Parkinson's Disease and the Road Ahead: Addressing Challenges and Solutions to Driving

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MEDICINE & HEALTH SCIENCES

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Objectives

- Identify challenges that individuals with Parkinson's Disease (PD) may face with driving.
- Explore early interventions in driving rehabilitation including assessments, adaptive strategies and techniques to enhance driving independence.
- Discuss approaching the topic of driving with individuals with PD.
- Examine a case study to highlight practical insights and real world-applications.

The Speakers

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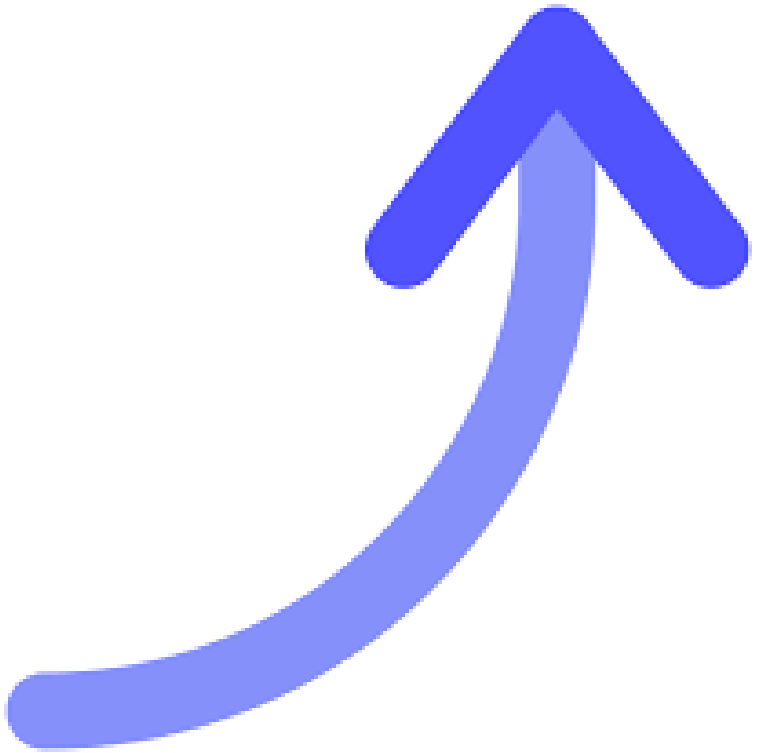
Importance of Driving

- Driving provides independence, participation and engagement in life activities.
- Occupational Therapy classifies driving as an instrumental activity of daily living (IADL) and is within the scope of practice to address.
- A survey of individuals with PD and views of driving ability and impact of changes:
  - Employment
  - Socialization
  - Transport costs
  - Ability to make spontaneous lifestyle choices

AOTA, 2016; Brock et. al., 2022

Projections for Prevalence of Parkinson's Disease



- According to the Global Burden of Disease Study in 2021, PD has the fastest growing prevalence and disability of neurological diseases.
- From 2021 to 2050, global number of PD cases is projected to increase by 112%, reaching 25.2 million in 2050.

Classen et. al., 2011; Su et. al., 2025

PD & Driving

Includes motor, non-motor and cognitive systems that can impact safe driving abilities and independence with mobility and community living.

Driving is a complex activity requiring visual, motor and cognitive abilities.

Driver is required to process information quickly.

How Can PD Affect Driving?

Ways That PD Impacts Driving

- Motor: motor planning, posture, range of motion
- Vision: dry eye, double vision, visual movement skills
- Cognition: concentration, memory, multi-tasking
- Medication Side Effects: Dyskinesia, on/off times, fatigue

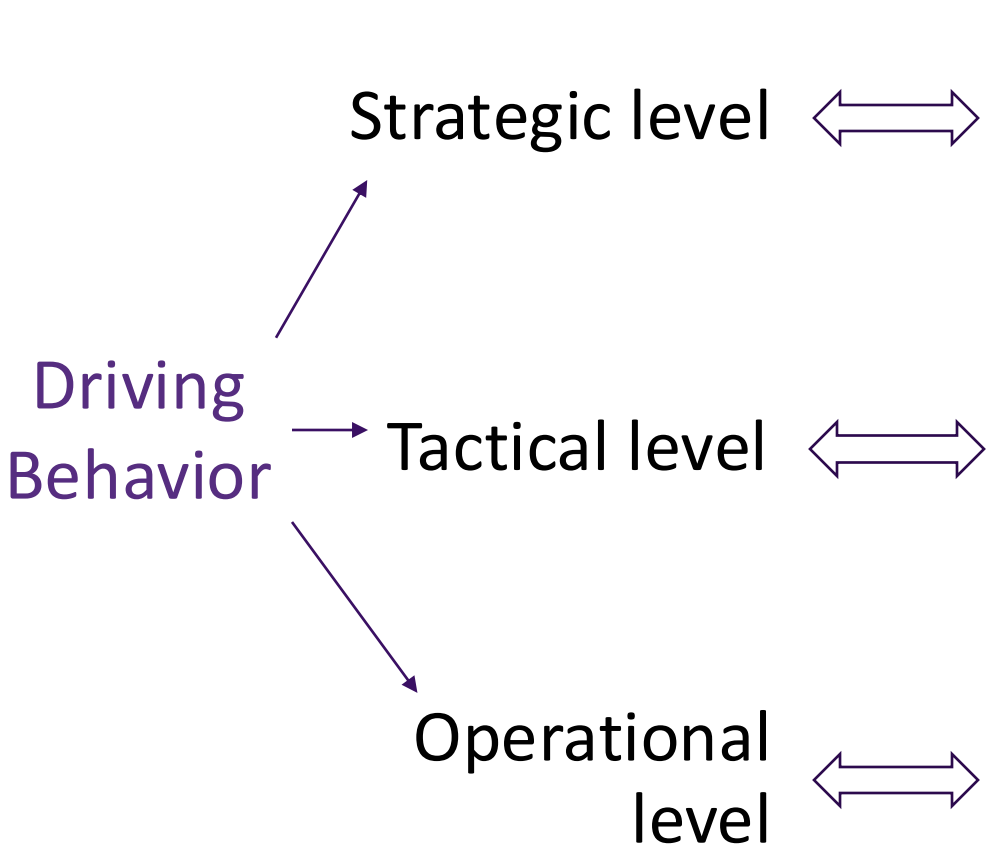
Side Effects From Medication

Driving Performance

- Study reported decreased driving performances in PD patients compared to healthy controls with use of driving simulators and real on-road situations.
- Always evaluated when on medication and feeling well.
- Those with PD commit more at-fault safety errors in the categories of:
  - Lane observance
  - Stop signs
  - Urban conditions
  - Intersections/roundabouts
  - Hesitation before turns
  - Do not accelerate to proper speed
  - Lapse of concentration
  - Decrease awareness of how driving affects others
  - Driving slower and with higher speed variability during distraction

Ranchet et. al., 2012; Vardaki et. al., 2016

Michon's Model and Cognitive Functions Involved in Driving



- High-level executive skills
- Planning, organizing, complex reasoning

- High-level executive skills: working memory, planning, set-shifting
- Lower order cognitive skills: information processing speed

- Information processing speed
- Visuoperceptual skills

Ranchet et.al., 2012

Cognitive Impairments

- Most frequent reported cognitive impairments
  - Attention/executive functions
  - Visuospatial abilities
  - Psychomotor speed and memory
- Symptoms can appear at very early stages of PD
- All cognitive functions required for driving

Ranchet et. al., 2012

Driving Performance

PD is a slow progressive disease making it difficult to determine when individuals may become unsafe drivers.

Physicians' ability to determine driving ability is limited to short observations in a clinical setting.

There is a need for efficient screening that have good predictive validity of passing or failing on-road driving.

Classen et. al., 2011

Driving Assessments

Driving Evaluation

- The driver evaluation should include assessments of:
  - Vision and perception
  - Cognition including cognitive processing speed
  - Range of motion
  - Reaction time
  - Ability to transfer into the vehicle
  - Ability to don/doff seatbelt and adequately set up the vehicle for driving
  - Performance behind the wheel
    - Parking
    - Lane management
    - Perception to potential hazards

Research on Clinical Assessments for Evaluation

- Trail Making Test, Symbol Digit Modalities Test, Useful Field of View and Block Design test are good predictors of driving and have a strong correlation with driving performance with PD.
- Trail Making Test has consistently shown in research to be the best independent predictor of safety errors during distraction.
- This tool is useful for clinicians to predict driving performance.
- Disease duration has not been shown to be as reliable to predict driving performance.

Classen et. al., 2011; Ranchet et. al., 2012

Research on Clinical Assessments for Evaluations

- Useful Field Of View Subtest 2 and Rapid Pace Walk correctly classified 81% of PD participants in a study for pass/fail outcomes.
- Cannot generalize this to all individuals with PD, provides guidance for clinical decision making.

Consensus Statements on Driving in People with PD

Literature suggests relationships between driving ability and motor and cognitive impairments in PD.

1. Those with mild motor disability as measured by the Unified Parkinson's Disease Rating Scale (UPDRS) motor section (Part 3) and no or few risk factors, may be fit to drive:
   - Those who fit this profile and are newly diagnosed recommended to:
     - Plan a baseline comprehensive driving evaluation by a driving rehabilitation specialist
     - Consider annual evaluations
     - Begin planning for driving cessation
     - Develop a plan for alternative transportation options and start conversations with family about ending driving

Classen, 2014

Consensus Statements on Driving in People with PD

2. Those with severe motor impairment and disease as classified with high UPDRS Part 3 scores and multiple risk factors recommendations include:

- Cessation of driving
- Reporting to licensing agency
- Address transportation

Consensus Statements on Driving in People with PD

3. Continued research for guidelines for the middle group or mild to moderate motor disability and few to several risk factors. These recommendations include:

- Strongly recommend comprehensive driving evaluation by driving rehab specialist to provide opportunities for rehab
- Provide strategies to transition to non-driving
- Develop a mobility plan for driving cessation

Automated Vehicle Technologies

- A randomized control trial looked at the impact of in-vehicle information systems (IVIS) and advanced-driver assistance systems (ADAS) and the number of on-road errors with individuals with PD.

- Fewer driver errors with use of IVIS and ADAS
  - Adaptive cruise control reduced speeding errors
  - Bradykinesia correlated with driving errors when systems deactivated
  - Memory impairments correlated with total number of driving errors when systems activated
  - Memory declines provide challenge with use of the technology

- https://mycardoeswhat.org/

Classen et. al., 2025

Driving Rehabilitation Steps

- Referral from physician
- Find a driving rehabilitation specialist
- Complete clinical assessments
  - On-Road Assessments
- Outcomes
  - Fit to drive
  - Fit to drive with modifications
  - Continued Interventions
  - Not fit to drive
- Repeat driving rehabilitation evaluation

Driving Rehabilitation Strategies

- Use of driving simulators to expose driving situations in dynamic and realistic conditions.
  - Aim to address impairments and provide compensatory strategies.
  - Study has shown improvements with on-road driving with use of simulator trainings.
- Individualized plans on compensatory strategies, trainings, vehicle modifications, restricted driving times etc.
- Collaboration with medical team

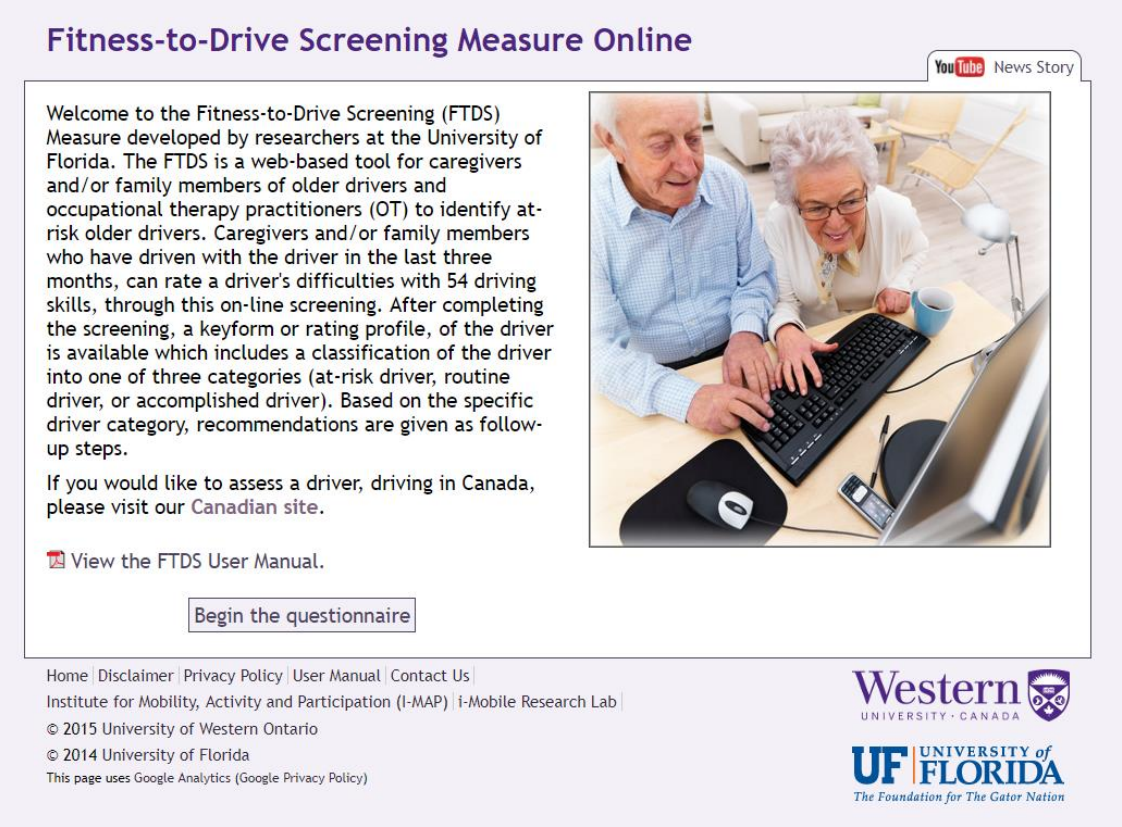
Ranchet, Devos & Uc, 2020

Approaching Driving Cessation

- Driving Transitions Education
- Licensing requirements in each state
- Alternative transportation options
- Gradual transitions
- “Buddy system”
- Keeping the vehicle for others to drive

Dickerson et. al., 2024

Fitness to Drive Screening Measure



https://ftds.phhp.ufl.edu/us/

AAA Driver Planning Agreement

https://exchange.aaa.com/wp-content/uploads/2021/03/Driver-Planning-Agreement.pdf

AAA and the American Occupational Therapy Association put together a sample Driver Planning Agreement to help your family plan for future changes in driving abilities before they develop.

DRIVER PLANNING AGREEMENT

Helping families plan *together* for continued, safe mobility

I realize that the natural aging process may, at some point in the future, affect my ability to drive safely. By taking the time now to work closely with my family, I can develop a plan to ensure my safety and the safety of others while also maintaining my mobility and independence.

The most important thing my family can do is to help me **explore all of my options** to keep me driving or mobile. If concerned about my driving abilities, help me access the appropriate resources or services that can potentially mitigate these concerns so that I may safely drive. Examples include, but are not limited to:

- Help me find an occupational therapist who is trained to address the problems that put me at risk behind the wheel and equipped to develop an individualized plan to use moving forward;
- Ensure that I am able to visit my primary care physician or local pharmacist to review how medications I take may affect my driving;
- Assist me in accessing an eye doctor or vision care specialist who can address my needs;
- Help me determine how I can appropriately self-regulate when and where I drive so that I maintain maximum comfort and safety behind the wheel; and
- Encourage me to take a driver-improvement course to refresh my skills and learn new techniques for adapting to my changing needs as an aging driver.

Additionally, I want my family help me **explore other forms of transportation**, showing me all of my choices, and recognizing that these options may complement my driving or be used as a substitute to extend my mobility should driving become unsafe. Examples include, but are not limited to:

- Discuss the places I enjoy going and the destinations I need to reach to ensure I maintain a high quality of life;
- Identify local public and private transportation options available in my community (e.g., carpooling, public transportation, local organizations with a volunteer driver program, or other services) so that I am aware of my options;
- Introduce me to these transportation options before I must rely on them so that I become familiar with them when I do choose to use them; and
- Recognize that I may need support and practice to feel safe using these other transportation options. It may take a few rides or the companionship of a friend to accompany me until I am comfortable. If necessary, we will make certain I have the necessary support services to ensure I can get home safely.

I trust my family to prioritize my safety and mobility and to not ask me to stop driving until all options have been explored.

Should it become necessary to discuss if it is safe or reasonable for me to continue driving,

I designate _____ to address this issue with me.
(name of family member or trusted friend)

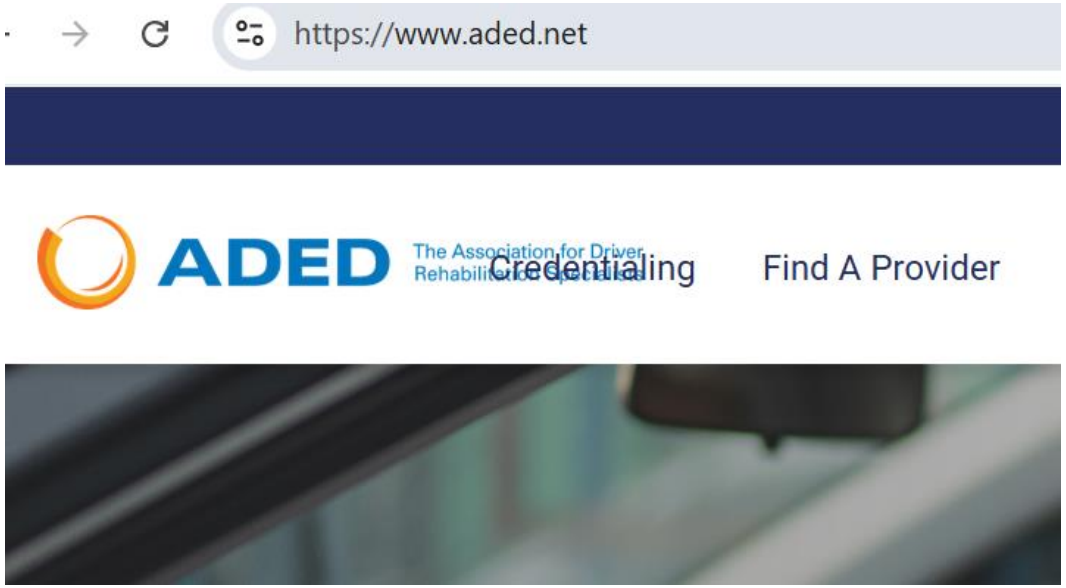
Signed: _____ Date: _____
(Your signature)

Signed: _____ Date: _____
(Family member)

Finding a Provider

Step 1: www.aded.net

Step 2: Find a provider



Step 3: Find ADED Members who Provide Services

Search for all **ADED members** that provide varying levels of driver rehabilitation services, including those with the CDRS® or DRP credential.

SEARCH HERE

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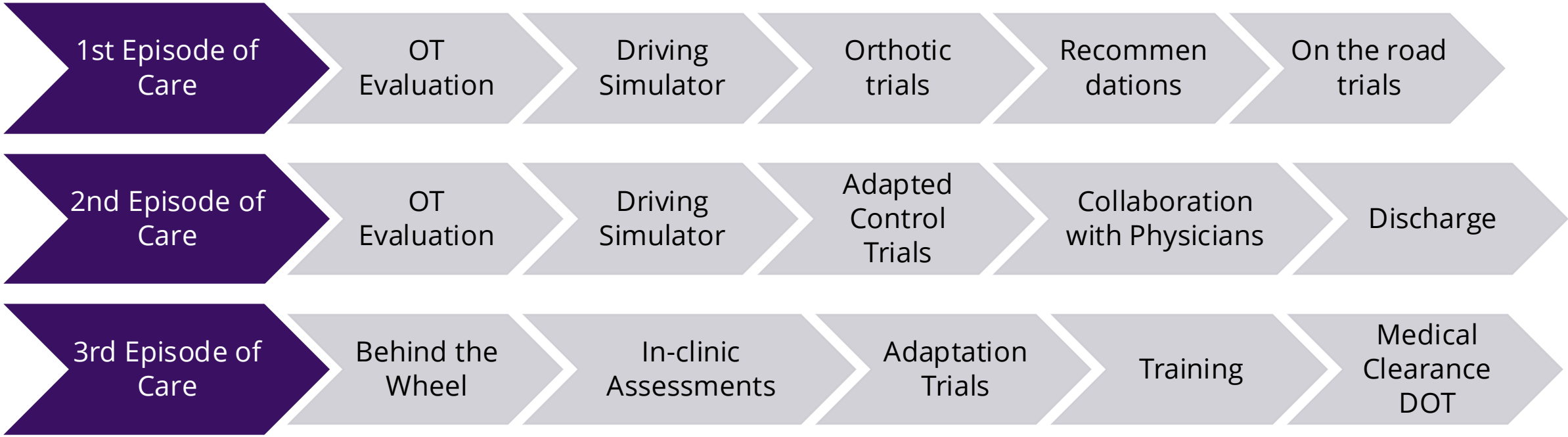
Case Study: Driving Rehabilitation Parkinson's Disease

- Name: Mark
- Demographics: 82 years old, Male, Caucasian
- Episodes of Care & Years: 1st- 2022 and 2nd- 2024
- Diagnosis:
  - Heart Disease, Peripheral Neuropathy (December,2022)
  - Parkinsonism, Idiopathic progressive neuropathy (December, 2025)

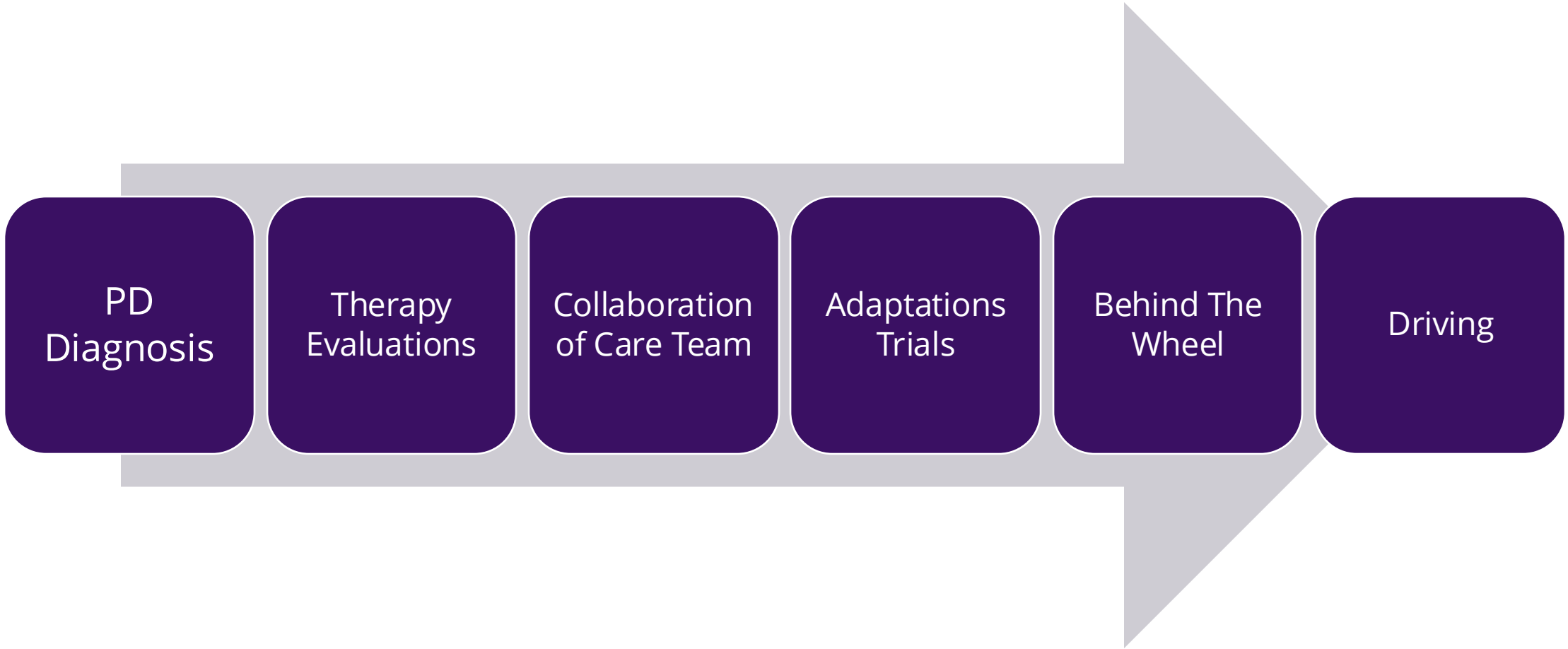
Mark's Driving Rehab Journey



What to Look For:

- Slower or varying driving speeds
- Hitting both accelerator/ brake simultaneously
- Slow reaction times
- Near misses and accidents
- Getting lost or confused
- Poor attention or fatigue

Progression of Driving Rehab with Parkinson's Disease



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Questions?

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