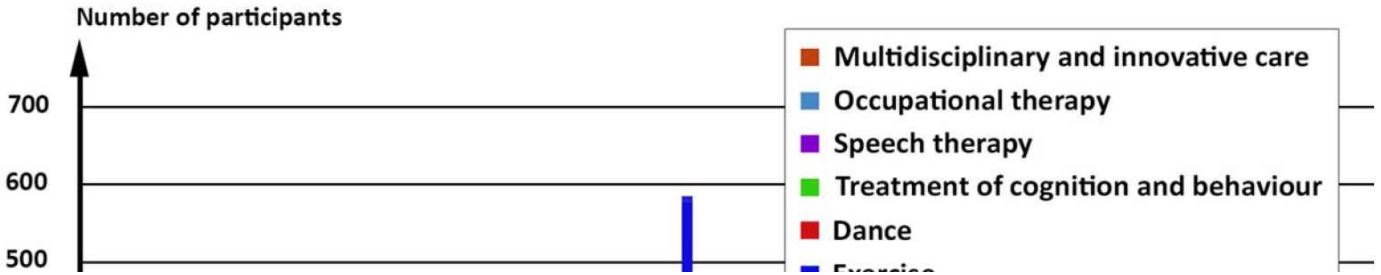
Ospedale «Moriggia-Pelascini», Gravedona ed Uniti (Como)

REVIEW

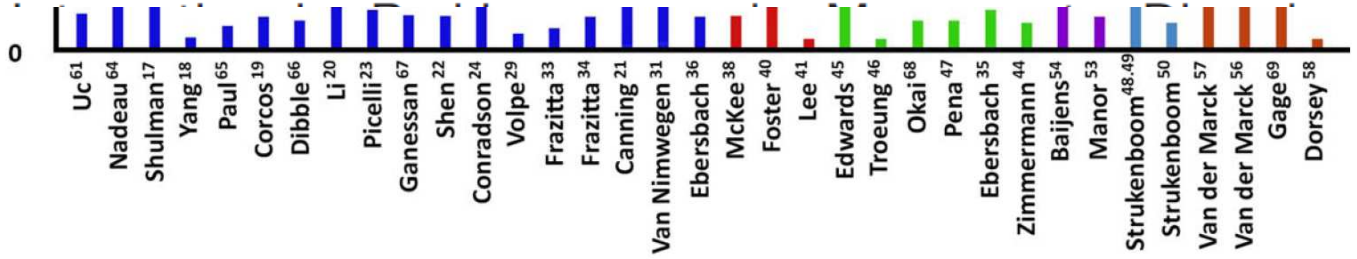
Received: 10 June 2015; **Revised:** 3 July 2015; **Accepted:** 13 July 2015

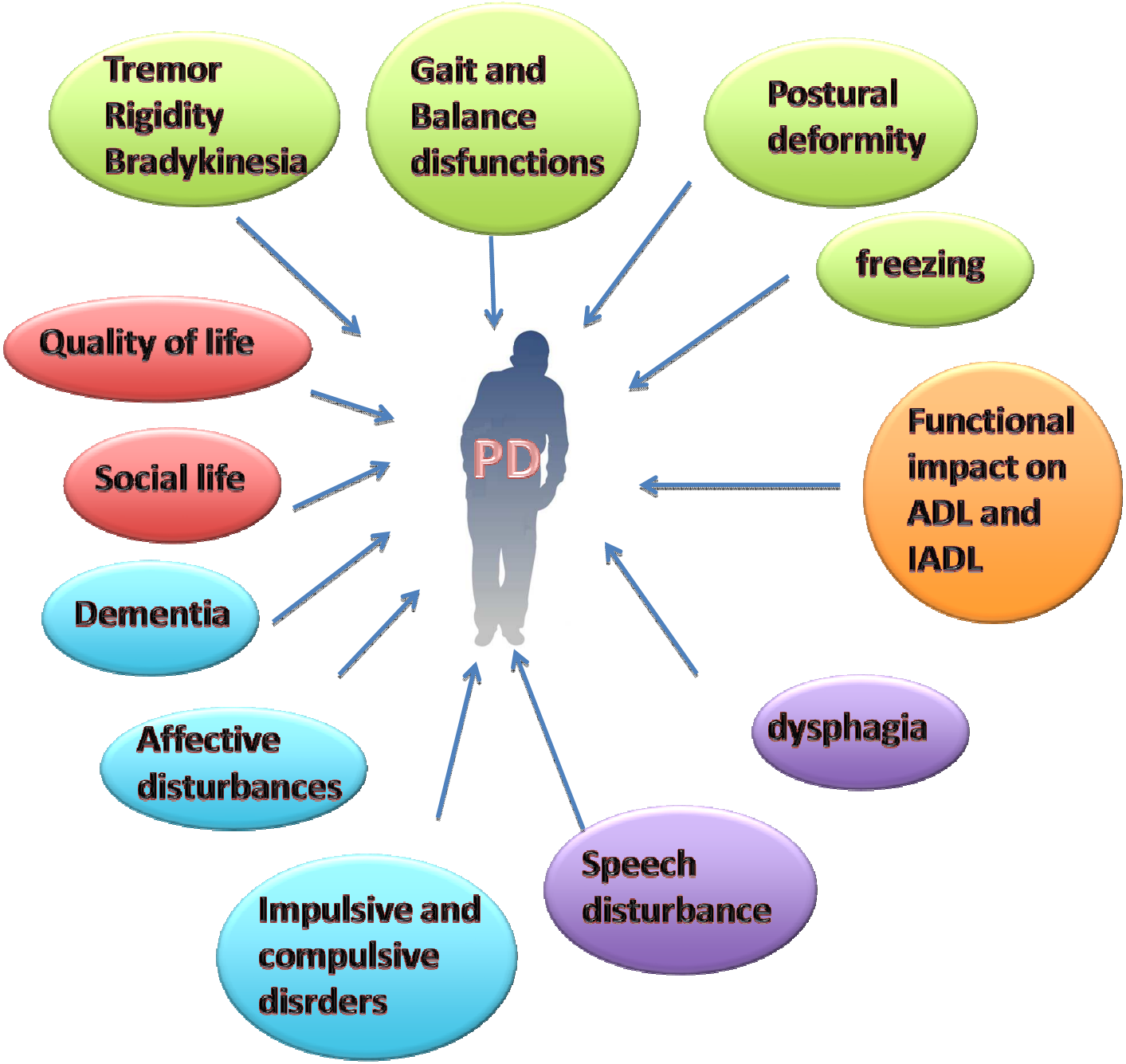
Nonpharmacological Treatments for Patients with Parkinson's Disease

Bastiaan R. Bloem, MD, PhD,[1†*] Nienke M. de Vries, PhD,[1†] and Georg Ebersbach, MD, PhD[2]



mindfulness. These studies attest to the marked interest in these therapeutic approaches and the increasing evidence base that places nonpharmacological treatments firmly within the integrated repertoire of treatment options in Parkinson's disease. © 2015




Tremor
Rigidity
Bradykinesia
Gait and
Balance
disfunctions
Postural
deformity
freezing
Quality of life
Social life
Dementia
Affective
disturbances
PD
Functional
impact on
ADL and
IADL
dysphagia
Speech
disturbance
Impulsive and
compulsive
disrders

Approccio multidisciplinare

Summary

Neurodegenerative Disease Management
October 2016 ,Vol. 6, No. 5, Pages 399-415 , DOI 10.2217/nmt-2016-0020
(doi:10.2217/nmt-2016-0020)

Perspective

Strategies to maintain quality of life among people with Parkinson's disease: what works?

Seyed-Mohammad Fereshtehnejad[*,1,2]

*Author for correspondence: sm.fereshtehnejad@ki.se

Among chronic neurodegenerative disorders, Parkinson's disease (PD) is one of the most difficult and challenging to tackle as several motor and nonmotor features influence the patients' quality of life (QoL) and daily activities. Assessing patients QoL with valid instruments and gathering knowledge about the determinants that affect QoL in individuals with PD are the basis of an efficient caring strategy. In addition to the known motor symptoms, nonmotor disorders must also be comprehensively tracked and targeted for treatment to enhance QoL. A holistic strategy to maintain QoL in people with PD should consist of a multidisciplinary, personalized and patient-centered approach with timely administration of palliative care and efficient involvement of caregivers and family members

Neuroprotective Benefits | International Parkinson | Role of Physical Therapy | Google Traduttore | Giuseppe

www.parkinson.org/understanding-parkinsons/treatment/Exercise/Neuroprotective-Benefits-of-Exercise

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NATIONAL PARKINSON FOUNDATION®

A division of the Parkinson's Foundation

What role does exercise play in the management of PD?

Exercise is an important part of healthy living for everyone. However, for people with PD exercise is not only healthy, but a vital component to maintaining balance, mobility and daily living activities. NPF is studying exercise in the ***Parkinson's Outcomes Project***.

Every NPF Center of Excellence agrees that they believe exercise is important to good outcomes in PD, and the data supports that.

Exercising is associated with a better sense of well being, even across stages and severity of the disease. This was expected: there is a growing consensus amongst researchers about the short- and long-term benefits of exercise for people with PD.

ITA 17:44 08/05/2017

Treadmill training for patients with Parkinson's disease (Review)

Mehrholz J, Kugler J, Storch A, Pohl M, Elsner B, Hirsch K

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2015, Issue 8

THE COCHRANE COLLABORATION®

Summary of main results

The aim of this review, which included 18 trials with a total of 623 participants, was to evaluate the effects of treadmill training on gait in patients with PD. We found evidence that the use of treadmill training may improve gait parameters, such as gait speed and stride length, of patients with PD at Hoehn Yahr stages one to three. However, walking distance and cadence did not improve [BJ1] significantly. Additionally, it is not known how long gait improvements after treadmill training may last. Adverse events and drop-outs did not occur more frequently in people receiving treadmill training than control interventions and were not judged to be clinically serious adverse events.

Neurology®

Phase I/II randomized trial of aerobic exercise in Parkinson disease in a community setting

Ergun Y. Uc, Kevin C. Doerschug, Vincent Magnotta, et al.

Neurology published online July 2, 2014

- Intervention: 2 groups (60/41 patients):
  - continuous (HR 70-80% of HR max)
  - interval (every 3 minutes between slower 60-70% and faster 80-90% HR max)

Conclusions: Our preliminary study suggests that aerobic walking in a community setting is safe, well tolerated, and improves aerobic fitness, motor function, fatigue, mood, executive control, and quality of life in mild to moderate PD.

UPDRS			
I: Mental, Mood, Behavior (↓)	2.1 ± 1.9	1.6 ± 1.3	0.025[a]
II: ADL (↓)	9.3 ± 4.9	8.8 ± 4.6	0.535
III: Motor (↓)	18.8 ± 10.4	15.9 ± 8.4	0.009[a]
Disability			
Schwab-England Scale (↑)	89.8 ± 7.0	88.9 ± 7.6	0.269

Efficacy of occupational therapy for patients with Parkinson's disease: a randomised controlled trial

*Ingrid H W M Sturkenboom, Maud J L Graff, Jan C M Hendriks, Yvonne Veenhuizen, Marten Munneke, Bastiaan R Bloem, Maria W Nijhuis-van der Sanden, for the OTiP study group**

Interpretation Home-based, individualised occupational therapy led to an improvement in self-perceived performance in daily activities in patients with Parkinson's disease. Further work should identify which factors related to the patient, environmental context, or therapist might predict which patients are most likely to benefit from occupational therapy.

Integrated multidisciplinary care in Parkinson's disease: a non-randomised, controlled trial (IMPACT)

*Marjolein A van der Marck, Marten Munneke, Wim Mulleners, Edo M Hoogerwaard, George F Borm, Sebastiaan Overeem, Bastiaan R Bloem, for the IMPACT study group**

Interpretati need for development of improved interventions. The lisease, and
these disap evidence supporting the merits of isolated allied health- roaches are
needed to a care interventions is growing,[48–50] but more work is needed
to investigate how these separate interventions are best
bundled into a multidisciplinary approach. Finally, future

Original Investigation

Physiotherapy and Occupational Therapy vs No Therapy in Mild to Moderate Parkinson Disease

A Randomized Clinical Trial

Carl E. Clarke, MD; Smitaa Patel, MSc; Natalie Ives, MSc; Caroline E. Rick, PhD; Francis Dowling, BSc; Rebecca Woolley, MSc; Keith Wheatley, DPhil; Marion F. Walker, PhD; Catherine M. Sackley, PhD; for the PD REHAB Collaborative Group

JAMA Neurology Published online January 19, 2016

In the therapies group, the median number of therapy sessions was 4 (range, 1-21), with a mean time per session of 58 minutes. The mean duration of therapy was 8 weeks. The mean total dose of both therapies was 263 minutes (range, 38-1198

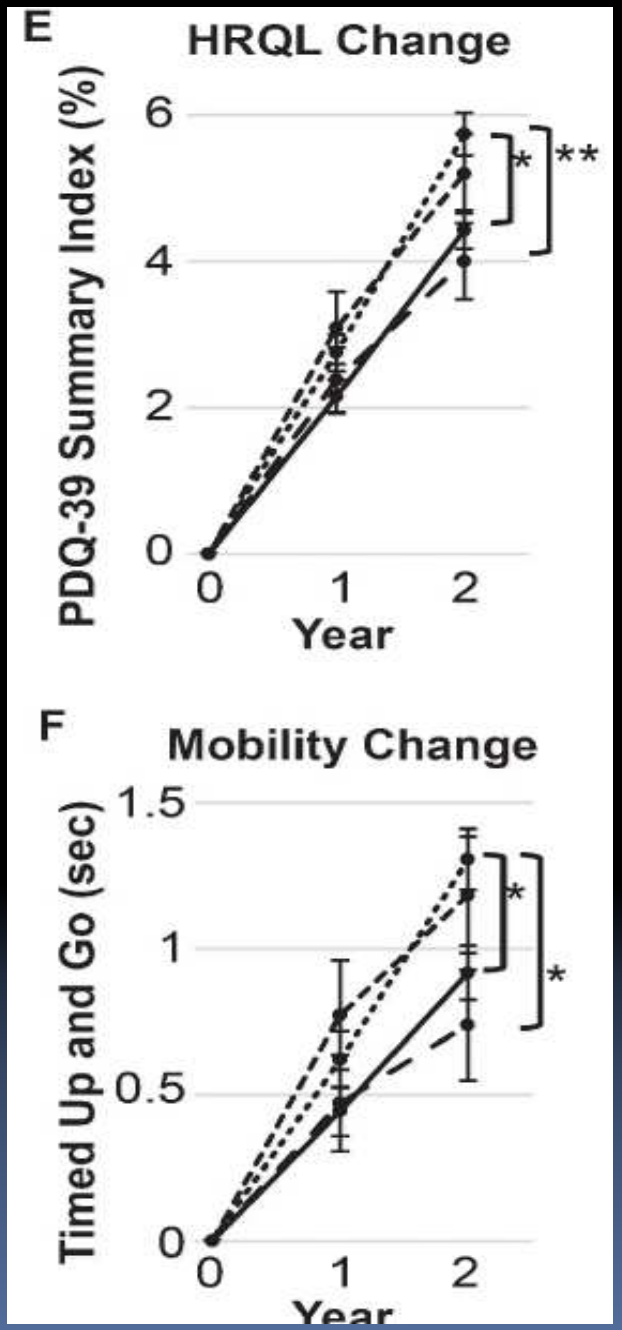
CONCLUSIONS AND RELEVANCE Physiotherapy and occupational therapy were not associated with immediate or medium-term clinically meaningful improvements in ADL or quality of life in mild to moderate PD. This evidence does not support the use of low-dose, patient-centered, goal-directed physiotherapy and 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.

Journal of Parkinson's Disease 7 (2017) 193–202
DOI 10.3233/JPD-160912
IOS Press

Research Report

Regular Exercise, Quality of Life, and Mobility in Parkinson's Disease: A Longitudinal Analysis of National Parkinson Foundation Quality Improvement Initiative Data

Miriam R. Rafferty[a,*], Peter N. Schmidt[b], Sheng T. Luo[c], Kan Li[d], Connie Marras[e], Thomas L. Davis[f], Mark Guttman[g], Fernando Cubillos[b], Tanya Simuni[h] and on behalf of all NPF-QII Investigators[i]



Parkinson's Disease and Intensive Exercise Therapy - a Systematic Review and Meta-analysis of Randomized Controlled Trials.

Anders Uhrbrand[1], Egon Stenager[2,3], Martin Sloth Pedersen[1] & Ulrik Dalgas[1]

Received date: 9 February 2015
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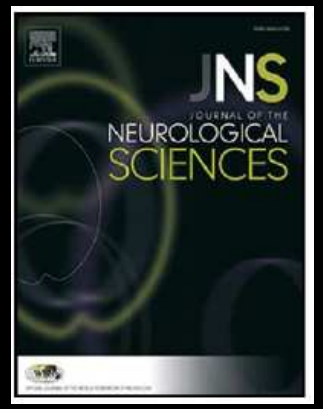
Accepted date: 2 April 2015



Abstract

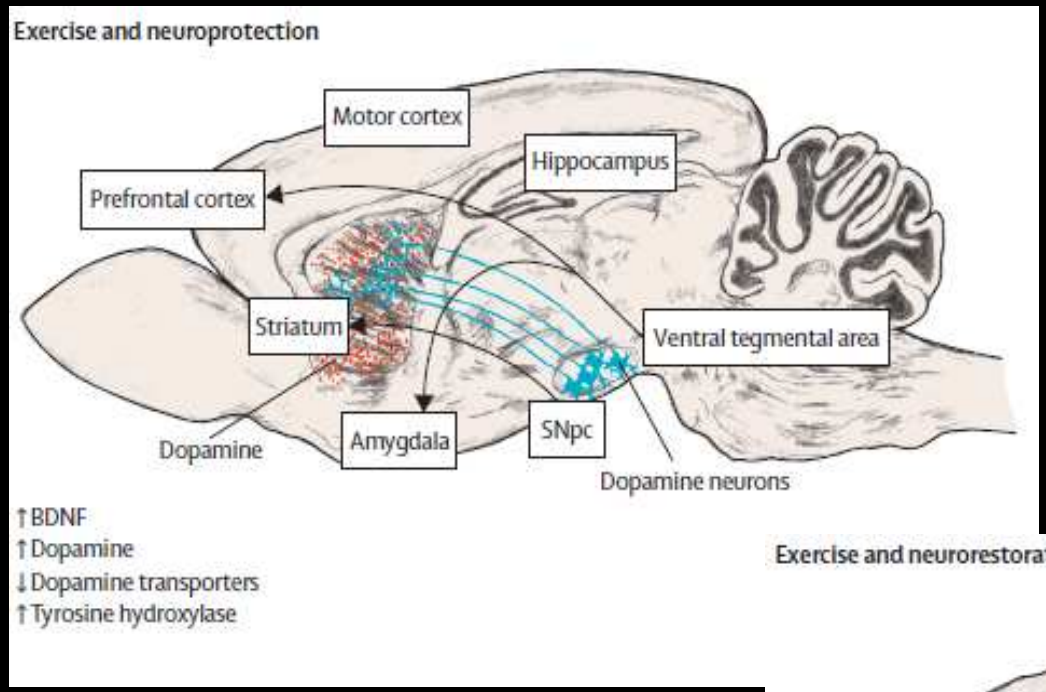
Objective: To evaluate and compare the effect of 3 intensive exercise therapy modalities - Resistance Training (RT), Endurance Training (ET) and Other Intensive Training Modalities (OITM) - in Parkinson's Disease (PD).

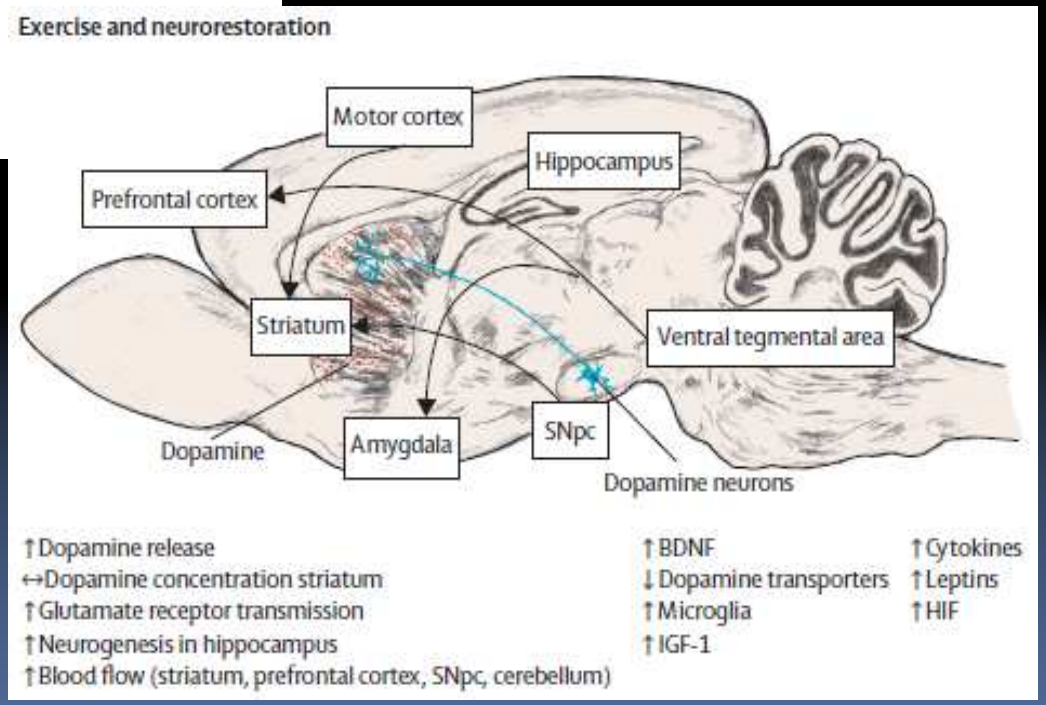
Design: A systematic review and meta-analysis of randomized controlled trials.

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.





- Petzinger et al. Lancet Neurology 2013

Contents lists available at ScienceDirect

Parkinsonism and Related Disorders

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

Exercise-induced neuroplasticity in human Parkinson's disease: What is the evidence telling us?

Mark A. Hirsch*, Sanjay S. Iyer, Mohammed Sanjak

Abstract

Introduction: While animal models of exercise and PD have pushed the field forward, few studies have addressed exercise-induced neuroplasticity in human PD. **Method:** As a first step toward promoting greater international collaboration on exercise-induced neuroplasticity in human PD, we present data on 8 human PD studies (published between 2008 and 2015) with 144 adults with PD of varying disease severity (Hoehn and Yahr stage 1 to stage 3), using various experimental (e.g., randomized controlled trial) and quasi-experimental designs on the effects of cognitive and physical activity on brain structure or function in PD. We focus on

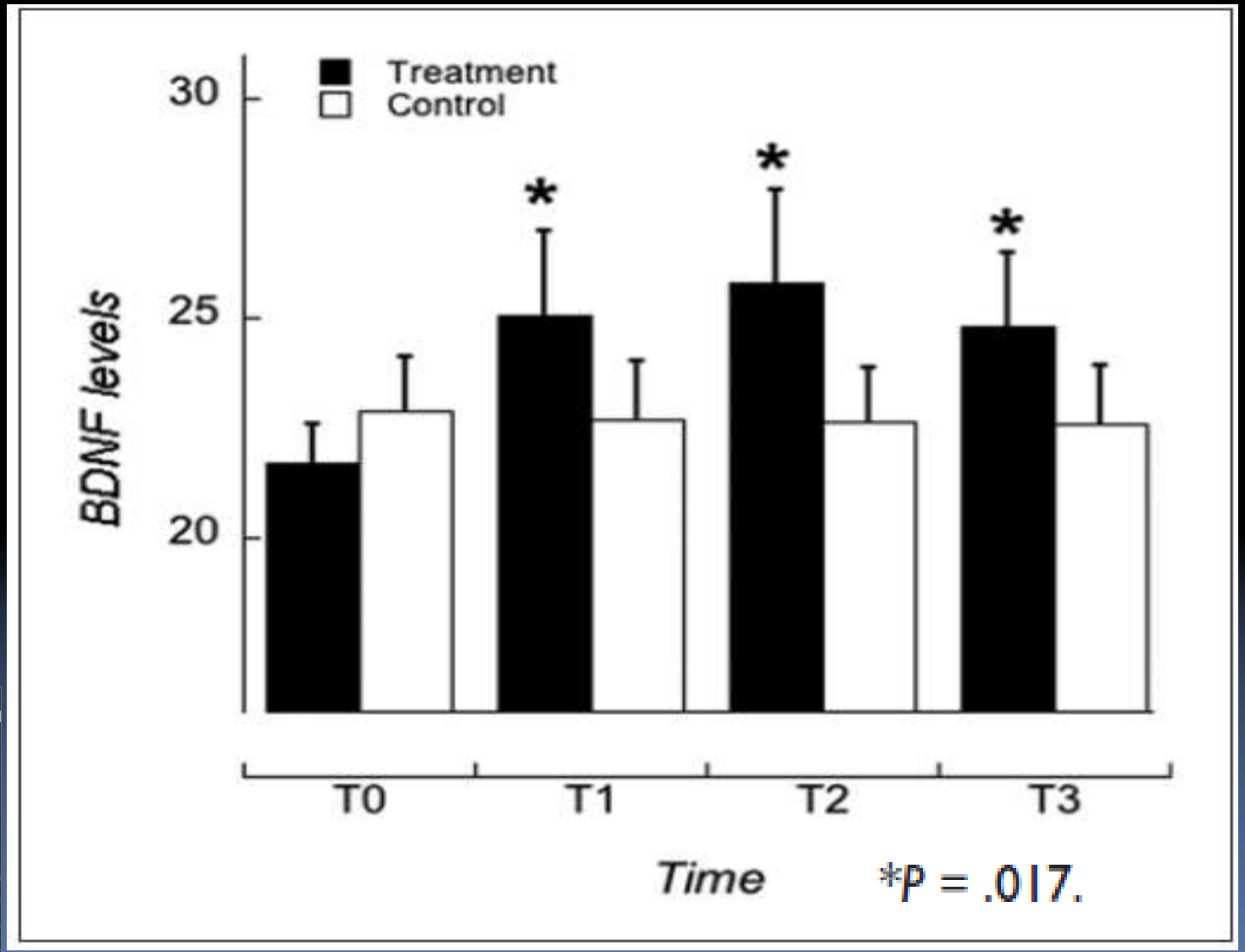
Table 1
Intervention-induced neuroplasticity in human PD.

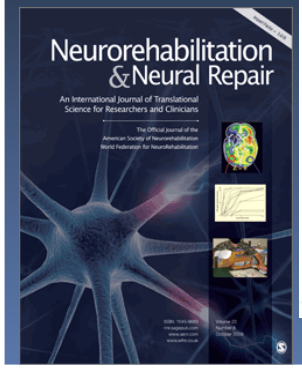
Plasticity marker	PD n
Increase in maximal corticomotor excitability and improved gait parameters[a]	30
Weakening of the overactive indirect striatal pathway DA-D2R expression[b]	4
Change in gray matter volume[c]	47
Increase in BDNF level[d]	12
Increase in BDNF level and decreased rigidity[e]	11
Increase in BDNF level[f]	25
Increase in BDNF level[g]	15

Intensive Rehabilitation Increases BDNF Serum Levels in Parkinsonian Patients: A Randomized Study

Giuseppe Frazzitta, Roberto Maestri, Maria Felice Ghilardi, Giulio Riboldazzi, Michele Perini, Gabriella Bertotti, Natalia Boveri, Sara Buttini, Franco Luis Lombino, Davide Uccellini, Marinella Turla, Gianni Pezzoli and Cristoforo Comi

Neurorehabil Neural Repair 2014 28: 163 originally published online 8 November 2013





Intensive Rehabilitation Enhances Lymphocyte BDNF-TrkB Signaling in Patients With Parkinson's Disease

Neurorehabilitation and Neural Repair
1–8

DOI: 10.1177/1545968315600272
nnr.sagepub.com
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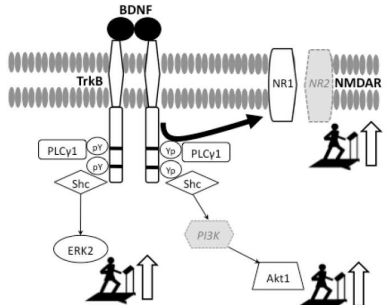
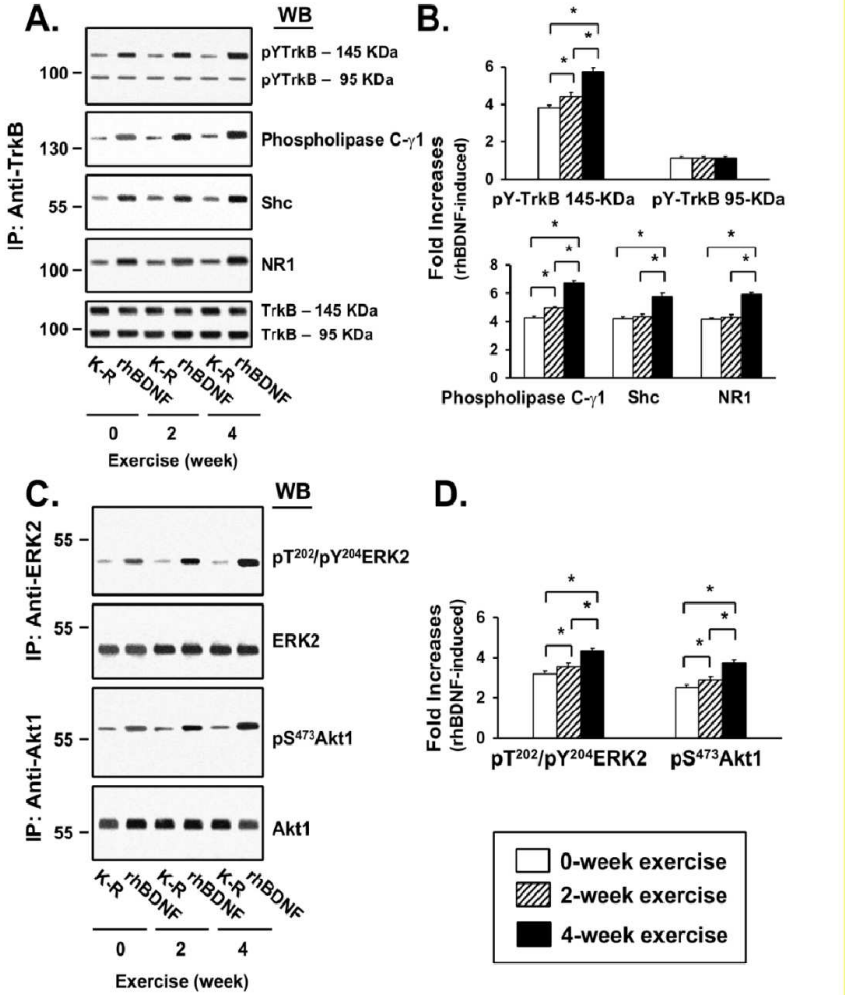
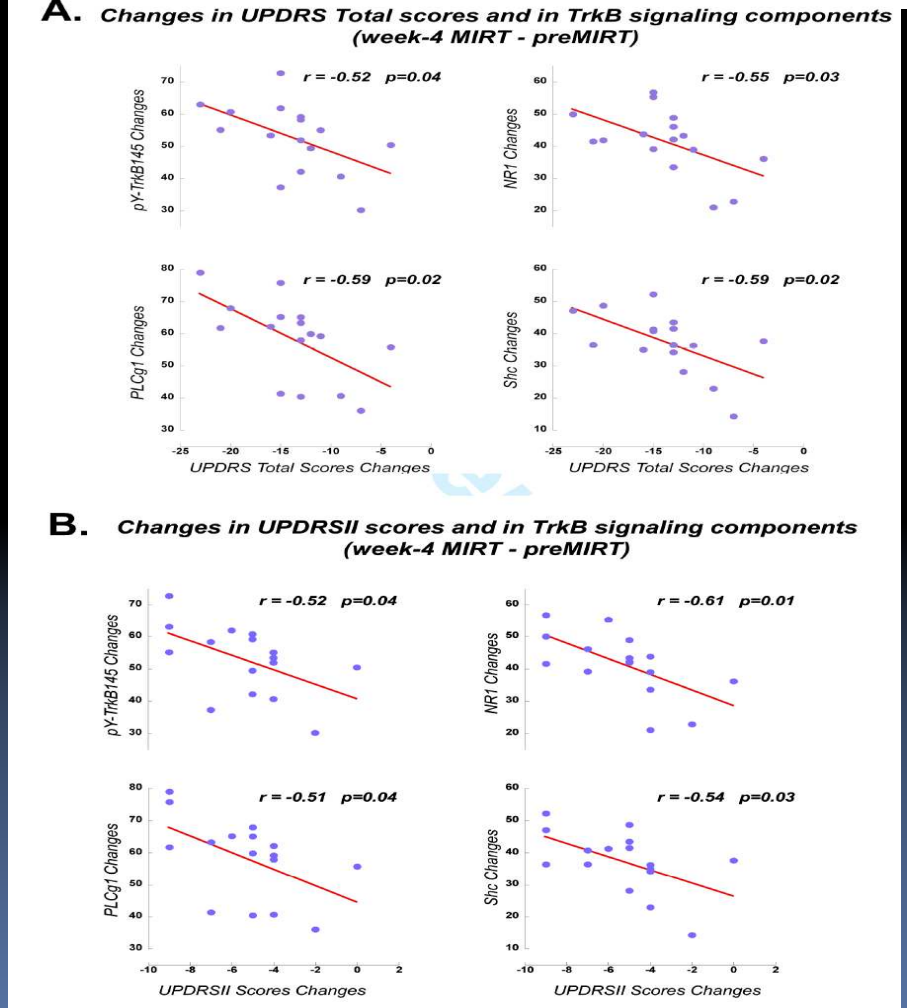


Cecilia Fontanesi, MS/MPhil[1,2], Svetlana Kvint[1], Giuseppe Frazzitta, MD[3],





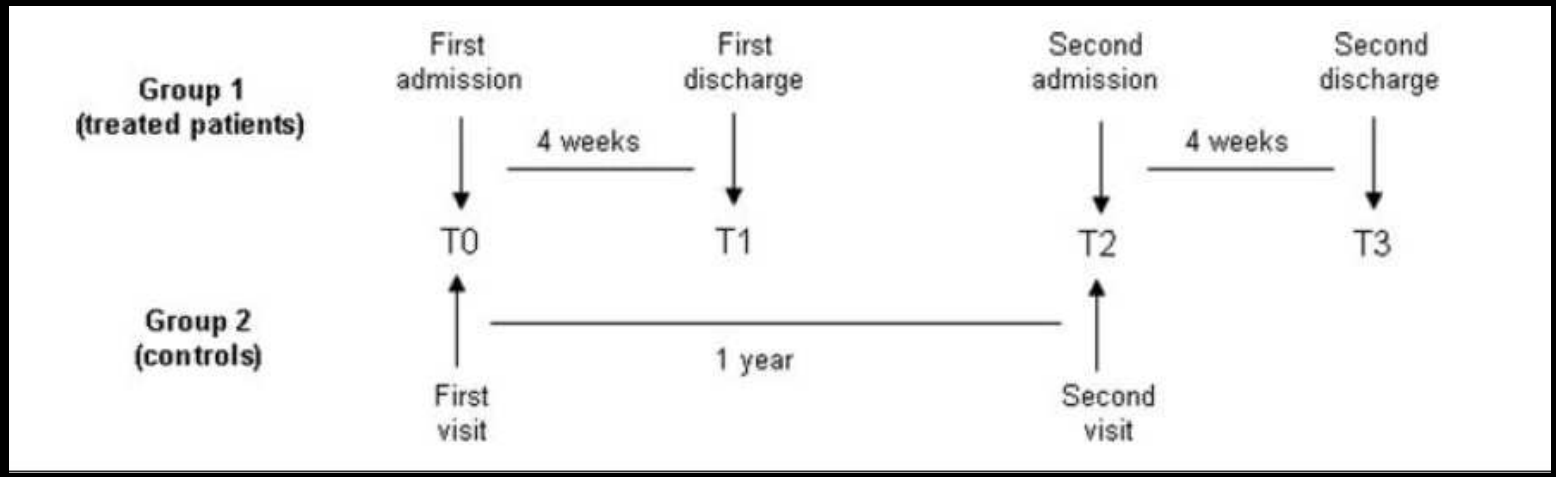
Multidisciplinar Intensive Rehabilitation Treatment

- MIRT is a **4-week** Multidisciplinar Intensive Rehabilitation Treatment that intailed 4 daily sessions of physiotherapy (2 in the morning and 2 in the afternoon, each for 1 hour), 6 days a week (about 90 hours of cognitive and aerobic treatment in 4 weeks)
- Neurologists, physiatrists, psychologists, nurses, nutritionist, physiotherapists, speech and occupational therapists are involved
- At the beginning of treatment we develop a rehabilitation plan tailored for the patient and every week there is a team meeting in order to evaluate the results obtained by the patient and programme new objectives

Effectiveness of Intensive Inpatient Rehabilitation Treatment on Disease Progression in Parkinsonian Patients : A Randomized Controlled Trial With 1-Year Follow-up

Giuseppe Frazzitta, Gabriella Bertotti, Giulio Riboldazzi, Marinella Turla, Davide Uccellini, Natalia Boveri, Gabriele Guaglio, Michele Perini, Cristoforo Comi, Pietro Balbi and Roberto Maestri

Neurorehabil Neural Repair 2012 26: 144 originally published online 15 August 2011



	Group 1 (Treated Patients)				Group 2 (Controls)	
	T0	T1	T2	T3	T0	T2
Age, y	72 ± 7				70 ± 7	
Male/Female	11/14				13/12	
Disease duration, y	8 ± 3				9 ± 3	
Levodopa equivalent, mg/d	653 ± 322		602 ± 268		617 ± 239	647 ± 245
UPDRS II	13 ± 5	9 ± 4	14 ± 6	11 ± 5	14 ± 4	19 ± 6
UPDRS III	21 ± 6	15 ± 5	21 ± 6	16 ± 5	22 ± 7	28 ± 7
UPDRS tot	40 ± 13	28 ± 11	41 ± 12	31 ± 11	40 ± 11	49 ± 13

Intensive Rehabilitation Treatment in Early Parkinson's Disease: A Randomized Pilot Study With a 2-Year Follow-up

Giuseppe Frazzitta, Roberto Maestri, Gabriella Bertotti, Giulio Riboldazzi, Natalia Boveri, Michele Perini, Davide Uccellini, Marinella Turla, Cristoforo Comi, Gianni Pezzoli and M. Felice Ghilardi

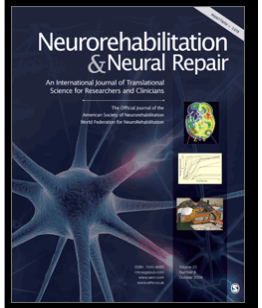
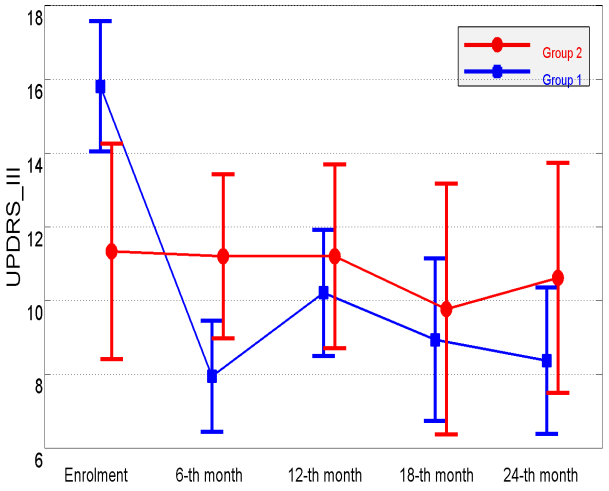
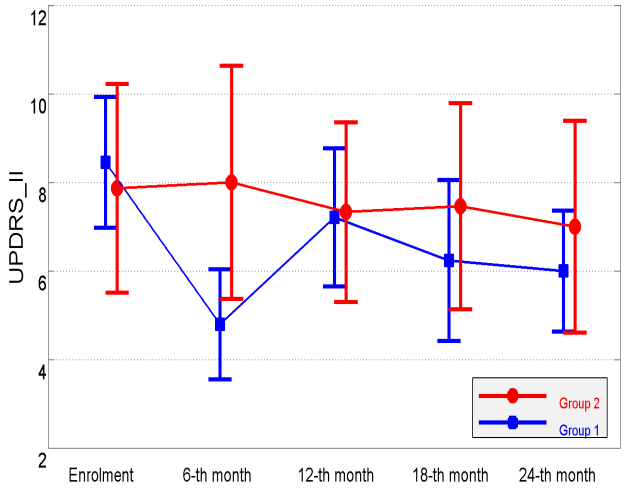
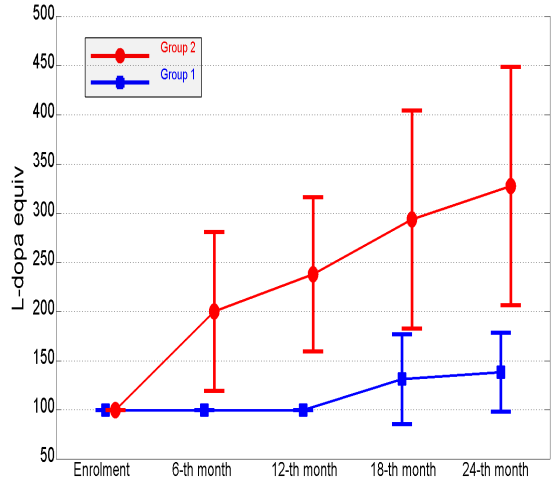


Table 2. Acute Changes (Values at Discharge − Values at Admission) in Outcome Measurements After First and Second MIRT (Values are Reported as Mean ± SD).

	Changes After First MIRT	*P* Value	Changes After Second MIRT	*P* Value
UPDRS II	−2.9 ± 1.6	<.0001	−2.1 ± 2.2	.0028
UPDRS III	−7.3 ± 2.6	<.0001	−3.4 ± 1.3	<.0001
TUG	−2.9 ± 2.4	<.0001	−1.1 ± 1.6	.017
PDDS	−13.8 ± 9.2	<.0001	−11.3 ± 9.1	.0002
6MWT (m)	85.9 ± 59.8	<.0001	41.4 ± 26.2	<.0001







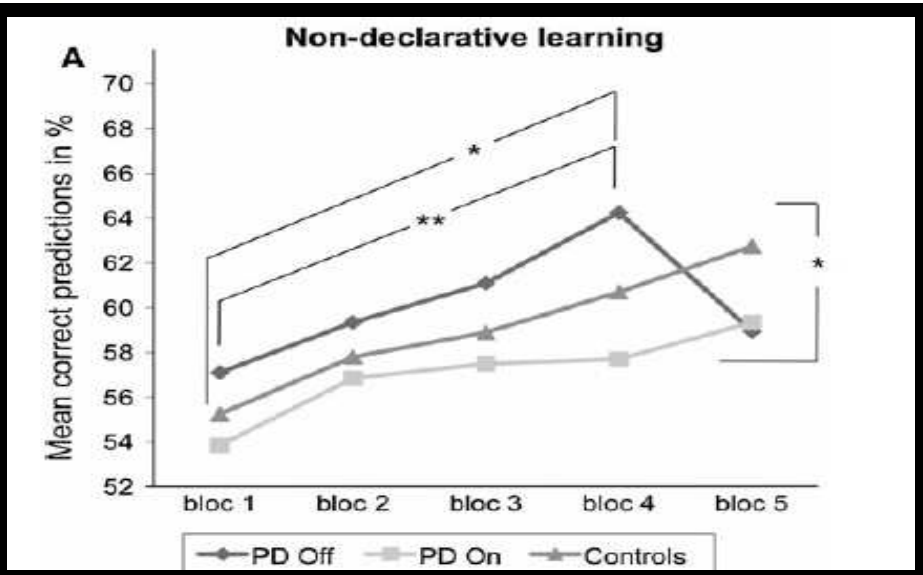
Group 1 comparison T6 vs T0 p<0.0001 **Group 1 comparison T6 vs T0 p=0.0125** **Group 1 comparison T6 vs T0 p=0.0585**

Group 2 comparison T6 vs T0 p=0.8465 **Group 2 comparison T6 vs T0 p=0.9301** **Group 2 comparison T6 vs T0 p=0.0015**

Levodopa inhibits habit-learning in Parkinson's disease

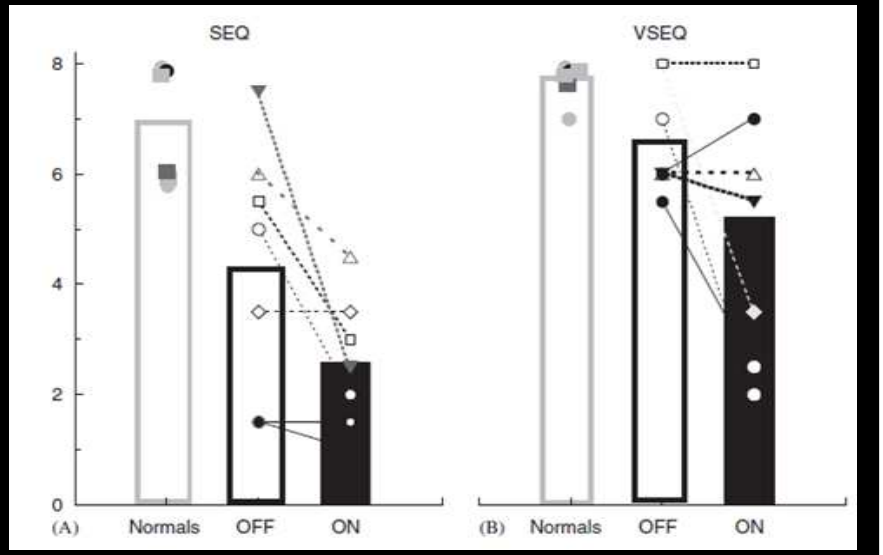
Hannah Fuhrer · Andreas Kupsch · Thomas D. Hälbig · Ute A. Kopp · Peter Scherer · Doreen Gruber

J Neural Transm (2014) 121:147–151
DOI 10.1007/s00702-013-1081-2



L-Dopa infusion does not improve explicit sequence learning in Parkinson's disease

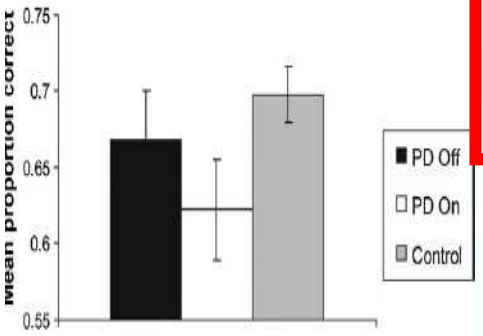
M. Felice Ghilardi[a,*], Andrew S. Feigin[b], Fortunato Battaglia[a], Giulia Silvestri[a], Paul Mattis[b], David Eidelberg[b], Alessandro Di Rocco[c]



Medication impairs probabilistic classification learning in Parkinson's disease

Marjan Jahanshahi[a,*], Leonora Wilkinson[a], Harpreet Gahir[b], Angeline Dharminda[b], David A. Lagnado[b]

Neuropsychologia 48 (2010) 1096–1103



in PD the tonic increase of dopamine with dopaminergic medication may mask the phasic changes in dopamine release essential for incremental learning across trials. These results have implications for the medical management of PD and highlight the need for careful 'titration' of dopaminergic medication to produce the desired improvement of the motor symptoms without the associated detrimental effects on cognition and learning, particularly

RESEARCH ARTICLE

Exercise Improves Cognition in Parkinson's Disease: The PRET-PD Randomized, Clinical Trial

Fabian J. David, PhD,[1*] Julie A. Robichaud, PT, PhD,[2] Sue E. Leurgans, PhD,[3] Cynthia Poon, PhD,[1] Wendy M. Kohrt, PhD,[4] Jennifer G. Goldman, MD, MS,[5] Cynthia L. Comella, MD,[5] David E. Vaillancourt, PhD,[6] and Daniel M. Corcos, PhD[1,5]

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).

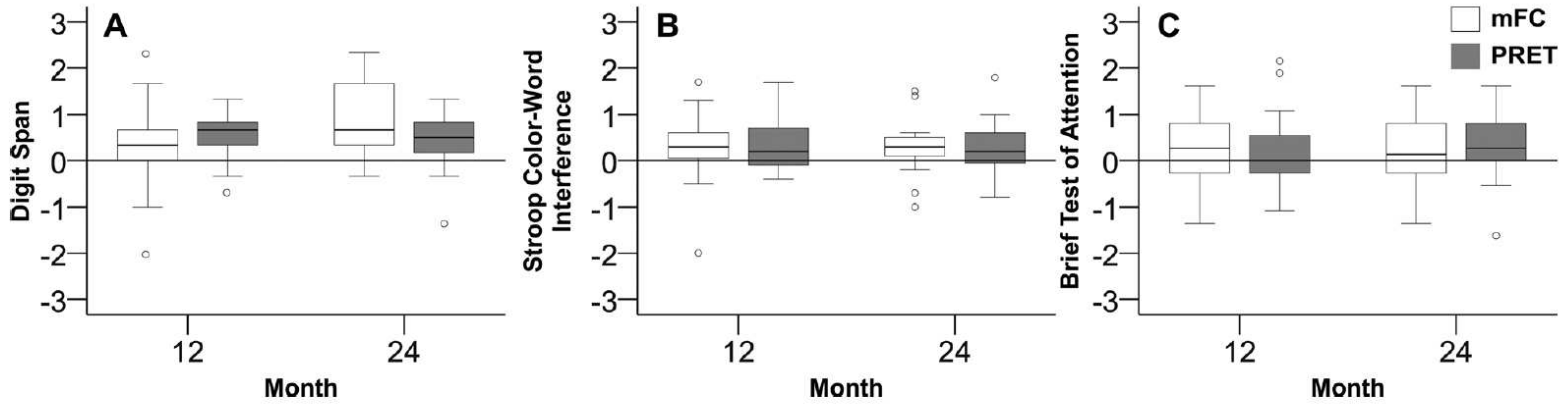
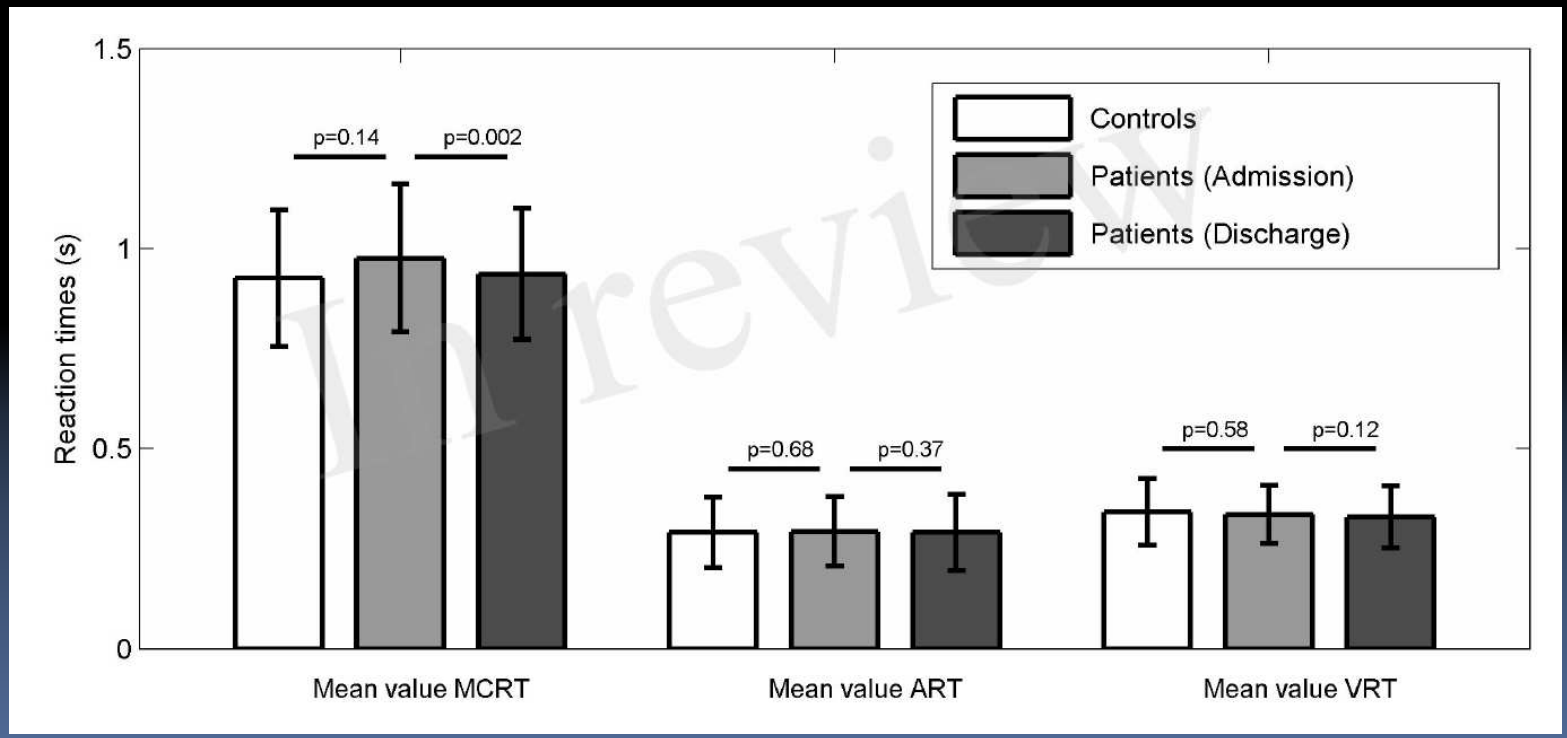


FIG. 1. Box plots illustrate the *off* medication change from baseline z-scores in the modified fitness counts and progressive resistance exercise training for (A) the Digit Span Forwards and Backwards, (B) the Stroop Color-Word Interference, and (C) the brief test of attention (BTA) at 12 and 24 months. Positive z-scores indicate improvement in the Digit Span Forwards and Backwards sum score, the Stroop Color-Word Interference T-score, and the BTA sum score.

frontiers

Focused and sustained attention is modified by a goal-based rehabilitation in Parkinsonian patients

Davide Ferrazzoli[1*], Paola Ortelli[1], Roberto Maestri[2], Rossana Bera[1], Roberto Gargantini[1], Grazia Palamara[1], Marianna Zarucchi[1], Nir Giladi[3], Giuseppe Frazzitta[1]



Does Cognitive Impairment Affect Rehabilitation Outcome in Parkinson's Disease?

frontiers in Aging Neuroscience

Davide Ferrazzoli[1], Paola Ortelli[1], Roberto Maestri[2], Rossana Bera[1], Nir Giladi[3], Maria Felice Ghilardi[4], Gianni Pezzoli[5] and Giuseppe Frazzitta[1]*

Methods: We retrospectively identified 485 patients with PD hospitalized for a 4-week Multidisciplinary Intensive Rehabilitation Treatment (MIRT) between January 2014 and September 2015. According to Mini Mental State Examination (MMSE), patients were divided into: group 1—normal cognition (score 27–30), group 2—mild cognitive impairment (score 21–26), group 3—moderate or severe cognitive impairment (score $\leq$ 20). According to Frontal Assessment Battery (FAB), subjects were divided into patients with normal (score $\geq$13.8) and pathological (score $<$13.8) executive functions. The outcome measures were: Unified Parkinson's Disease Rating Scale (UPDRS), Parkinson's Disease Disability Scale (PDDS), Six Minutes Walking Test (6MWT), Timed Up and Go Test (TUG) and Berg Balance Scale (BBS).

TABLE 1 | Demographical and clinical data of patients subdivided according to MMSE.

	MMSE 27–30 (GROUP 1)	MMSE 21–26 (GROUP 2)	MMSE ≤ 20 (GROUP 3)
Age	65.0 (59.0, 73.0)	71.0 (67.0, 75.0)	75.0 (70.0, 78.3)
Education (years)	11.0 (8.0, 13.0)	10.0 (5.0, 13.0)	8.0 (5.0, 13.0)
H&Y scale	2.5 (2.0, 3.0)	3.0 (2.5, 3.0)	3.0 (3.0, 4.0)
L-dopa equivalent dose	617.5 (395.0, 850.0)	656.0 (430.0, 872.5)	695.0 (500.0, 830.0)
Sex (% Male)	52	61	56
Most affected side (% right)	55	50	63

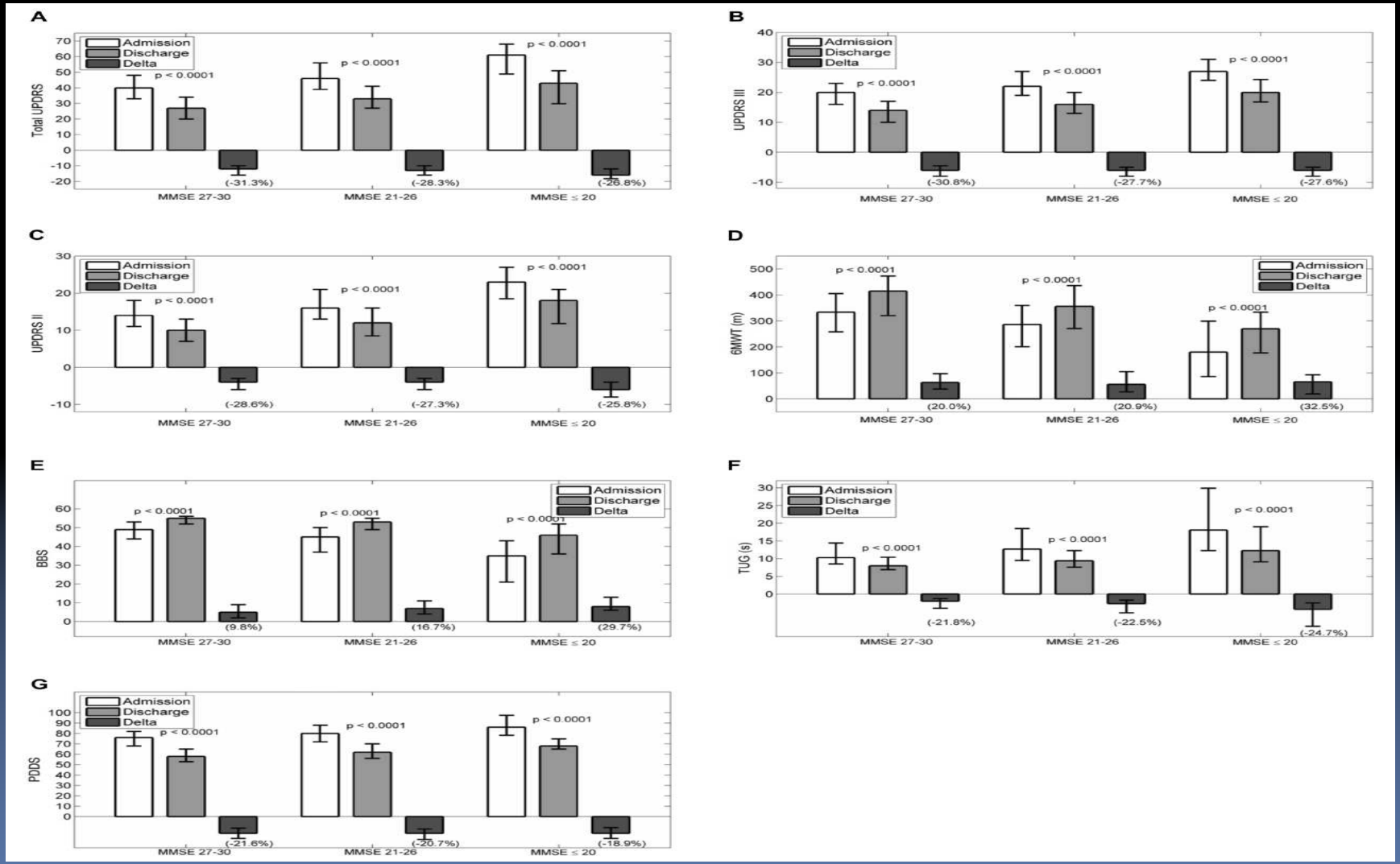
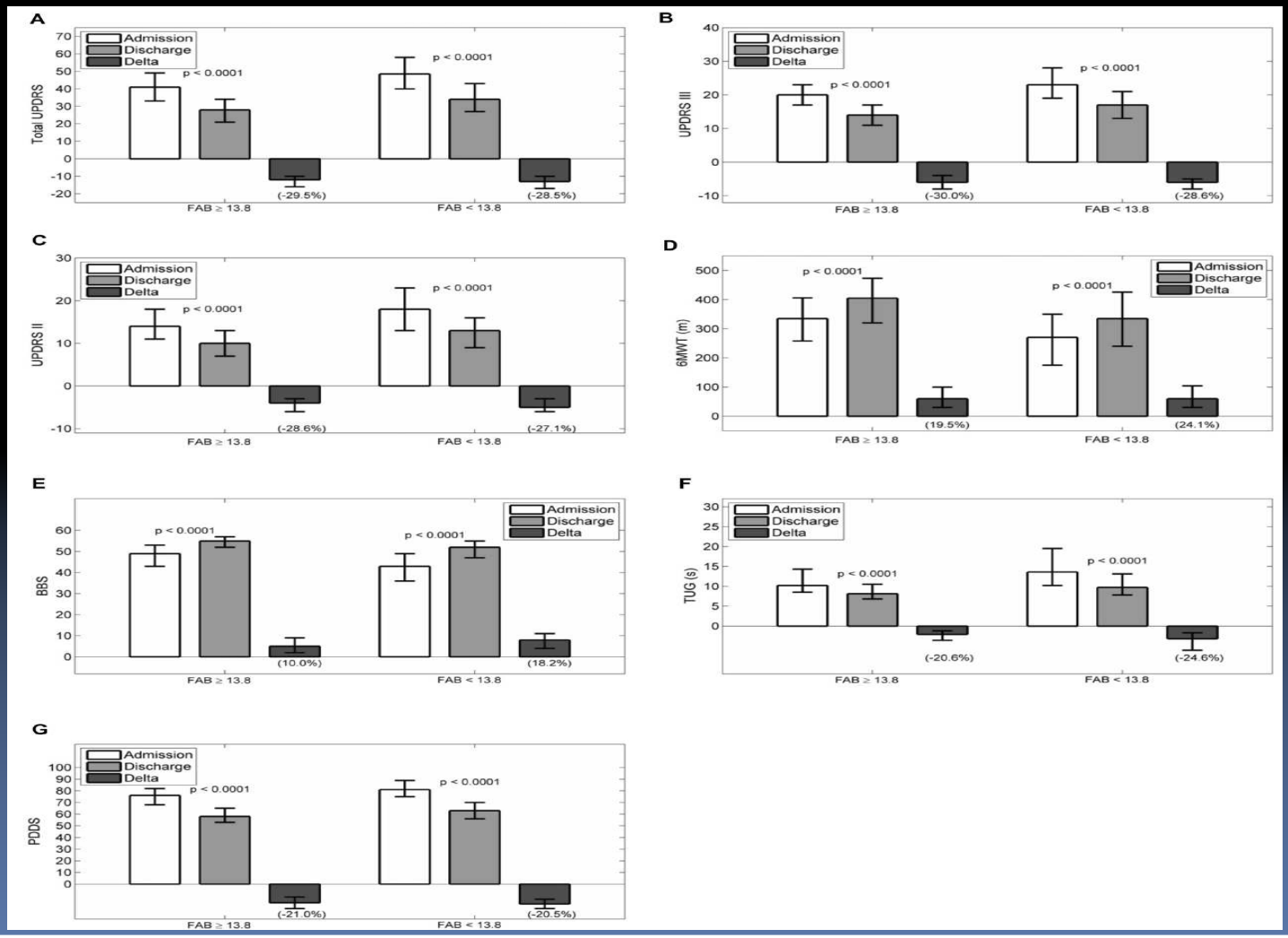


TABLE 2 | Demographical and clinical data of patients subdivided according to FAB.

	FAB ≥ 13.8	FAB < 13.8
Age	66.0 (59.0, 72.0)	71.0 (67.0, 77.0)
Education (years)	12.0 (8.0, 13.0)	8.0 (5.0, 13.0)
H&Y scale	2.5 (2.0, 3.0)	3.0 (2.5, 3.0)
L-Dopa equivalent dose	600.0 (392.5, 850.0)	665.0 (458.8, 876.3)
Sex (% Male)	54	58
Most affected side (% right)	53	54



Effectiveness of a Multidisciplinary Rehabilitation on Quality of Life of Parkinsonian Patients: a randomized controlled study

Davide Ferrazzoli, MD,[1§] Paola Ortelli, PsyD,[1*] Ilaria Zivi, MD,[1] Veronica Cian, PsyD,[1] Elisa Urso, PsyD,[1] Maria Felice Ghilardi, MD,[2] Roberto Maestri, BME,[3*] Giuseppe Frazzitta, MD.[1*]*

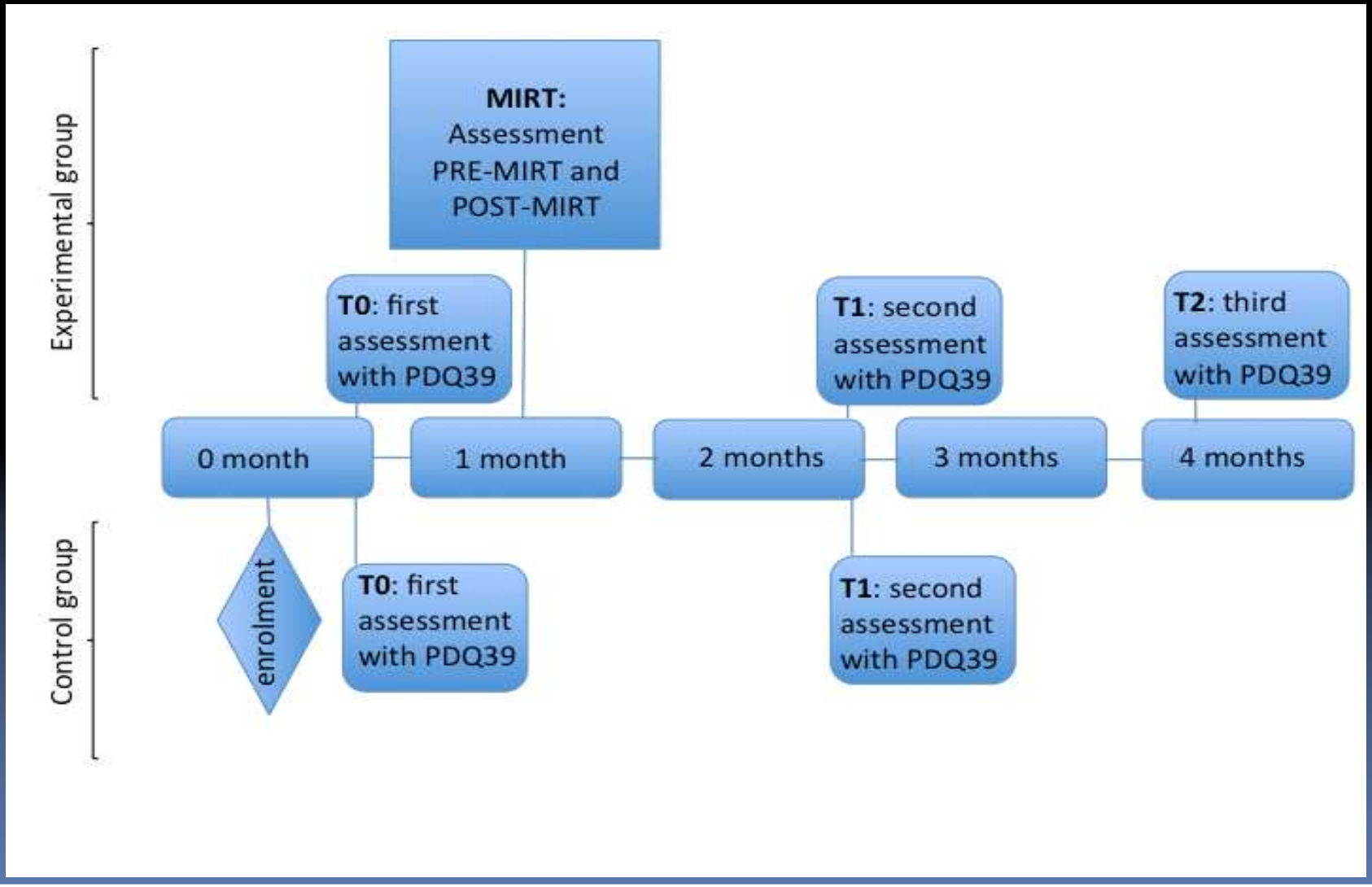


Table 2. Left: PDQ-39 scores (all dimensions and index score), at T0 and T1 for controls and experimental group. Right: PDQ-39 delta values (T1-T0) for controls and experimental group.

	Controls			Experimental group			Controls	Experimental group	
	T0	T1	p	T0	T1	p	Delta T1-T0	Delta T1-T0	p
PDQ-39 Index Score	41.6 ± 22.9	42.8 ± 22.9	0.23	43.6 ± 21.4	35.3 ± 22.1	<0.0001	1.2 ± 9.9	-8.3 ± 18.0	<0.0001
Mobility	13.3 ± 10.7	13.4 ± 10.4	0.54	13.6 ± 9.3	11.5 ± 10.2	<0.0001	0.1 ± 4.8	-2.0 ± 7.6	0.0047
ADL	6.8 ± 5.5	6.7 ± 5.7	0.36	6.7 ± 5.0	5.6 ± 5.3	<0.0001	-0.1 ± 2.9	-1.2 ± 4.3	0.0160
Emotional Well-Being	6.5 ± 5.0	7.1 ± 4.7	0.10	7.0 ± 4.6	5.6 ± 4.7	<0.0001	0.6 ± 2.8	-1.4 ± 4.1	<0.0001
Stigma	4.6 ± 1.9	5.0 ± 2.4	0.80	4.5 ± 2.7	4.4 ± 2.4	0.8025	0.3 ± 2.2	-0.1 ± 2.7	0.71
Social support	2.0 ± 1.9	2.1 ± 2.0	0.60	2.0 ± 2.2	1.3 ± 2.0	<0.0001	0.1 ± 1.6	-0.7 ± 2.3	0.0093
Cognition	3.3 ± 2.4	3.4 ± 2.2	0.49	3.8 ± 2.9	2.5 ± 2.4	<0.0001	0.1 ± 1.4	-1.2 ± 2.5	<0.0001
Comunication	2.1 ± 2.4	2.0 ± 2.1	0.56	2.2 ± 2.2	1.4 ± 1.7	<0.0001	-0.1 ± 1.3	-0.8 ± 2.0	0.0015
Bodily discomfort	3.1 ± 2.6	3.2 ± 2.5	0.65	3.7 ± 2.7	2.9 ± 2.5	<0.0001	0.1 ± 1.5	-0.8 ± 2.4	0.0016

Table 3. PDQ-39 values of experimental group at enrolment and after four months (T2 versus T0).

Variable	T2	Delta T2-T0	p-value
PDQ-39 Index Score	38.8 ± 20.9	-4.8 ± 17.5	<0.0001
Mobility	13.3 ± 10.0	-0.2 ± 7.4	0.48
ADL	6.0 ± 5.2	-0.7 ± 4.3	0.012
Emotional Well-Being	5.7 ± 4.4	-1.3 ± 3.9	<0.0001
Stigma	4.6 ± 2.2	0.1 ± 2.7	0.21
Social support	1.5 ± 1.9	-0.5 ± 2.3	0.44
Cognition	2.9 ± 2.6	-0.9 ± 2.5	<0.0001
Communication	1.6 ± 1.9	-0.6 ± 2.1	0.0020
Bodily discomfort	3.2 ± 2.7	-0.5 ± 2.5	0.0093

Take home message

- Aerobic, goal-based, intensive treatment
- Appropriateness of instruments used
- Continuity of exercises
- Early start

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The Interplay between Cognitive and Motor Rehabilitation in PD

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