

Why Exercise is Essential in Early PD

1

Jennifer Tuccitto, MPT, GCS

Ms. Tuccitto received her Master's Degree in Physical Therapy from the College of St. Catherine in Minnesota in 2001 & received her Geriatric Clinical Specialist Certification in 2015. As a physical therapist, she has over 20 years of experience in treating a wide variety of clients with neurological diagnoses with a focus in Parkinson Disease. Ms. Tuccitto has been certified in LSVT BIG since 2009 and part of the LSVT BIG Training and Certification Faculty with LSVT Global since 2011. She now serves as the Director of Innovation and Communications for LSVT Global as well as the LSVT BIG Clinical Expert. She has assisted with the development of many LSVT BIG treatment tools & courses including the LSVT BIG Homework Helper videos, BIG for LIFE training, webinars & LSVT for LIFE. She has presented for the National Parkinson Foundation, the Minnesota Physical Therapy Association, Combined Sections for the American Physical Therapy Association and at the American Speech and Hearing Association on LSVT BIG & Parkinson Disease.



Disclosures: Ms. Tuccitto is an employee of and receives lecture honorarium from LSVT Global, Inc.

2

It is a "Stunning Time" to be in rehabilitation today

- Basic science evidence for the **value of exercise** in PD has been well established.
- Key principles of exercise that drive activity-dependent neuroplasticity have been identified (intensity, repetition, salience, complexity, timing matters)
- Demonstrated that exercise can improve brain functioning (neuroplasticity) and may slow symptom progression
- Exercise is Medicine!

Hirsch et al., 2016; Kleim & Jones, 2008; Zigmund et al., 2009

3

There is no cure but...

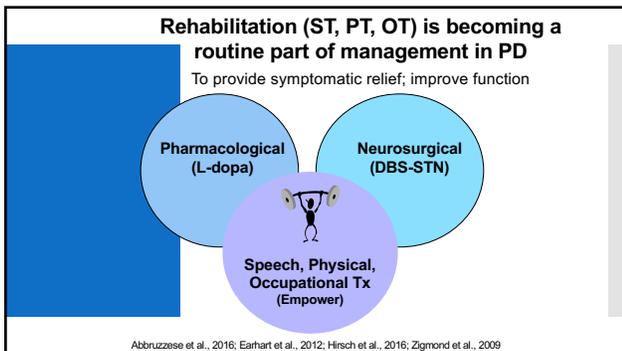
Despite new drugs and new and refined surgical approaches to treat PD...no pharmacological or surgical approach has been shown to cure PD or definitely modify disease progression. *Earhart and Falvo.*

The new avenue that has gained prominence :

THE ROLE OF EXERCISE IN DISEASE MANAGEMENT



4



5

Physical Therapy's Role in Parkinson Disease

- Evaluate and assess for the need for intervention
- Perform treatment in clinic/home/facility
- Create an individualized home and/or community exercise plan for long term success
- Be a partner on this journey, potentially see a patient multiple times per year as needed
- GOAL:** to maintain best possible functional ability throughout all stages of the diagnoses

6

Historical Treatment of Parkinson Disease

- Previously patients were referred later in their diagnoses
- Often referred when falls or loss of independence occurred
- Therapy focused on compensation techniques & assistive devices. Limited expectation of improvement.
- Infrequent visits in therapy: 1-2 times per week PT/OT
- Little emphasis on the importance of exercise
- Therapy typically consisted of prescription of home exercises & expectation patients will complete on their own
- Emphasis on external cuing systems

7

Current Treatment of Parkinson Disease

- Much earlier referral to therapy
- Therapist guided program for prevention of decline and restoration of function
- Tailor treatment to each individuals needs
- Greater emphasis on the importance of exercise
- Increased focus on new ways to support exercise adherence
- Emphasis on retraining internal cuing systems

People with PD NEED continuous monitoring and intervention over the course of their disease



8

Optimal Wellness Models

DENTAL MODEL

- See the Dentist
 - Restore and improve oral health
 - Preventative care
- Get regularly scheduled cleanings every 6-12 months
 - Brush and Floss Daily!

THERAPY MODEL

- See PT
 - Restore and improve physical function
 - Prevent functional decline
- Get regularly scheduled check ups every 6-12 months or sooner if needed
- Exercise Daily!

**** Need to maintain exercise between check ups with PT!!!!**

9

Exercise/Therapy Treatment

What is considered "Best Practice"

- Type of exercise
- Time of implementation
- Frequency & Duration
- Intensity
- Practicality
- Cost Effectiveness
- Environment
- Sustainability



10

Key principles that are important to optimize neuroplasticity have emerged

(Dobkin et al., 2004; Fisher et al., 2004; Fisher et al., 2008; Kleim & Jones, 2008; Kleim et al., 2003; Liepert, 2006; Petzinger et al., 2007)

Study neurobiological phenomenon related to functional recovery and to identify fundamental principles that may help to guide the optimization of rehabilitation.

Kleim & Jones, 2008

11

Principles of Neuroplasticity

- **Use it or Lose it** – inactivity is pro-degenerative
- **Use it & Improve it** – skilled training facilitates plasticity
- **Specificity** – task specific training: train to the deficit(s)
- **Repetition Matters** – the key to permanent change in brain and behavior
- **Intensity Matters** – push/challenge yourself! More reps, longer duration & frequency

Kleim JA, Jones TA. J Speech Lang Hear Res. 2008 Feb;51(1):S225-39.

12

Principle of Neuroplasticity

- **Time Matters** – better earlier, but can occur at any point
- **Salience Matters** – must be important to the patient
- **Age Matters**
- **Transference** – changes in one area can promote concurrent or subsequent changes elsewhere
- **Interference** – learning compensatory strategies first may lead to plasticity that needs to be overcome.

13

Salience Matters

Practicing rewarding tasks (success/emotionally salient) activates basal ganglia circuitry

- Incorporate tasks that are meaningful and salient to person to enhance motivation
- Link program to functional goals
- Practice doing things they enjoy
 - Incorporate hobbies and passions to achieve self-realization and improve participation
- Utilize task oriented, client centered treatment
- Helps to address depression and apathy



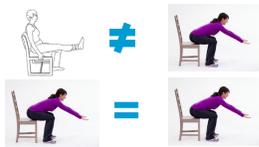
Family
Work
Hobby

14

Specificity Matters

- Train to the specific deficits of:
 - Hypokinesia
 - Bradykinesia
- Include specific functional task practice

**Example: Cycling does not necessarily carryover to improved bed mobility*



15

Does the Type of Exercise Matter?

- ✓ YES!
- Research is showing that exercise that is sustained and intense is important
- Skilled exercise vs Aerobic exercise
 - Best practice would be a combination of both

16

Does the way you deliver Physical Therapy (PT) matter?

- YES!
- Study by King & Horak
 - Compared Group Therapy, Individual Therapy & Home Exercise Prescription
 - Largest gains were from 1:1 PT intervention
 - Home exercise prescription was the least effective
 - Shows the need for supervised/guided exercise
 - 1:1 & group class were both delivered 3 times per week frequency

King, L et al. *Journal of Neurologic Phy. Therapy.* 2015, Oct.204-211

17

“Wimpy exercise programs”

The exercises prescribed by physical therapists, especially for older adults are sometimes too easy, using much lighter weights or fewer repetitions than you can handle. That’s a mistake, since to make gains you have to tax yourself, and the best way to do that is under the supervision of a trained physical therapist.

What to do instead? “The therapist should match the program to your abilities, and add weight, repetitions, or new exercises whenever the task gets too easy. If you think you can handle more, say so.”

www.consumerreports.com

18

Therapy/Exercise Timing

Early intervention is KEY!

There is 50-60% cell death at diagnoses, so newly diagnosed does not mean early in the disease process

Even subtle changes are significant and need to be addressed early on

But... it is NEVER too late to start exercising or begin therapy!!

19

Early, Intensive Exercise

- 40 newly diagnosed people with PD followed for 2 years:
 - Group 1 – Medication (Rasagiline) + intensive exercise
 - two 28-day multidisciplinary intensive rehabilitation treatments (at 1-year intervals)
 - Group 2 – Medication (Rasagiline) only
- Assessed at baseline, 6 months, 1 year, 18 months & 2 years
 - UPDRS, 6MWT, TUG, PD Disability Scale (PDDS) & the need for more meds
- Results:
 - Medication + exercise group improved in all measures and needed less meds/no increase in meds over the 2 years
 - Medication only group did not improve on the measures & they needed increased meds over the 2 years

Frazzitta G, et al. Neurorehabil Neural Repair. 2014 Jul 18.

20

High intensity defined

HIGH INTENSITY TRAINING

Vigorous Exercise:
 "aerobic physical activity sufficient to increase heart rate and the need for oxygen...cardiovascular fitness..."

- Sustained for at least 20-30 minutes
- Ongoing
- Intensity also relates to motor difficulty

Ahlskog JE. Neurology. 2011 Jul 13;77(3):288-94.

21

Work Hard!

15 subjects – Moderate Stage Parkinson Disease

- 16 weeks of high-intensity resistance training with interval training
- Simultaneously challenge strength, power, endurance, balance and mobility function – 40 minute sessions
- 3 sets of 8-12 reps of a variety of strength training exercises (leg or overhead presses) with a 1 min interval between sets for high-repetition, bodyweight exercises, such as lunges or pushups
- Kept HR high throughout program
- Improved total body strength, leg power, SLS, STS, 6MWT, PDQ-39, UPDRS and fatigue severity

J Appl Physiol (1985). 2014 Mar 1;116(5):982-92

22

Examples of Evidence-based Physical Therapy for PD

Cued Training Visual, auditory, somatosensory	Gait Training	Balance Training
Functional Task Training	Hydrotherapy	Multi-modal Training • Multi-disciplinary Intensive Rehab (MIRT) • LSVT BIG • Agility Boot Camp

Lehman et al., 2005; Nieuwboer et al., 2007; Mak et al., 2017; Perry et al., 2019; Pinto et al., 2019; Frazzitta et al., 2015; Ebersbach et al., 2010; King et al., 2015

23

LSVT BIG®

24

LSVT BIG

- Evidence-based treatment protocol for treatment of Parkinson Disease and other disorders
- LSVT BIG: Physical and/or Occupational Therapy treatment for increasing amplitude of movement.
- Therapists must be certified in providing this treatment
- Each is delivered by LSVT Certified Therapists in 1-hour sessions, 4x/week for 4 weeks
- Focus on retraining the motor-sensory disconnect
 - Perform large amplitude exercises with intensity & repetition
 - Perform large amplitude functional movements & gait
 - Work toward goals that incorporate big, quality movements into functional tasks
 - Retraining the internal cuing system!

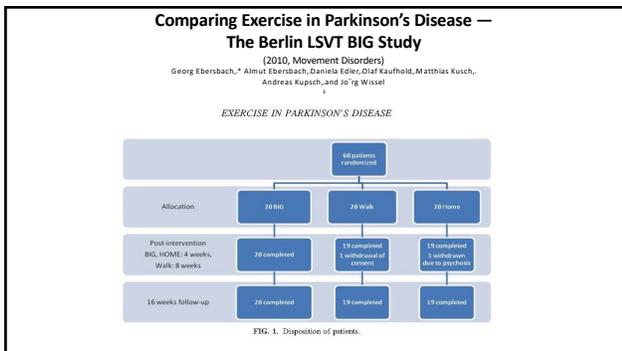


25

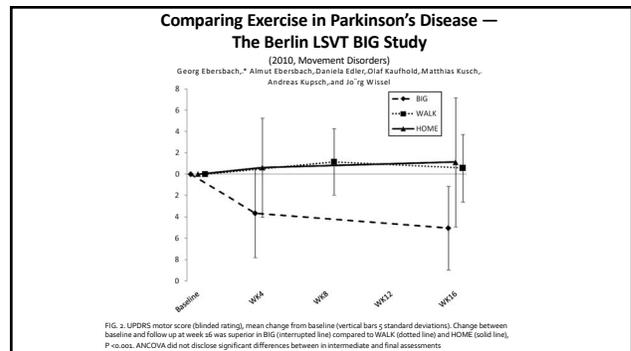
Standardized, yet Individualized

- Adapted to specific abilities, goals, comorbidities and needs of patients at all stages
 - People with early PD require CHALLENGE
 - People with advanced PD require adaptations
 - Treatment MUST BE salient to each individual
- Even people with advanced PD can handle and NEED intensity and frequency of training!
- Standardization supports treatment fidelity

26



27



28

BIG for LIFE® Classes

- Post graduate class for people that have previously completed the LSVT BIG treatment with therapists
- Typically, a 1-hour class completed 1-2 days per week
- Led by BIG for LIFE trained therapists
- Cash based classes
- Group practice opportunity to practice with other people living with PD

To find LSVT BIG® Certified Therapists or a BIG for LIFE® Instructor near you, visit: www.lsvtglobal.com & click on "Find LSVT Clinicians"

29

Evidence Based Exercise Options

(Therapy & Community Based Options)

Tai Chi	Aerobic Training
Boxing	• Treadmill Training
Yoga	• Biking
Dancing	Community classes
Nordic Walking	Agility programs



Schenkman et al., 2018; Studer et al., 2017; Ridgel et al., 2015; Corcos et al., 2013; Duncan et al., 2012; Combs et al., 2013; Liu et al., 2019; Bombieri et al., 2017

30

American College of Sports Medicine Guidelines

- For adults > 50 years old
- **All** adults need **aerobic, strengthening, balance, and flexibility** training
 - Aerobic at least 150 minutes to 300 minutes per week at moderate intensity or 75 to 150 minutes per week at vigorous intensity
 - **2** days/week strengthening major muscles groups at moderate or greater intensity
 - **2** days/week flexibility exercises
 - Balance training for those at risk of falls

https://health.gov/opa/guidelines/second-edition/pdf/Physical_Activity_Guidelines_2nd_edition.pdf

31

Boxing

2013 study comparing Group Boxing to a Traditional Exercise Group

- Traditional group = stretching, resistance, aerobic, & balance exercise
 - 24-36 sessions, 90 min, 12 weeks
- Both improved with Berg, TUG, Dual-task TUG, & QOL
- Only Boxing improved with velocity and 6MWT
- Traditional improved in ABC (perception of their balance)

Combs, SA et al. *NeuroRehabilitation*. 2013;32(1):117-24



32

Dance

Dance for PD®

- Collaboration between the Mark Morris Dance Group and the Brooklyn Parkinson Group
- They have dance classes in more than 75 other communities around the world
- They provide teacher training

www.danceforparkinsons.org



2014 study:

- Argentinian Tango compared to no exercise
- 1 hr class, 2x/week for 2 years (10 participants)
- Improvements in motor and non-motor symptoms, ADL's and Balance

Duncan & Earhart. *J Altern Complement Med*. 2014 Oct;20(10):757-63. doi: 10.1089/acem.2013.0714. Epub 2014 Sep 5

33

Nordic Walking

2008 study that looked at the benefits of Nordic Walking Program was 6 weeks of Nordic Walking Found improved postural stability, stride length, gait pattern & variability Improved 10 meter walk, 6MWT, TUG & Quality of Life Rating (PDQ-39)



Tai Chi

2012 Study of 195 patients Compared Tai chi, resistance training & stretching Tai Chi showed more improvement in all areas tested than the other treatments Showed reduced balance impairment & falls in people with idiopathic PD



Van Etjkeren FJ, et al. *Mov Disord*. 2008 Nov 15;23(15):2 Li F et al. *N Engl J Med* 2012; 366:511-519.

34



Aerobic Exercise

Literature shows improvements are possible in:

- improved walking economy
- aerobic capacity
- 6-minute walk times
- BORG (perceived exertion)

Walk (inside, outside, treadmill), pool, recumbent bike, elliptical, dancing, chair aerobics...get creative & get that HR up!
Find something that you enjoy

We often will self select a lower intensity of exercise. Increase the intensity of your exercise program!!

35

Aerobic Equipment

- Stationary bike
- Stationary rowing
- Treadmill
- Elliptical

The Body:

- Dancing
- Gardening
- Swimming
- Chair aerobics
- Pole walking



36

Community Based Exercise Classes

Connect with local fitness facilities for ongoing exercise



37

Take Home Messages

- Start exercise as soon as possible! However, it is never too late.
- Increase the intensity of the exercise you are already doing or choose to start
- Find a therapist to guide you in appropriate exercise options
- Focus on large amplitude movements in whatever exercise you choose to do
- Make exercise a priority in your life
- Look for (or create) programs for continued exercise options once therapy ends

38

Thank you!

Questions?

info@lsvtglobal.com



39