Cognitive Impairment in Parkinson's Disease

Speakers

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What We will Learn Today:

1.) Identify and understand the physiology of Parkinson's disease, common motor and non-motor symptoms, and potential causes.

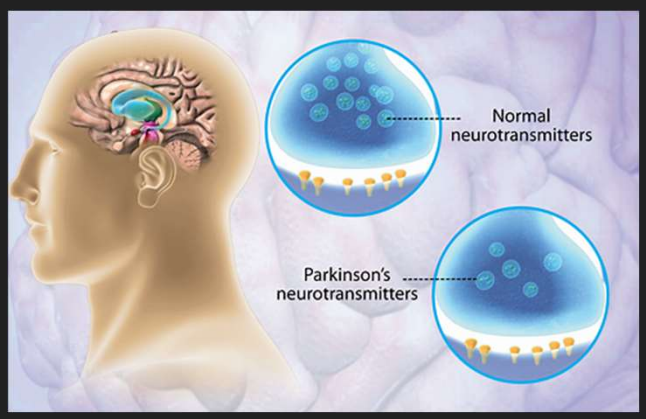
2.) Identify 3 or more causes that specifically affect cognition in Parkinson's disease.

3.) Identify the difference between Alzheimer's disease, Parkinson's disease dementia and Lewy Body dementia and 3 or more treatment and coping strategies to address the symptoms of impaired cognition.

What is Parkinson's Disease?

- Parkinson's Disease is a *chronic* and *progressive movement disorder* that involves the malfunction and death of vital nerve cells in the brain, called **neurons.**
- Discovered in **1817** by Dr. James Parkinson as a *"shaking palsy"*.
- Simply put, Parkinson's Disease is a movement disorder.

What is Parkinson's Disease? *Cont.*



Neurotransmitter Dopamine is diminished.

- By the time of diagnosis, 60-80% of dopamine cells are weakened **OR** the cells have died off.
- Dopamine lives in the **substantia nigra.**
- Many people are already <u>less</u> active at the time of diagnosis

Primary Motor Symptoms

Tremor
(at rest – hand, leg, jaw…)

Rigidity
Stiff Muscles.

Postural Instability
Poor posture, balance issues.

Slow Movements
Bradykinesia.

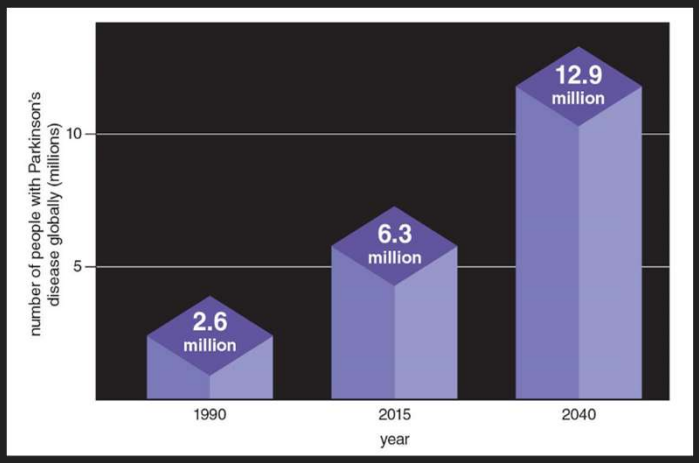
But it's NOT just a movement Disorder…

Non-Motor Symptoms

Parkinson's Disease Statistics

- Nearly **1 million** people in the U.S. have Parkinson's Disease
- **More than the combined #** with MS, Muscular Dystrophy, & ALS.
- **2nd Leading** Neurodegenerative disease behind Alzheimer's
- Average age is **60 years**; Young Onset at 4% for those **before age 50**;
  - Males are 1.5x > Females

Expected Parkinson's Prevalence 1990-2040



80-85% of all Parkinson's diagnoses are **idiopathic**: cause is unknown;

Between 2015-2040, Parkinson's is expected to double

Causes of Parkinson's Disease

- **Environmental Factors**
- **Traumatic brain injury**
- **Genetics**
- **Drug induced Parkinson's**

Research is ongoing but there is no cure.

Parkinson's V.S. Parkinsonism

- **Parkinson's Plus Syndrome (Parkinsonism)**
  Refers to the entire category of neurological diseases that cause slowness of movement
  - Mimics symptoms
  - Can resemble normal pressure hydrocephalus, vascular or drug induced Parkinsonism.
  - 15% develop an atypical variant that is less treatable than Parkinson's
    - MSA
    - CBD
    - PSP
    - LBD

Symptoms Lead to…

- Falls/near falls or impaired balance
- Chronic fatigue
- Stress…
- Muscle stiffness, difficulty with movement
- Difficulty sleeping, anxiety, and depression

→ **Decreased Confidence and Fear**

→ **Decline in Activities and LIVING LIFE!**

Cognition

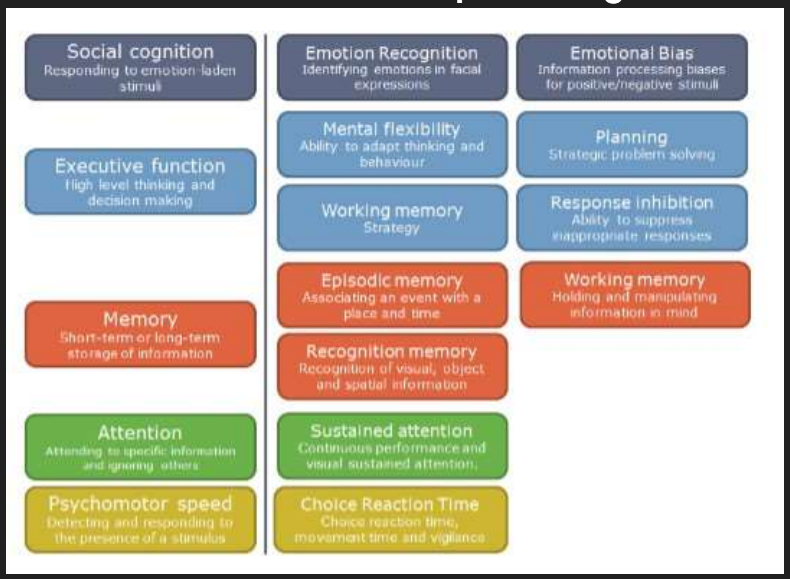
The reason we are here today is to speak about one piece of the puzzle at that is Cognition.

3 Types of Dementia

Cognitive Impairment may lead to dementia when more than one cognitive domain is involved.

Alzheimer's	Parkinson's Disease Dementia (PDD)	Lewy Body Dementia
• Most common of neurodegenerative diseases, 60-80% • Memory loss, no new memories formed • Language difficulty – speaking and writing • Tau protein – found in brain cells/neurons – are tangled and related to Parkinsonism's • Cueing will not aid memory decline	• Develops later after PD diagnosis • Attention, recent memory, executive function, visuospatial relations are affected • Alpha-synuclein protein – clusters form Lewy bodies • Cueing can benefit memory	• Atypical parkinsonism; cognitive symptoms are present before or within a year of onset of Parkinsonism motor symptoms • Progressive cognitive decline • Fluctuations in alertness and attention • Visual hallucinations • Memory is inconsistent

Cognition:
The act of mental processing



Types of Cognitive Processes:

Cognitive changes may be evident through a variety of mental skills, such as:

1. Attention and working memory

- Decreased attention and concentration
- Difficulty managing multiple things in memory

2. Executive function

- Difficulty with multitasking
- Difficulty with organization and planning
- Difficulty with switching focus and tasks
- Decreased ability to initiate activities
- Impaired regulation

Types of Cognitive Processes: *Cont.*

3. Memory

- Decreased short-term memory
- Long-term memory is NOT affected

4. Language

- Trouble finding the right words
- Difficulty understanding verbal and written instructions

5. Visuospatial function

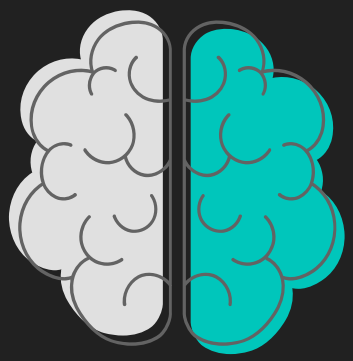
- Impaired sense of direction
- Getting lost in familiar places
- Difficulty navigating unfamiliar places
- Misjudging distances and locations

What Contributes to Cognitive Decline

- Coexisting conditions (PD, Stroke, repeated falls with head injury, etc.)
- Age
- Depression – 50% in PD?
- Sleep problems
- Orthostatic hypotension (when related to a neurologic disorder it's called nOH (neurogenic OH)
- Diabetes
- Infections (UTI)
- Fatigue
- Medications
- Biology/Genetics

10 Warning Signs of Dementia

- Memory loss that disrupts daily life
- Challenges in planning or solving problems
- Difficulty completing familiar tasks
- Confusion with time or place
- Trouble understanding visual images and spatial relationships



- Problems with words in speaking or writing
- Misplacing things and losing the ability to retrace steps
- Deceased or poor judgement
- Withdrawal form work or social activities
- Changes in mood and personality

Treatment

- **Goal:** Slow the progression, learn compensatory strategies
- There are no treatments that can stop or reverse the decline.

Medications:

- Similar to those used to treat symptoms of Alzheimer's (Aricept, Exelon, Razadyne)
- Antipsychotics can decrease symptoms (hallucinations) but could also increase motor deficits
- DaT scan detects an unhealthy dopamine system– may be used for confirmation when a neurological exam is inconclusive

Treatment *Cont.*

- **Counseling and Behavioral management (look up)**
  - Stress mgmt. due to disease progression and anxiety/depression; hallucinations
  - Coping strategies to decrease negative thinking due to disease diagnosis
- **Rule out other causes of mental status/depression (UTI, other infections)**
- **Review medications/contraindications/side effects**

Treatment *Cont.*

- **Cognitive Therapy: Make it Functional**
  - Hobbies - simplify
  - Cards – problem solving, strategic planning
  - Daily Activities: Cooking, sort tools or fishing lures
  - Computer Games: Constant Therapy, Luminosity, Brain Boot Camp, Cranium Crunches
  - Board games – scrabble, Rumikub, Apples to Apples, Farkle, Yahtzee, Dominoes, Checkers
  - Card games – rummy, gin, Blink, Spot It, Uno
  - Puzzles: word search, sudoku, crossword puzzles, jigsaw puzzles

All the above attend to attention, working memory, & executive functioning

Treatment *Cont.*

- **Compensatory**

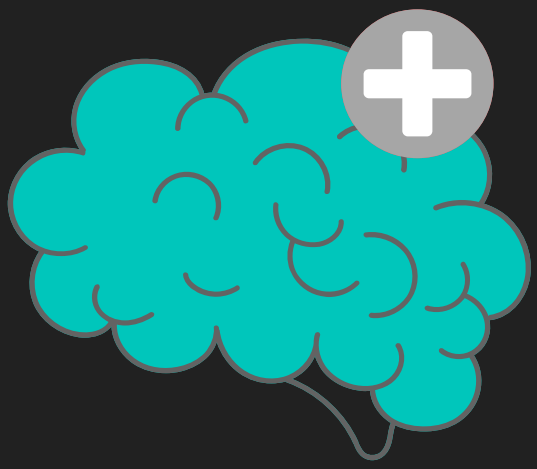
Techniques

- Make checklists for specific tasks
- Post reminder notes
- Exercise, diet, **AND** rest.
- Follow a routine

Nutrition Benefits

Diet and Nutrition

- Plant based foods
- 1 Serving of fatty, low-mercury fish/week
- Reduce processed foods
- Fish oil Supplementation
- Thiamine enriched foods (**thiamine** includes beef, liver dried milk, nuts, oats, oranges, pork, eggs, seeds, legumes, peas and yeast.)



Anti-inflammatory diet – direct effect on immune cells

- Mediterranean diet; rich in pre- and probiotics
  - **Includes vegetables**, fruit, herbs, nuts, beans and whole **grains**. Meals are built around these plant-based foods. Moderate amounts of dairy, poultry and eggs are also central to the Mediterranean Diet, as is seafood.

Exercise Effects on Cognition

Neuroplasticity/Neuroprotection

- Exercise changes how the brain uses neurotransmitters, especially how it uses dopamine more effectively.
- Causes new blood vessels to grow, helping brain cells get the O2 and nutrients it needs.
- Releases brain growth factor and changes how brain cells are connected.
- Improves immune function.

Exercise Effects on Cognition *Cont.*

- Improved heart and lung function = improved motor function, attention and cognitive speed.
- Aerobic exercise improves all the previous symptoms of cognitive decline (attention, executive function, memory, etc.)

Research shows:

- Moderate intensity **(45-60 min., 3x/wk)** = improved executive function.
- Progressive Resistive Ex. **(60-90 min. 2x/wk)** = improved working memory, executive function and attention

Dopamine RPE Chart

Chart provided by Rogue Physical Therapy

ROGUE

RATING OF PERCEIVED EXERTION (RPE) CHART

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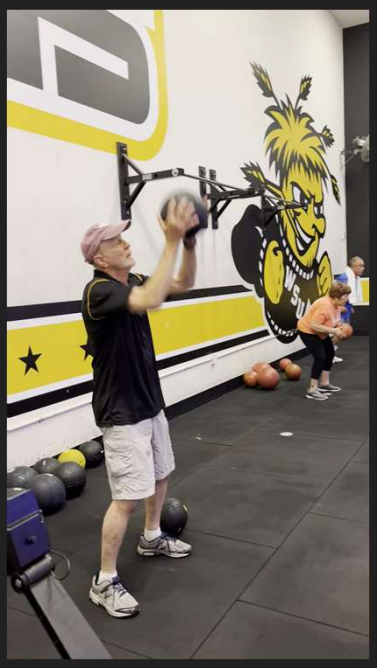
1-10 SCALE	EFFORT DESCRIPTION	ACTIVITY TYPES	BRAIN ZONE
10	**All-Out Sprint** The maximum possible effort, sustainable for just 20-30 seconds	Cardio: Speed 2 HIIT, Boxing (during high intensity bouts)	Dopamine Zone
9	**Very Hard Intensity** Hard to speak, breathing labored after a few seconds, good for 1 minute intervals	Cardio: Speed 2 HIIT, Boxing (during high intensity bouts)	Dopamine Zone
8	**Hard Intensity** Hard to say more than 2-3 words	Cardio: Speed 2 HIIT, Boxing (during high intensity bouts) PWR! Moves with Strength	Dopamine Zone
7	**Vigorous Activity** Can speak in short sentences; becomes uncomfortable quickly	Cardio: Speed 2 HIIT, Boxing (during high intensity bouts) PWR! Moves with Strength	Dopamine Zone
6	**Hard Activity** Labored breathing, challenging and uncomfortable but sustainable for 30-60 minutes	Cardio: Speed 1 PWR! Moves with Mobility/ Balance/ Stretch/ Flow Flow Yoga	Functional Zone
5	**Progressive Pace** A pace that requires some pushing and effort to maintain; still able to hold a conversation	Cardio: Speed 1 PWR! Moves with Mobility/ Balance/ Stretch/ Flow Flow Yoga	Functional Zone
4	**Comfortable Pace with Some Effort** Slight "push" but still at a pace which you could speak a few sentences without struggling	Cardio: Speed 1 PWR! Moves with Mobility/ Balance/ Stretch/ Flow Flow Yoga	Functional Zone
3	**Comfortable Pace** Able to maintain a conversation without getting out of breath	Cardio: Warmup/Cooldown PWR! Moves with Mobility/ Balance/ Stretch/ Flow Tai Chi, Restorative Yoga	Comfort Zone
2	**Light and Easy** Very gentle and easy to maintain a conversation – could continue for hours	Static stretching, Slow walking, Tai Chi, Restorative Yoga	Comfort Zone
1	**Minimum Effort** Bare minimum exertion; a gentle stroll in your backyard – could continue all day	Static stretching, Slow walking, Tai Chi, Restorative Yoga	Comfort Zone
0	**No Effort** Your body is still (seated, standing, on your back) - You are exerting no effort	Meditation	Meditation Zone

To view the research supporting dopamine production related to exercise, please visit www.roguept.com/cardio-class-research

Learn Something New
Nordic Walking

HIIT-
exercise in your
THR zone



Dual Tasking

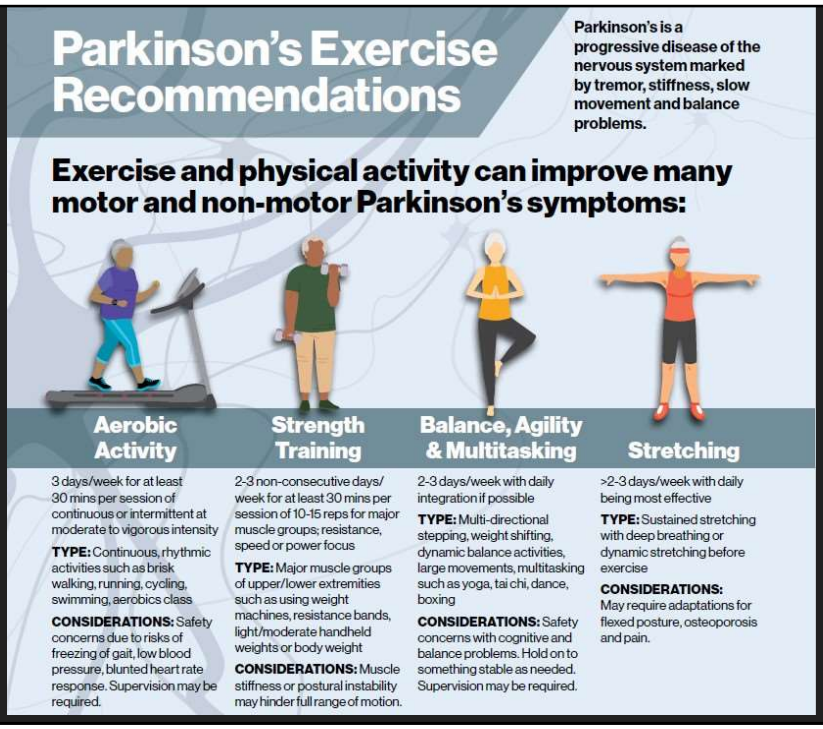
Dual Tasking-Another Example

Rhythm and Patterning

Strength Training:

What a difference 15 minutes makes

What a difference a year makes



What's YOUR motivator?

Resources in Wichita, KS

PARKINSON'S Connect

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WELLNESS • FITNESS • EDUCATION

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