

# The Role of Therapy in Early PD & Beyond

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## Objectives

- Identify early signs and symptoms of Parkinson's Disease.
- Describe the possible causes of PD including genetic and environmental factors.
- State the roles of physical and occupational therapy in PD.
- Explain motor and non-motor complications in PD.
- Discuss the surgical and non-surgical management options of advanced PD.
- State the importance and role of nutrition and diet in PD.
- Identify the role of speech therapy in PD.
- Recognize the ongoing research focusing on disease modification strategies in PD.

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## Exercise for Brain Change

- Exercise is a physiological tool that promotes brain health, repair, adaptation and behavior recovery from the inside
- Exercise addresses both motor & non-motor symptoms

(Hamer and Chida 2009; Thacker et al. 2006; Xu et al. 2010; Chen et al. 20005; Hale et al. 2008; Gray et al. 2009; Sasco et al 1992; Reuter et al 2011; Ebersbach et al 2010; Goodwin et al. 2008; Cruise et al. 2011)



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**GET BETTER and STAY BETTER with EXERCISE**

**Amplitude + Progressive Aerobic Training = Optimal Functional** (essential for optimal brain change)

→ Using large amplitude movement at high intensity to increase dopamine output and counteract Parkinson's symptoms of bradykinesia, rigidity & tremor

(Alberts et al 2011; Ridgel et al 2009; Kurtais et al 2008; Pothakos et al. 2009)

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## Exercise is Medicine



- Early intervention is **KEY!**
  - Disease-modifying interventions are time dependent
- Most benefit from neuroplasticity-based, Parkinson's specific rehab
  - LSVT BIG
  - Parkinson's Wellness Recovery (PWR!)
  - Rock Steady Boxing (non-combative boxing)
- Interdisciplinary care is the most beneficial
  - Each discipline has a different approach
  - All areas of deficit will be addressed

(Archer et al 1998; Dibble et al 2006; Ebersbach 2010; Farley 2008; )

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## Goals of Therapy Throughout the Stages

- Pre-Parkinson's/Newly Diagnosed: **NEUROPROTECTIVE**
- Early-Moderate Stages: **NEUROREPAIR/RESTORATIVE**
  - ~40% loss of dopaminergic cells on diagnosis
  - Neuroplasticity
- Advanced Stages: **ADAPTATION**

(Graybiel AM; Keus et al 2007; Morris ME 2000; Petzinger et al 2010)

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## Early Stage Interventions

Physical Therapy	Occupational Therapy
<ul style="list-style-type: none"> <li>● <b>PD Specific Exercise Education:</b> <ul style="list-style-type: none"> <li>○ Exercise is medicine</li> <li>○ High intensity-large amplitude</li> <li>○ Home program &amp; community</li> </ul> </li> <li>● <b>Gait and Balance Training:</b> <ul style="list-style-type: none"> <li>○ Exaggerated step height &amp; length</li> <li>○ Reciprocal arm swing</li> <li>○ Challenge</li> </ul> </li> <li>● <b>Strength Training:</b> <ul style="list-style-type: none"> <li>○ Upper &amp; Lower Extremity</li> <li>○ Core Stabilization</li> </ul> </li> <li>● <b>Cardiovascular:</b> <ul style="list-style-type: none"> <li>○ Neuro Priming</li> <li>○ Physical Activity Regimen</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● <b>PD Specific Exercise Education:</b> <ul style="list-style-type: none"> <li>○ Emphasis of each exercise</li> <li>○ Functional benefits</li> <li>○ Establish routine</li> </ul> </li> <li>● <b>Gait and Balance Training:</b> <ul style="list-style-type: none"> <li>○ Reinforce PT concepts (big steps, reciprocal arm swing)</li> <li>○ Reinforce stop/reset</li> </ul> </li> <li>● <b>Strength Training:</b> <ul style="list-style-type: none"> <li>○ Establish gross and fine grip HEP</li> </ul> </li> <li>● <b>Cardiovascular:</b> <ul style="list-style-type: none"> <li>○ Educate on benefits, options, community based programs</li> <li>○ High intensity treatment sessions</li> </ul> </li> </ul>

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## Early Stage Interventions

Physical Therapy	Occupational Therapy
<ul style="list-style-type: none"> <li>● <b>Fine motor training:</b> <ul style="list-style-type: none"> <li>○ Finger flicks &amp; extension with exercises</li> </ul> </li> <li>● <b>ADL Training:</b> <ul style="list-style-type: none"> <li>○ Mindfulness of movement</li> <li>○ Sit to stand</li> <li>○ Management of rigidity</li> </ul> </li> <li>● <b>Work Task Training:</b> <ul style="list-style-type: none"> <li>○ Techniques for rigidity and tremor</li> <li>○ Techniques to address fatigue/endurance</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● <b>Fine motor training:</b> <ul style="list-style-type: none"> <li>○ Establish coordination HEP</li> <li>○ Education on continued use</li> </ul> </li> <li>● <b>ADL Training:</b> <ul style="list-style-type: none"> <li>○ PWR! Prep</li> <li>○ Big effort for small task concept</li> <li>○ Pre and Post Timing Sessions</li> </ul> </li> <li>● <b>Work Task Training:</b> <ul style="list-style-type: none"> <li>○ Tremor management techniques</li> <li>○ Rigidity management</li> </ul> </li> </ul>

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## Middle Stage Interventions

### Physical Therapy

- **PD Specific Exercise Education:**
  - Community based or supervised for safety & cues
- **Gait and Balance Training:**
  - Fall recovery
  - Home safety/fall prevention
  - Assistive devices as needed
- **Strength Training:**
  - Functional strength training
  - Cognitive dual task
- **Cardiovascular:**
  - Endurance training
  - Pacing

### Occupational Therapy

- **PD Specific Exercise Education:**
  - Modifications to HEP
  - Proprioceptive work
- **Gait and Balance Training:**
  - Vision
  - Blood pressure fluctuations
- **Strength Training:**
  - Gross grasp discrepancy
  - Proximal strength during ADLs/Work
- **Cardiovascular:**
  - RPE or Effort Level
  - High intensity with pacing

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## Middle Stage Interventions

### Physical Therapy

- **Fine Motor:**
  - Weighted pens or utensils
  - Adaptive tools
- **ADL Training:**
  - Bed mobility
  - Sit to stand
  - Car transfers
  - Tools or modifications
- **Work Task Training:**
  - Work modifications
  - Techniques to address dystonia & dyskinesia
- **Range of motion:**
  - Passive range of motion, stretching, & soft tissue mobilization to address rigidity

### Occupational Therapy

- **Fine motor training:**
  - 9-Hole weighted trials
- **ADL Training:**
  - Driving
  - Home modifications
  - Sleep hygiene
  - Adaptive device trials
- **Work Task Training:**
  - Workstation ergonomics
  - Adaptive devices
  - Work simplification for cognition
- **Range of Motion:**
  - Home program for specific joints
  - Daily routine planning

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## Late Stage Interventions

Physical Therapy	Occupational Therapy
<ul style="list-style-type: none"> <li>● <b>PD Specific Exercise Education:</b> <ul style="list-style-type: none"> <li>○ Assisted exercise</li> <li>○ Function</li> <li>○ Energy conservation vs. exercise</li> </ul> </li> <li>● <b>Gait and Balance Training:</b> <ul style="list-style-type: none"> <li>○ Assistive devices/wheelchair</li> <li>○ Seated &amp; standing balance</li> </ul> </li> <li>● <b>Strength Training:</b> <ul style="list-style-type: none"> <li>○ Focus on range of motion</li> </ul> </li> <li>● <b>Cardiovascular:</b> <ul style="list-style-type: none"> <li>○ Breathing</li> </ul> </li> <li>● <b>Fine motor training:</b> <ul style="list-style-type: none"> <li>○ Adaptations</li> </ul> </li> <li>● <b>ADL Training:</b> <ul style="list-style-type: none"> <li>○ Assisted/caregiver training</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● <b>PD Specific Exercise Education:</b> <ul style="list-style-type: none"> <li>○ PNF with extension emphasis</li> <li>○ Less pacing and more range</li> </ul> </li> <li>● <b>Gait and Balance Training:</b> <ul style="list-style-type: none"> <li>○ Wheelchair Assessment</li> </ul> </li> <li>● <b>Strength Training:</b> <ul style="list-style-type: none"> <li>○ Range of Motion</li> <li>○ Splinting and Botox</li> </ul> </li> <li>● <b>Cardiovascular:</b> <ul style="list-style-type: none"> <li>○ Breath support during mobility</li> </ul> </li> <li>● <b>Fine motor training:</b> <ul style="list-style-type: none"> <li>○ High value activities</li> </ul> </li> <li>● <b>ADL Training:</b> <ul style="list-style-type: none"> <li>○ Compensatory strategies</li> <li>○ Caregiver training and body mechanics</li> </ul> </li> </ul>

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## Late Stage Interventions

Physical Therapy	Occupational Therapy
<ul style="list-style-type: none"> <li>● <b>Cognitive:</b> <ul style="list-style-type: none"> <li>○ Sequencing</li> <li>○ Attention to task</li> </ul> </li> <li>● <b>Caregiver Training:</b> <ul style="list-style-type: none"> <li>○ ADL sequencing &amp; cues</li> <li>○ Review of pathology</li> </ul> </li> <li>● <b>Placement:</b> <ul style="list-style-type: none"> <li>○ Home vs. AL vs. SNF</li> </ul> </li> <li>● <b>Emotional:</b> <ul style="list-style-type: none"> <li>○ Therapy</li> <li>○ Medication</li> <li>○ Patient &amp; caregiver</li> </ul> </li> <li>● <b>Psychological:</b> <ul style="list-style-type: none"> <li>○ Hallucinations</li> </ul> </li> <li>● <b>Energy Conservation:</b> <ul style="list-style-type: none"> <li>○ Pacing &amp; moderation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● <b>Cognitive:</b> <ul style="list-style-type: none"> <li>○ Routine for orientation</li> <li>○ One step commands</li> <li>○ Repetitive task training</li> </ul> </li> <li>● <b>Caregiver Training:</b> <ul style="list-style-type: none"> <li>○ Command familiarity</li> <li>○ Body mechanics</li> <li>○ Cues</li> </ul> </li> <li>● <b>Placement:</b> <ul style="list-style-type: none"> <li>○ Advanced planning</li> </ul> </li> <li>● <b>Emotional:</b> <ul style="list-style-type: none"> <li>○ Support groups</li> <li>○ Counseling</li> </ul> </li> <li>● <b>Psychological:</b> <ul style="list-style-type: none"> <li>○ Depression</li> <li>○ Sleep disturbances</li> </ul> </li> <li>● <b>Energy Conservation:</b> <ul style="list-style-type: none"> <li>○ Energy budget</li> </ul> </li> </ul>

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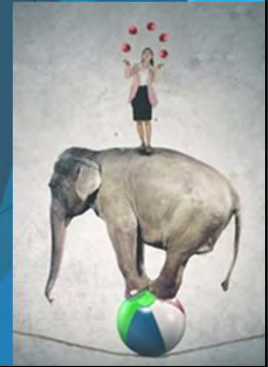
## Dual Tasking Throughout Stages of Intervention

### Cognitive + Motor

- Counting
- Multi-step commands
- Task sequencing
- Stroop
- Recall
- Problem solving
- Naming with/without categories

### Motor + Motor

- Finger extension
- Simultaneous upper & lower extremity movements
- Bilateral upper or lower extremity movements
- Ocular motilities
- Gross & fine motor combined or alternating



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## Cues for people with Parkinson's Disease

- People with PD lack internal cues for movement and mobility
- External cues for improved quality of movement
  - Visual
    - Mirroring
    - Target
  - Verbal
  - Auditory
    - Pacing
- Help patients develop intrinsic cues needed to succeed in any environment
- Extrinsic cues may be needed for safety and success



(Nieuwboer et al. 2007; Mak MK, Hui-Chan CW 2007)

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## Referral Sources Beneficial for People with Parkinson's

- Pelvic Floor Therapy
  - Bowel/bladder dysfunction
- Aquatic Therapy
  - Balance/gait training in a safe environment
  - Improved tolerance to strength training
- Vestibular Therapy
- Ophthalmology
- Counseling, psychology, and psychiatry
- Speech therapy
- Massage



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## Case Study: TJ

### Background

- Diagnosed with PD in 2014
- Started physical therapy on 04/25/2016
- Has attended 273 PT visits
- Seeing PT/OT/ST at different clinics
- Discogenic left-sided low back pain and left lower extremity radicular symptoms

### Referral to other disciplines:

- Dietary
- Speech
- Ophthalmologist
- Cardio update with primary
- Psychology

### Treatment progression

- Early:
  - See Videos
- Moderate:
  - Currently in this stage
  - Complains of leg weakness & stiffness in the AM; increased time getting up and ready
  - Cardiovascular dysfunction vs medication dose
    - Feeling more tired/fatigued
  - Reports increased mental fog
  - Occasional hallucinations
  - See Videos
- Anticipated Late:
  - Home set-up or placement
  - Family/caregiver assistance
  - Changes in physical activity regimen
  - Energy conservation
    - Exercise vs function/ADL

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