


# Implementing High Intensity Exercise in Parkinson's Disease

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## OUR MISSION

Our mission is to lead the world in transforming lives to create a healthy future for all individuals and communities through premier educational programs, innovative research and extraordinary patient care.

## OUR VALUES

reflect **who we are** and **why we're here**.

ITEACH

 <b>Innovation</b> <small>Search for a better way. Seek and implement ideas and approaches that can change the way the world discovers, teaches and heals. Drive transformational change.</small>	 <b>Teamwork</b> <small>Respect diversity and one another. Communicate effectively and listen well. Be approachable and courteous. There is no limit to what we can achieve when we work together.</small>	 <b>Excellence</b> <small>Strive for the highest standards of safety and quality in all that you do. Work to achieve exceptional results.</small>	 <b>Accountability</b> <small>Commit. Take ownership. Be resilient, transparent and honest. Always do the right thing and continuously learn.</small>	 <b>Courage</b> <small>Make the tough decisions. Have no fear of failure in the pursuit of excellence. Admit mistakes and learn from them.</small>	 <b>Healing</b> <small>Show the empathy you feel. Be softness in caring for patients, one another and the community.</small>
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## OUR DOMAINS

reflect our **priorities** and **areas of focus**.



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## Why is exercise so important for managing Parkinson's disease?

"High-intensity exercise induces brain-protective effects that have the potential to not just slow down, but possibly reverse, the neurodegeneration associated with Parkinson's disease, a new pilot study suggests."

(Yale School of Medicine, 2023)

"The medications we have available are only for symptomatic treatment. They do not change the disease course. But exercise seems to go one step beyond and protect the brain at the neuronal level."

(Sule Tinaz, MD, PhD via Yale School of Medicine, 2023)

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## Symptoms of PD that are managed with exercise

**Everything!** The only current treatment that manages all symptoms.

### Motor Symptoms

- Gait
- Balance
- Tremor
- Rigidity
- Bradykinesia
- Dysmetria

Carvalho et al, 2015 (Brazil): After 12 weeks, strength training groups improved by 27.5% and aerobic training groups improved by 35% on the motor section of the UPDRS.

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## Symptoms of PD that are managed with exercise

### Non-motor Symptoms

**Depression and anxiety:** A meta-analysis showed physical activity had both moderate and significant influences on depression for people with Parkinson's

**Sleep:** Compared to traditional sleep hygiene interventions, exercise demonstrated significant improvement in sleep measures compared.

**Fatigue:** Reduced fatigue noted overall but more information on the frequency of exercise to see the best results is needed.

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## High Intensity is Key

- Exercise is **key** for healthy lifestyle regardless of diagnosis.
- People with mild to moderate PD demonstrate improvement in motor function tests with exercise programs.
- Current research, although limited, indicates that **intense exercise** may be most beneficial.
  - Pre-post DAT scan availability significantly increased in the substantia nigra and putamen after 6 months of intense exercise protocols.
  - Motor function tests that demonstrated improvement include 5 times sit to stand, 360-degree turn, 2-minute walk test.
  - During this time there was no change in daily levodopa use.
  - Exercise included PWR! Moves, boxing, strength training, and aerobic training.
  - Target heart rate was defined as 80% of the maximum.
  - 90% of classes were reported as intense by the subjects.

Bart de Laat et al

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## How to implement high intensity in therapy sessions

Sustained activity versus HIIT

Heartrate:

Vigorous Physical Activity defined as 70-85% of HR max

Max Heartrate =  $220 - \text{age}$

Calculate the 70-85% range for each patient

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## How to implement in therapy sessions

RPE SCALE	RATE OF PERCEIVED EXERTION
<b>10</b> /	<b>MAX EFFORT ACTIVITY</b> Feels almost impossible to keep going. Completely out of breath, unable to talk. Cannot maintain for more than a very short time
<b>9</b> /	<b>VERY HARD ACTIVITY</b> Very difficult to maintain exercise intensity. Can barely breathe and speak only a few words
<b>7-8</b> /	<b>VIGOROUS ACTIVITY</b> Borderline uncomfortable. Short of breath, can speak a sentence
<b>4-6</b> /	<b>MODERATE ACTIVITY</b> Breathing heavily, can hold a short conversation. Still somewhat comfortable, but becoming noticeably more challenging
<b>2-3</b> /	<b>LIGHT ACTIVITY</b> Feels like you can maintain for hours. Easy to breathe and carry a conversation
<b>1</b> /	<b>VERY LIGHT ACTIVITY</b> Hardly any exertion, but more than sleeping, watching TV, etc.

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## Strength Training:

### Complex exercises:

- Cross-body movements
  - PNF patterns
- Reciprocal movements
  - Weights
- Therapy ball
  - Seated exercises
  - Core exercises
- Combined arm and leg movements



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## Boxing:

- Increase intensity and/or speed
- Sequence of hits
- Cognitive challenge
- PWR! Moves



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## Gait training:

- Treadmill
  - Add incline, increase speed, change direction
- Agility ladder
  - Coordination of stepping sequence, cognitive task, increase speed
- Reciprocal movement patterns
  - Boomwhackers
  - Training mitts
- Resisted walking
  - Theraband
  - Multi-directional

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## PWR! Moves

- Endurance based
- Targets
- Weights
- Surface changes
- Flow and changing sequence
- Oculomotor tasks simultaneously
- Combinations with recall, sequencing, and PWR! Moves
  
- Multi-system approach

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## Example Video



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## Resources

Tian, J.; Kang, Y.; Liu, P.; Yu, H. Effect of Physical Activity on Depression in Patients with Parkinson's Disease: A Systematic Review and Meta-Analysis. *Int. J. Environ. Res. Public Health* **2022**, *19*, 6849. <https://doi.org/10.3390/ijerph19116849>

Amara AW, Wood KH, Joop A, Memon RA, Pilkington J, Tuggle SC, Reams J, Barrett MJ, Edwards DA, Weltman AL, Hurt CP, Cutter G, Bamman MM. Randomized, Controlled Trial of Exercise on Objective and Subjective Sleep in Parkinson's Disease. *Mov Disord.* 2020 Jun;35(6):947-958. doi: 10.1002/mds.28009. Epub 2020 Feb 24. PMID: 32092190; PMCID: PMC8826749.

Folkerts AK, Nielsen J, Gollan R, Lansu A, Solfronk D, Monsef I, Ernst M, Skoetz N, Zeuner KE, Kalbe E. Physical Exercise as a Potential Treatment for Fatigue in Parkinson's Disease? A Systematic Review and Meta-Analysis of Pharmacological and Non-Pharmacological Interventions. *J Parkinsons Dis.* 2023;13(5):659-679. doi: 10.3233/JPD-225116. PMID: 37334618; PMCID: PMC10473113.

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