

Cognition and Parkinson's Disease

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What is Cognition?

- Cognition is a general term that refers to the mental abilities that we use to process information and apply knowledge
- These mental processes allow us to perform daily functions such as paying attention, solving problems, and remembering where items are and how to do certain tasks

Non- motor PD symptoms

- Non-motor symptoms in Parkinson's Disease are common and affect:
 - cognition
 - behavior
 - sleep
 - sensory functions

What is Neuropsychology?

- Neuropsychology studies the relationships between the brain and behavior
- Neuropsychologists conduct evaluations to characterize behavioral and cognitive changes resulting from central nervous system disease or injury, like Parkinson's disease or another neurological disorder

What is a Neuropsychological Evaluation?

- A neuropsychological evaluation is an assessment of how one's brain functions, which indirectly provides information about the structural and functional integrity of your brain
- The evaluation involves an interview and the administration of tests
- The tests are typically pencil and paper type or question and answer tests. Some tasks might be computer-based or self-reports measures

What is a Neuropsychological Evaluation?

- Neuropsychological tests are standardized, meaning that they are given in the same manner to all patients and scored in a similar manner time after time
- An individual's scores on tests are interpreted by comparing their score to that of healthy individuals of a similar demographic background (i.e., of similar age, education, gender, and/or ethnic background) and to expected levels of functioning
- In this way, a neuropsychologist can determine whether one's performance on any given task represents a deficit, strength or weakness
- Although individual scores are important, the neuropsychologist looks at all of the data from the evaluation to determine a pattern of cognitive strengths and weaknesses and, in turn, to understand more about how the brain is functioning

What is a Neuropsychological Evaluation?

- Neuropsychological tests evaluate functioning in a number of areas including: intelligence, executive functioning, attention, memory, language, visuospatial skills, mood, and personality
- A complete evaluation generally takes between two and five hours to complete, but can take up to eight hours, depending on the complexity of the issues to be addressed by the evaluation and the patient's condition
- Occasionally, it is necessary to complete the evaluation over two or more sessions

Cognition

- Cognitive Domains:
 - Attention and working memory
 - Processing Speed
 - Language
 - Visuospatial Skills
 - Learning and Memory
 - Executive Functioning

Attention and Working Memory:

- **Attention** is the ability to selectively focus on a particular aspect of one's environment, often while ignoring competing stimuli
- **Working memory** refers to the memory process of temporarily storing information in one's mind and manipulating it over a short period
 - Mental arithmetic is one example of working memory function

Processing speed and Language:

- **Processing speed** is a way of describing how the brain receives, understands and responds to information
- **Language** abilities include:
 - naming objects
 - generating words
 - comprehension
 - expression

Visuospatial Skills:

- Visuospatial functions tell us where things are around us in space, give us a spatial map of our environment, and involve our sense of direction
- These abilities allow us to estimate distance and depth perception, use mental imagery, copy drawings, or construct objects or shapes

Memory:

- In general memory involved being able to learn (encode) and remember (recall) information
- Memory, includes immediate memory (seconds-minutes), short-term memory (minutes-days), and long-term memory (days-years)
- **Declarative memory**- memory for facts, concepts, or events
- **Procedural memory**- memory for how to do certain tasks like tie our shoes or ride a bicycle as well as working memory
- **Working memory**- memory process of temporarily storing information in one's mind and manipulating it over a short period

Executive Functioning:

- Executive functioning includes the ability to plan, organize, initiate, and regulate goal directed behavior
- These activities may include multitasking, solving problems, starting new tasks, and switching tasks
- Think of the “CEO” of a company and the many tasks involved in directing the organization

Cognitive Impairment in Parkinson's Disease

- Cognitive impairment, may include a disturbance of memory, thinking and/or language abilities
- Cognitive Impairment is a non-motor symptom that can be associated with Parkinson's
- Cognitive disturbances can arise at any time in the course of Parkinson's disease and vary widely in severity
- Some people don't experience any problems; others have subtle changes only detectable on formal testing
- Still others have issues they describe as mild or somewhat annoying, and some will go through more significant changes that interfere with the ability to perform daily activities

Why Cognitive Changes Occur

- The exact causes of cognitive impairment and dementia in PD are not fully known but are likely due to a combination of chemical and structural changes
- In addition to dopamine, Parkinson's affects a number of brain chemicals that support cognition, attention and mood
- Parkinson's also causes loss of and/or changes in cells in areas of the brain that are responsible for these functions

What is Mild Cognitive Impairment?

- When cognitive problems are more than what is expected with normal aging but not enough to significantly interfere with daily activities, they may be due to mild cognitive impairment (MCI)
- Those with MCI may complain of feeling distracted or forgetful, or losing their train of thought in conversation
- Individuals in fast-paced jobs might find it more challenging to concentrate or manage multiple projects

MCI in Parkinson's Disease

- Studies estimate that MCI occurs in about 20-50% of patients with PD
- Mild cognitive changes may be present at the time of Parkinson's Disease diagnosis or early in the course of PD
- Cognitive changes may or may not be noticeable to the person and may or may not affect work or activities, depending on the demands of specific tasks and work situations

What is Dementia?

- Dementia refers to a syndrome in which patients
 - Have problems in more than one cognitive domain
 - Representing a decline from previous levels of functioning
 - The cognitive problems are severe enough to significantly impair everyday life functioning (social, occupational, personal care responsibilities)

Parkinson's Disease Dementia

- The core clinical features of dementia associated with Parkinson's disease (PDD) include:
 - Cognitive, behavioral, and autonomic symptoms as well as problems with sleep
- Patients PDD have prominent impairments in attention, executive, and visuospatial functions, moderate impairments in memory, and neuropsychiatric symptoms including apathy and psychosis

Parkinson's Disease Dementia

- Studies following people with Parkinson's over the entire course of their illness estimate that 50 to 80 percent of those with the disease may experience dementia
- Dementia in Parkinson's Disease typically develops many years after the initial onset of Parkinson's Disease and is more common with advanced disease
- Some studies have reported that the average time from onset of Parkinson's to developing dementia is about 10 years

Diagnosis of PDD and DLB:

- Guidelines for diagnosing Parkinson's disease dementia and DLB are:
 - **Parkinson's disease dementia (PDD)**-when a person is originally diagnosed with Parkinson's disease based on symptoms related to movement and dementia symptoms don't appear until a year later or more
 - **Dementia with Lewy Bodies (DLB)**- when Dementia symptoms consistent with DLB either Develop First; are present along with symptoms related to movement; or appear within one year after movement symptoms

Risk Factors Associated with PDD

- Advanced age
- Greater severity of motor symptoms
- Mild cognitive impairment (MCI)
- The presence of hallucinations in a person who doesn't yet have other dementia symptoms
- Excessive daytime sleepiness
- Parkinson's symptom pattern known as postural instability and gait disturbance (PIGD), which includes "freezing" in mid-step, difficulty initiating movement, shuffling, problems with balancing and falling

Cognitive Features of PDD:

- Attention:
 - Impairments in focus, sustained attention, and also notice fluctuations in attention
- Processing Speed:
 - Cognitive slowing
- Language:
 - The most common language problems in PD are finding the “right” words to say and understanding complex sentences
 - People with PD also tend to speak less overall, use simpler speech, and speak using a softer voice

Cognitive Features of PDD:

- **Visuospatial Abilities:**
 - Impairments in tasks requiring visuospatial orientation, perception, or construction
- **Executive Functioning:**
 - Impairments in planning, set shifting, abstract reasoning, and mental flexibility

Cognitive Features of PDD:

- Memory:
 - Memory is less impaired in Parkinson's Disease compared to Alzheimer's disease
 - Short-term memory and working memory are most commonly affected
 - Free recall may be impaired but may improve with cueing
 - Impairments in both visual and verbal memory
 - Long-term memory typically remains intact in PD

Behavioral Features of PDD:

- Apathy: decreased spontaneity, loss of motivation, interest, and effortful behavior
- Changes in personality and mood, including symptoms of depression and anxiety
- Hallucinations: mostly visual, usually complex formed visions of people, animals or objects
- Delusions: usually paranoid
- Excessive daytime sleepiness

Treatment:

- Current strategies focus on improving symptoms
- Medications may:
 - Reduce visual hallucinations
 - Improve sleep disturbances
 - Slow changes in thinking
 - Improve mood symptoms related to depression and anxiety

Non-Medication Treatment

- The goals of these strategies are to help patients with cognitive tasks, communication, and daily activities; improve quality of life, and address safety concerns
- Cognitive enhancement strategies:
 - Pill reminders, clock alarms, and timers
 - Step-by-step approaches to break down activities into simple steps
 - "to do" checklists and daily planners to keep track of events and time
- Maintaining a regular routine for daily activities
- Exercise

Brain Boot Camp

- Brain Boot Camp is an interactive, research-based training experience that provides participants with tools and lifestyle tips to keep their brains vital and healthy
- Big Four staples:
 - *Brain Healthy Diet*
 - *Stress Management*
 - *Physical Exercise*
 - *Memory Techniques*

Brain Boot Camp

- This program is designed for people with mild memory concerns or mild cognitive impairment, who wish to improve or maintain their memory ability
- Brain Boot Camp is offered on an individual or group basis and tailored to accommodate individuals who have mild cognitive impairment
- The goals of Brain Boot Camp are to help participants develop good memory habits and to teach techniques to improve memory

Brain Boot Camp

- The course provides the following:
 - Didactics on optimal brain health: proper nutrition, stress management, exercise, memory training
 - Baseline measurements of memory, stress, and fitness level
 - Customized healthy lifestyle program
 - Mentoring of various techniques for learning and recalling names and faces
 - Improvement tracking
 - Take home strategies, exercises, and assignments to continue improving memory on a daily basis

Thank you!

Please feel free to email or call if you have
any additional questions!

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