Staying Healthy and Happy with Positive Cognitive Health Habits

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Outline

1. Spectrum of aging to dementia
2. Cognitive impairment in PD
3. Pharmacologic interventions
4. Non-pharmacologic interventions
   ➢ Pillars of brain health
5. Recommendations for maintaining cognitive health
SPECTRUM OF AGING TO DEMENTIA
FUNCTIONAL TRAJECTORY

Cognitive Impairment → Functional Abilities → Dependence on Caregivers

Patients & Caregivers

Emotional Distress → Declines in Physical Health → Increased Economic Burden
COGNITIVE CONTINUUM

Normal  Mild Cognitive Impairment  Dementia
NORMAL CHANGES WITH AGING

- Slowed mental processing
- Slowed decision-making ability
- Diminished capacity for multi-tasking
- Less flexibility in thinking (“stuck in our ways”)
- Occasional forgetfulness
  - Factual information (names, faces, dates)
  - Purpose for going into a room
WARNING SIGNS

Not normal aging anymore…

- More forgetfulness than expected for age/background, more frequently
- Short-term memory loss
  - Appointments/day-to-day activities
  - Recent events and conversations
  - Repeating stories and phrases
- Misplacing things often
- Disorientated to time and place
# Cognitive Impairment

## Mild Cognitive Impairment (MCI)
- Cognitive complaint
- Normal general cognitive abilities
- Cognitive decline beyond normal aging
- Activities of daily living relatively unaffected

MCI present in 25-30% of persons with PD without dementia

## Dementia
- Significant decline from previous functioning
- Impairment in one or more cognitive domains
- Cognitive deficits interfere with independence in activities of daily living

Dementia present in 24-31% of persons with PD, up to 75% with survival > 10 years

“I wish I had known…”

From a person with Parkinson’s disease

“I wish that they had stated that it [cognitive impairment] was a possibility and discussed more about it. I only got information on the motor symptoms.”

From a care partner

“I wish that the doctor might have mentioned some changes to be watchful for so I could be aware and helpful.”

Quotes from the Parkinson’s Disease Foundation Community Choice Research Award project working group workshop in Chicago, IL June 3-4, 2016.
Cognitive Impact in Daily Life: Examples

- From a person with Parkinson’s disease
  
  “Sometimes my brain ‘freezes up’, kind of like my legs sometimes do. Finding the words I want to say is very hard, and my thoughts seem like they are blank.”

- From a care partner
  
  “The most bothersome is attention, which we call ‘chasing rabbits’ at our house. Early on this manifested as flitting from task to task without completion. However, cognitive symptoms have started to affect communication, which in turn affects our relationship. My husband’s frustration in turn sparks irritation in both of us. I sometimes wonder if the same is not occurring with friends, and they are too polite to tell me.”

Quotes from the Parkinson’s Disease Foundation Community Choice Research Award project working group workshop in Chicago, IL June 3-4, 2016. Published in partnership with the Parkinson’s Foundation. Goldman et al. Cognitive impairment in Parkinson’s disease: a report from a multidisciplinary symposium on unmet needs and future directions to maintain cognitive health. npj Parkinson’s Disease 2018;4:19; doi:10.1038/s41531-018-0055-3.
Brain processes = cognitive functions

- Cognitive functions include
  - Attention
  - Processing speed
  - Executive functions
  - Language
  - Visual-spatial skills
  - Motor skills
  - Memory
COGNITIVE DOMAINS

Attention
- Focus
- Concentrate
- Shift gears

Processing Speed
- Input > Process > Output

Executive Functioning
- Problem-solving
- Decision-making
- Reasoning/judgment
- Flexible thinking
COGNITIVE DOMAINS

Motor Skills
- Coordinated movement
- Motor control
- Balance

Memory
- Declarative (what, when, who)
- Procedural (how to)

Visuospatial
- Spatial relationships
- Judging distance
- Part-to-whole integration

Language
- Comprehension
- Communication (verbal and non-verbal)
BRAIN WITH PARKINSON’S DISEASE

- Early cognitive deficits
  - Attention/working memory
  - Executive functioning
  - Processing speed

- Cognitive deficits in PD dementia
  - Language (esp. semantic fluency)
  - Visuospatial skills
  - Learning and memory

PHARMACOLOGIC INTERVENTIONS
FDA-approved medications for MCI in PD
- None
- Few studied, several investigational only

FDA-approved medication for dementia in PD
- Rivastigmine only
- Cholinesterase inhibitors (donepezil, galantamine) possibly useful but not FDA-approved

Note: Some anti-Parkinson medications can adversely affect cognition
- Benztropine, trihexyphenidyl
NON-PHARMACOLOGIC INTERVENTIONS
Foundation of Brain Health
A good brain foundation helps you...

- Experience and enjoy your surroundings
- Interact with people and your environment
- Think and act with purpose
- Feel emotions
Pillars of Brain Health

- Cognitive Exercise
- Physical Exercise
- Healthy Diet
- Social Activity/Emotional Wellness
- Sleep
Pillar of Brain Health: Cognitive Exercise

- Staying mentally active
  - Strengthens brain cells and the connections between them
  - May create new brain cells (neurogenesis)
Cognitive Training in PD: Systematic Review

Meta-analysis

- Inclusion criteria
  - Published reports of RCTs examining behavioral effects (cognition, IADLs, QOL, depression) in mild to moderate PD
  - Repeated practice on cognitively challenging tasks
  - Computer or pencil-and-paper approaches ≥ 4 hours
  - For multicomponent interventions, cognitive training ≥ 50%

- 7 studies

- Results
  - Large and statistically significant effect sizes for improved working memory, processing speed, and executive functioning
  - Small to negligible and non-significant for memory, attention, visuospatial abilities, depression, quality of life, and ADLs

Cognitive Training in PD with MCI and Dementia: Systematic Review

Meta-analysis

Inclusion criteria
- RCTs that included PD with MCI or dementia
- Interventions training general or specific areas of cognitive function, single or multiple domains
- Compared to a control condition
- For multicomponent interventions, motor or other elements also eligible

7 studies (4 with PD-MCI, 2 PD-MCI + PD-no impairment, 1 PD dementia), totaling 225 participants

Results
- Overall, no significant evidence of improvement in cognitive impairment in PD 4-8 weeks of cognitive training
- One RCT (70 PD-MCI/no impairment), improved short-term and working memory after 6 weeks
  - 1-year follow-up (47), intervention group showed improved global cognition, non-intervention group increased risk of MCI (40% vs 18.2%)
- Few studies, small sample sizes, limitations of study design and execution, and imprecise results

Stimulate your Brain

1. Challenge yourself
2. Try something new
3. Partner with family and friends
4. Focus on cognitive stimulating exercises
5. Have fun!
Pillar of Brain Health: Physical Exercise

- Physical exercise
  - Protects brain cells against toxins
  - Improves cognitive functioning
  - Helps control factors associated with comorbidities that contribute to cognitive decline
    - High blood pressure, stroke, and heart disease
    - Diabetes
    - Colon and breast cancer
    - Depression

Image from michaeljfox.org
Physical Exercise and Cognition in PD with and without MCI: Systematic Review

- **Inclusion criteria**
  - RCTs, PD participants with or without MCI
  - Evaluated cognitive function and physical exercise
  - Compared to a control condition

- **9 studies (sample sizes ranging from 17-39)**
  - Mild to moderate stage of PD, approximately 6-year clinical diagnosis
  - Various forms of physical exercise
    - treadmill
    - dance
    - stationary bicycle
    - walking
    - Tai-Chi
    - Qigong
    - Wii Fit + motor training
    - others
  - Interventions performed 2-3 times per week, 40-90 minutes each session, for 7-24 weeks
  - Moderate to high intensities
  - Control group: unsupervised exercise, mild to moderate intensity, lectures with structured activities, group education

Physical Exercise and Cognition in PD with and without MCI: Systematic Review (cont.)

Results

➢ Physical exercise improved global cognition, processing speed, sustained attention and mental flexibility

➢ Significant effects specifically for
  ▪ Adapted tango for PD
  ▪ Wii Fit combined with motor training (stretching, strengthening, axial mobility exercises)
  ▪ Treadmill

➢ Treadmill use 3 times per week for 60 minutes over 24 weeks produced largest improvement in cognition

➢ Only 2 studies presented follow-up data (2-3 months), showing small magnitude effects for global cognition

Cognition and Mind-Body Movement

Yoga/Meditation
- Reduces mind strain
- Improves concentration, and secondarily, memory
- Promotes healthy cortical changes
- Dementia caregivers show lower levels of depression, improved mental and cognitive functioning
- In PD, improvements in physical functioning, mood, and quality of life; insufficient examination of cognitive functioning

Tai-Chi/Qigong
- Meta-analysis in PD
- Improved motor function, depression, and quality of life
- No change in cognition
Try for 45-60 minutes 3 times per week

Stay within your limitations

Consider treadmill, yoga, dance

Take a friend
Studies assessing nutrition and cognition in PD lacking

Foods such as blueberries, cocoa, dark chocolate, tea, and wine may **protect against cognitive decline**

Mediterranean, DASH, Mediterranean-Dash Intervention for Neurodegenerative Delay (MIND) may provide healthful benefit

- MIND diet associated with **54% reduction in risk of AD**
- MIND dietary patterns associated with **less decline in global cognition, processing speed, and executive function** over 4.7-year period compared to “traditional” eating patterns
- MIND associated with **13% reduction in risk of developing PD or progression of symptoms**
Pillar of Brain Health: Social Activity/Emotional Wellness

- Remaining socially active
  - Makes physical and mental activity more enjoyable
  - Reduces stress levels, which helps maintain healthy connections among brain cells
Social Support and Emotional Wellness

- Social engagement in 10,720 individuals (13% MCI)
  - Mortality risk greater in medium and low social (not high) engagement groups
- Cross-sectional and longitudinal measures of social engagement and cognition in 525 individuals with PD
  - Increasing age and low levels of recent social engagement associated with increased risk of dementia

Stay Engaged

- Socialization is good for the brain!
  - Decrease stress
  - Improves mood
  - Interaction is cognitively stimulating
- Laugh!
Pillar of Brain Health: 
Sleep

- Restorative sleep
  - Soothes and rejuvenates
  - Improves mood
  - Increases stress tolerance
  - Improves attention
  - Helps consolidate memories
Sleep disorders affect up to 98% of PD patients.

Meta-analysis of 16 papers reporting sleep and cognition in PD

- **Inclusion criteria**
  - Idiopathic PD (no atypical PD or parkinsonian syndromes)
  - Sleep reliably measured
  - Cognition measured with validated instruments
  - Relationship between sleep and cognition statistically reported

- **Results**
  - Significant **negative** effect of sleep on global cognitive function, long-term verbal recall, long-term verbal recognition, shifting, updating, generativity, fluid reasoning (i.e., **memory**, **executive functioning**)
  - Mechanism unclear – hypoxia, hypercapnia, sleep fragmentation, chronic sleep debt, decreased REM and/or slow-wave sleep
Manage your Sleep

Daytime tips

- Exercise early in the day
- Limit napping
- Avoid excessive caffeine intake
- Avoid alcohol/nicotine near bedtime
- Limit liquid intake 2-3 hours before bedtime

Evening tips

- Take time to “wind down”
- Bedtime routine to include relaxation
- Go to bed only when sleepy
- Reserve the bedroom for sleep and intimacy

Interventions for sleep

- Cognitive therapy
- Relaxation therapy
  - Progressive muscle relaxation
  - Biofeedback
- Mental/emotional guidance
  - Guided imagery
  - Meditation
- See your doctor
Rationale for Multicomponent Interventions

- **Meta-analysis**
  - 179 randomized, controlled trials
  - 26 non-pharmacological therapeutic (NPT) intervention categories

- **Key findings**
  - Delayed institutionalization of persons with Alzheimer’s disease and related dementias
  - Effects on cognition, ADLs, behavior, and mood similar to medication
  - No side effects from NPTs
  - More readily individualized than medication

RECOMMENDATIONS FOR MAINTAINING COGNITIVE HEALTH
• Systematic review of RCTs for evidence on efficacy

• Found insufficient evidence to justify “…an assertive public health campaign to encourage people to adopt them for the purpose of preventing cognitive decline and dementia.”

• HOWEVER, found evidence to support three classes of intervention
  • Cognitive training
  • Blood pressure management in people with hypertension
  • Increased physical activity
Early- to mid-stage PD

- Exercise according to guidelines from American College of Sports Medicine and American Heart Association
- Stay active socially
- Engage in cognitive training exercises
- Learn coping strategies
- Eat a nutritious diet
- Take your time when performing tasks
- Let your family and friends know if you are having trouble
- Seek help if feeling depressed or anxious

Adapted from Goldman JG et al. Cognitive impairment in Parkinson’s disease: a report from a multidisciplinary symposium on unmet needs and future directions to maintain cognitive health. npj Parkinson’s Disease 2018;4:19 doi:10.1038/s41531-018-0055-3.
KEEP the recommendations for earlier stages, PLUS:

- Develop a highly structured daily routine that you follow
- Consider the use of medication for cognitive impairment
- Have an advanced directive in place (living well, treatments)
- For care partners: take care of your own health as well (see doctors as needed)
- For care partners: seek out support such as counseling

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Yoga/Tai-Chi/Qigong


Healthy Diet


Social Support/Emotional Wellness


Sleep
