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The Unique Role of Occupational Therapy in the Treatment of Individuals with Parkinson's Disease

Julia Wood MOT, OTR/L
Dan Aaron Parkinson's Rehabilitation Center

1

Learning Outcomes

- Describe the impact of motor and non-motor symptoms on the daily function and participation of people with Parkinson's disease.
- Identify and list appropriate outcome measures to create a person-centered approach to the treatment of people with Parkinson's disease.
- Identify and list occupation-based treatment strategies to address the participation challenges for people living with Parkinson's disease

2

Theoretical Basis for Intervention

3

CONTINUED

Motor Learning

"a set of processes associated with practice or experience, leading to relatively permanent changes in the capacity of movement"

- Analyze specific task and individual performance
- Practice areas of difficulty or impaired performance
- Practice the entire task
- Transfer training into varied environmental constructs
- The final goal is the optimization and automatization of motor skills

"patients with PD often show a decrease in retention of newly learned skill, a problem that is present even in the early stages of the disease "
(Marinelli et al., 2017)

4

Task Oriented Approach

- Select activities and tools for therapy from daily life
- Collaborate with client to select meaningful functional tasks
- Analyze person and environmental aspects of task performance
- Structure practice of the task and provide feedback to facilitate motor learning
- Develop optimal movement patterns for task performance (Almhdawi, 2016)

5

NEUROPLASTICITY

- Use it or Lose it – inactivity is pro-degenerative
- Use it & Improve it - skilled training facilitates plasticity
- Specificity – task specific training: train to the deficit
- Repetition Matters – the key to permanent change in brain and behavior; add novel movements
- Intensity Matters – push/challenge your patient! More reps, longer duration & frequency, HR, BORG scale

- (Kleim & Jones, 2008)

6

CONTINUED

NEUROPLASTICITY

- Time Matters – better earlier, but can occur at any point
- Salience Matters – must be important to the patient
- Age Matters
- Transference – changes in one area can promote concurrent or subsequent changes elsewhere
- Interference – learning compensatory strategies first may lead to plasticity that needs to be overcome

(Kleim & Jones, 2008)

7

CONTINUED

Step Wise Approach

1. The therapist observes performance of the activity to analyze which components are limited.
2. Therapist supports recognition of the activity and selects the most optimal movement components; generally limited to four to six components.
3. Therapist summarizes the sequence of components in key phrases, preferably supported by visuals.
4. Therapist physically guides the performance.
5. The client rehearses the steps aloud.
6. The client uses motor imagery (mental training) of the consecutive movement components.
7. The client carries out the components consecutively, consciously controlled, and if required guided by the use of external cues.

(Radder et al, 2017)

8

OT Approach to Parkinson's Care

Occupational therapy for people with Parkinson's disease: towards evidence-informed care (Sturkenboom, 2015)

Parkinson's disease. OT Practice Guidelines for Adults with Neurodegenerative diseases (AOTA , 2014).

Occupational therapy for people with Parkinson's: Best practice guidelines

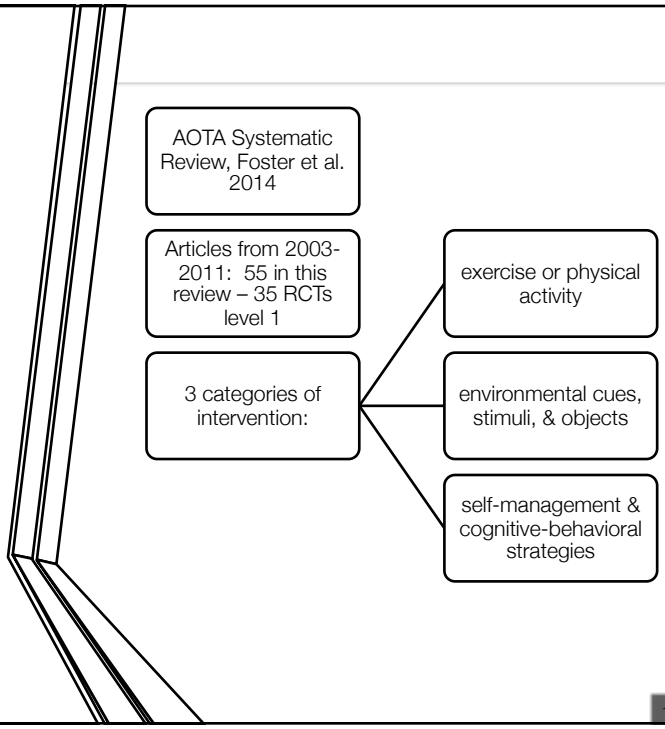
(Aragon & Kings, 2010), United Kingdom

Guidelines for Occupational Therapy in Parkinson's Disease Rehabilitation

(Sturkenboom et al., 2008), Netherlands

9

Evidence Base for OT Intervention (Foster et al., 2014)



10

Interventions: Exercise or Physical Activity

To improve performance skills:

- most responsive to ***task-specific***
- direct performance skill training ***does not generalize as well to more complex*** occupational performance or QOL
- ***Exercise*** improves motor performance, postural stability, & balance
- ***Limited evidence*** for postural training effecting FOF or fall reduction

(Foster et al., 2014)

11

Environmental Cues

Evidence for:

- use of ***auditory rhythmic stimuli***
- providing a safe movement ***environment*** for focusing on the functional task
- cueing paired with ***cognitive strategies***
- cueing on ***amplitude of movement***
- ***adaptive equipment*** for safety against falls

(Foster et al., 2014)

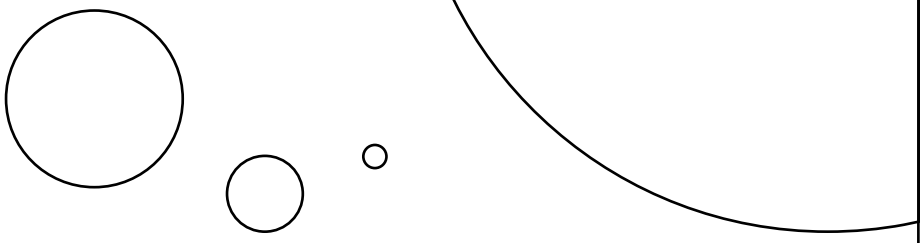
12

Self-Management and Cognitive–Behavioral Strategies

- Promoting wellness initiatives & personal control
- Help with modifying lifestyles and improving QOL
- Use a ***"cognitive–behavioral intervention that involves education, goal setting, performance skill training, practice, and feedback related to incorporating habits into daily life."***

(Foster et al., 2014)

13



Interventions for ADLs

14

CONTINUED

Symptom Impact on ADLs

- Rigidity
- Bradykinesia
- Posture
- Balance
- Hand dexterity
- Executive dysfunction/multi-tasking
- Visual/Perception
- Organization
- Coordination

15

CONTINUED

Time Pressure Management

- Based on Michon's task analysis, describing levels of decision-making in complex cognitive tasks
- Provides patients with compensatory strategies to deal with time pressure in daily life
- Individual must recognize a deficit and need for change
- Requires awareness to recognize and anticipate time pressure situations and identify strategy for use
- Motivation is needed to learn the strategy
- Training should be adjusted to the patient's individual learning abilities and cognitive skills

(Fassotti et al., 2009)

16

Strategies for Dressing

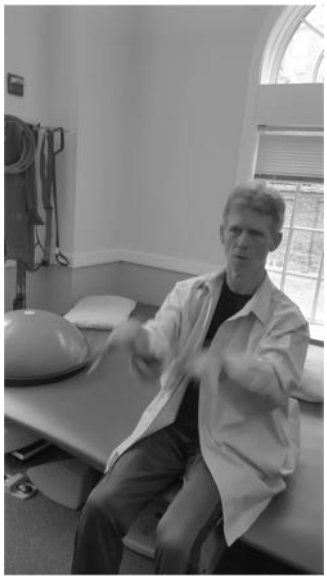
Choose and set up clothing the night before
Pre-fasten buttons/thread belt
When possible, wait 45 minutes after taking morning meds before dressing
Train in dressing prep HEP
Allow adequate time to avoid need to hurry
Sit to dress – preferably arm chair not edge of bed
Focus on each part of sequence—motor learning/ blocked practice
Use large amplitude movements and grasp for manipulation of clothing
Play up-tempo music for pacing-- if not distracting

17

Aids/strategies for dressing

- Loose-fitting, stretchy clothes- avoid/adapt impractical clothing from wardrobe
- Slippery underclothes, Under Armour 3 way stretch
- Velcro adaptation for collar, cuff, or whole shirt
- Snap/magnetic closures—magna ready, Tommy Hilfiger
- Button hook- if no perceptual deficits
- Buttoning is therapeutic-- if not frustrating-train flicks and sensorimotor approach
- Train in seated dressing strategies—seated weight shift

18



19

Hygiene and Grooming

- Sit for balance deficit or low endurance
- Wide/staggered stance
- Electric toothbrush
- Electric razor
- Magnified mirror
- Suction denture brush
- Suction nail clippers
- Adaptive flossers
- Permanent make-up

- Support arms on table or vanity
- Sit to apply makeup/build up handles to brushes/cosmetics
- Build up handles on brush or comb
- Blow dryer stand
- If possible, wait until meds take effect to decrease difficulty of task

20

PD and Eating

- Dexterity
- Wrist rigidity
- Bradykinesia/hypokinesia
- Tremor
- Appetite may be decreased
- Medications- nausea
- Olfactory changes
- Gastroparesis slowed/constipation
- Rigidity/tremor increases caloric expenditure
- Fatigue
- Self esteem, social identity

21

Strategies for self feeding

- Collaborate with client and care partner to modify routines in meals:
  - Time of meals
  - More frequent, small meals
  - Texture of foods—collaborate with SLP
  - Pacing strategies
  - Amount
  - Reduce distractions in the environment
  - Positioning close to table
  - Appropriate adaptive aids—OXO souper spoon, bendable utensils
  - Reduce degrees of freedom—plate height, arm support

22

23

Urban OT Legend

… “contrary to the traditional belief about the advantages of weighted utensils, our results demonstrate the benefits of using lightweight or normal-weight utensils.

To facilitate high-velocity and smooth arm movement for people with Parkinson’s disease, a lightweight utensil seems to be more appropriate than a weighted one.”

(Ma et al., 2009)

24

Liftware Steady Test

https://www.liftware.com/clinicians/

25

Bathing

- Shower curtain vs. sliding glass door
- Bathmat
- Grab bars
- Tub bench
- Large amplitude movements
- Terry robe

26

Toileting

- Trunk rotation exercises
- Large amplitude movement strategy to pull pants over hips & tuck shirt
- Marching turns in tight spaces/mobility training
- Toileting schedule for urgency
- Moist wipes
- Velcro adaptation for pants
- 'My belt' adaptive belt
- Bedside commode/urinal/
- Disposable urinal
- Toilet frame with raised seat
- Bidet

27

Interventions for IADLs

28

Medication Management

- Lack of knowledge/ awareness
- Busy schedule
- Lack of temporal organization
- Unexpected changes in routine
- Complex medication regimen
- Dexterity/muscle control
- Memory

29

Implementation Intentions

(Goedeken et al., 2017)

- *Prospective memory*: the ability to remember to perform an action at the appropriate moment in the future.
- Creating Implementation Intentions (II)
  - What do you have to do? Specify the intended action (Y)
  - Where or when do you have to do it? Specify the situation or place (X)
  - Develop intention statement: "When situation X arises, I will do Y."
  - Example: When I eat breakfast, I will take my medication.
  - Repeat the statement several times aloud (as appropriate).
  - Visualize yourself encountering the future situation and executing the intended action.

30

- Automatization, transfer, and retention of increased writing size (diminished micrographia) after intensive amplitude training
- Indicates that consolidation of motor learning is possible in PD.
- Extensive practice required
- Moreover, there was transfer to writing in daily life

(Naeckerts et al., 2016)

31

Micrographia & Tremor

- Practice does not make perfect
- Must **THINK** about making each letter big
- Lines help, but not when removed (1.0 vs. 0.6 cm)
- Try easier flow type pens to limit the dual task of holding and pressing
- Print is better than cursive/script

- "…no support for the clinical recommendation of using weighted utensils or weighted wrist cuffs to alleviate postural hand tremor in PD."

(Bryant et al. , 2010)

32

- Movement no longer automatic – conscious attention
- Slow down and allow extra time for task completion
- Large grip pen, pen again, trial pen types
- Lined paper as cue—size matters (1.0 vs. 0.6 cm)
- Sit and support forearm if possible
- Clipboard to stabilize paper
- Take frequent rest/stretch breaks (flicks)
- Dictaphone, computer, apps
- Practice every day using compensatory methods
- Avoid multi-tasking

33

Aids for Handwriting




Better Handwriting for Adults; National Adult Literacy Agency

https://www.nala.ie/sites/default/files/publications/better_handwriting_for_adults.pdf

34

Vision & Reading

- Decreased scanning speed impacts reading performance
- Convergence impairment and oculomotor function promote blurred vision

Environmental adaptations:

- Ensure adequate lighting
- Eliminate clutter
- Reduce glare
- Create visual contrast
- Magnifiers/line illuminators

35

Computer Use

- Word prediction software
- Keyboard adaptations
- Accessibility Options – Bounce keys, Filter Keys
- Trackball instead of mouse
- Adjust mouse speed
- Voice recognition –Dragon Naturally Speaking Preferred
- Steady Mouse software (filters tremor)
- Train in exaggerated movement of fingers at PIP/DIP

36

CONTINUED

Sleep Hygiene

- Establish consistent bed and wake times
- Set a bedtime that is early enough for you to get at least 7 hours of sleep
- Establish a relaxing bedtime routine.
- Make sure bedroom is quiet, dark, relaxing, and at a comfortable temperature (60-67 degrees)
- Remove electronic devices such as TVs, computers, and smart phones, from the bedroom—turn off devices at least 30 mins. before bedtime
- Avoid large meals, caffeine, and alcohol before bedtime
- Exercise regularly
- Use bed for sleep and sex only
- Reduce fluid intake before bedtime

(Centers for Disease Control, 2016)

37

CONTINUED

Fatigue Management

- Physical/cognitive fatigue
- Address sleep hygiene
- Alternate activities with rest
- Pace day—rest before times of general fatigue
- Modify/simplify activities to maximize energy
- Organize home and work spaces
- Plan your day to make most of energy/medication cycles
- Exercise is Medicine!

38

Mindfulness

"..mindfulness intervention tailored for PD is associated with reduced anxiety & depression, improved cognitive & motor function"

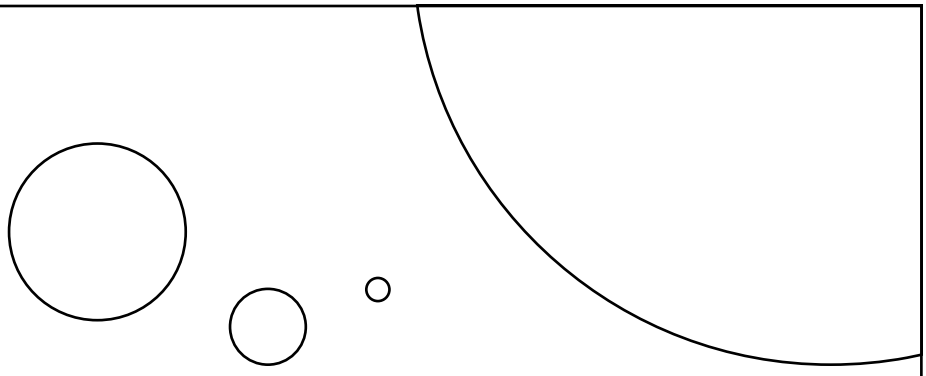
Improvement in working memory, verbal fluency - gains maintained at 6-month follow-up

Suggests mindfulness could serve as a form of cognitive training

Participants reported increased awareness of internal & external environment

(Dissanayaka et al., 2016)

39



Interventions for Functional Mobility & Dexterity

40

Symptoms Impacting Balance/Functional Mobility

- Freezing
- Propulsion/Festination
- Retropulsion
- Dyskinesia
- Dystonia
- Fatigue
- Vision
- Cognition

41

OT & PT Collaboration

- "A collaborative approach between OT and PT is successful when both disciplines focus on complementary, different aspects in both the assessment and interventions, while being aware of the instructions and strategies used by each other"

(Radder, Sturkenboom, Nimwegen, Keus, Bloem & de Vries, 2017)

42

Freezing of Gait

- FOG affects 26% with mild PD, 80% with more advanced PD – leading cause of falls
- Compensatory strategies such as external cues have been the long-standing treatment choice
- Effect is lost when cue is removed
- Relies on the patient's cognitive ability to retrieve and apply the cue
- FOG is not just due to sensorimotor deficits, but also executive function, attention, and visuospatial deficits

43

Freeze break strategies

When you find yourself in a freeze, remember the 4 S's……

- **Stop**- steady yourself and take a deep breath
- **Stand Tall-** arrange your center of gravity over your feet
- **Shift**- weight side to side until you can lift a foot and take a…
- **Step**- take a big step

44

Freeze break strategies

- Remove floor clutter (plant stands, magazine racks, foot stools) and throw rugs
- Arrange environment to widen walking paths
- Teach visualization techniques (stepping over or kicking through an imaginary object)
- Estimate steps to a target and count aloud
- Visual cues in environment – tape lines on floor to mark steps
- Walker with laser cue
- Collaborate with PT to facilitate consistent cues
- Educate care partner and train in environmental/cueing strategies for assist

45

Festination: gait with increased step cadence; "runaway train"

Prevention:

- No reaching before turning
- Training in big steps
- Cue upright posture
- Visual cues on rollator
- Reverse-braking system rollator
- Towel rolls under arms

Keep Your Friends Close, Keep Your Walker Closer!!

46

Factors contributing to retropulsion

- Displacement backward (elevators, crowds, pets, opening doors/cabinets)
- Stepping backward while turning (transfers, etc.)
- Carrying objects in both hands
- Pulling/dragging tools/objects backward (vacuuming, yardwork)
- High reaching outside center of gravity
- Poor weight shift in transfers

47

48

Transfer Training

- Task-specific training
- Teach sequencing
- "Don't reach before turning"
- Practice the most difficult portion 1st
- Tape on floor where feet should be
- Use incline wedge for theater seats
- Grade from high to low seats

- DO NOT FORGET to practice:
  - return to sit
  - getting in & out of chair at table/desk

49

Bed Mobility

- Comforter/quilt vs. blanket and sheet
- Visual cues/verbal cues
- Firm mattress
- Amplitude training—PWR! or LSVT BIG supine
- Bed rail, transfer pole, or chair for assist
- Adapt bed height
- Comfort linen https://comfortlinen.com/

50

Strategies /Programs to Enhance Movement

- LSVT BIG®
- Parkinson's Wellness Recovery (PWR!)
- Rock Steady Boxing
- Dance for PD
- Thera cycle, Speed Geezer
- Tango Dancing
- Wii
- Davis Phinney Foundation – Pedaling for Parkinson's
- Tai Chi

51

Sensorimotor Agility Exercise

- Self initiated movement
- Big movements
- Reciprocal arms and legs
- Lengthen flexors, strengthen extensors
- Trunk rotation
- Task specific vs. repetitive exercise
- Increasing difficulty, cognitive demands
- Rhythmic movements

(King & Horak, 2009)

52

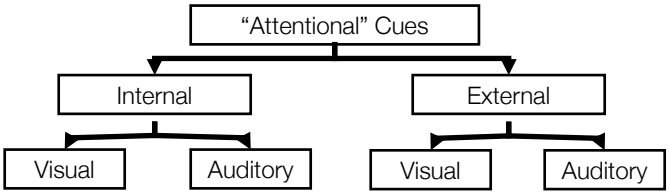
Cueing Strategies

"Attentional Cues"

In PD there is ↓ BG input going to the SMA/Primary motor cortex control

Override this by ↑ use of frontal-cortical control

(Premotor cortex) by thinking about the movement



Morris. 2000

53

Effects of a Single Hand–Exercise Session on Manual Dexterity and Strength in Persons with Parkinson Disease: A Randomized Controlled Trial

(Mateos-Toset et al, 2017)

- Sixty PWP; 30 participants were allocated to a brief exercise session and 30 to a control group.
- Participants randomized to the experimental group received a 15-minute exercise session focused on hand training using therapeutic putty. Participants allocated to the control group performed active upper limb exercises.
- Participants had significantly improved manual dexterity values ($P < .05$) after intervention. They also had increased hand grip ($P < .001$) and pinch strength ($P < .05$)

54

Summary: Themes to Guide Practice

- Foster a collaborative team with PWP and care partner
- Promote a multi/interdisciplinary approach
- Develop community resources
- Importance of EARLY intervention to capitalize on neuroplasticity and prevent decline
- Address even subtle functional changes
- Empower for the future

55

Case Study

56

CONTINUED

Meet Linda

- 70 year old female with recent history of Parkinson's disease (PD)

Strengths:

- Supportive partner, family & friends.
- Motivated to participate in exercise to improve symptom management and forestall use of medications for PD
- Retired social worker with excellent insight into strengths and impairments

Participation Challenges:

- Difficulty using left hand/arm in manipulation of jewelry and clothing
- Daily fatigue that decreases activity tolerance and impacts participation in meal preparation activities
- Increased time for completion of dressing tasks

57

CONTINUED

Client Centered Intervention

- LSVT BIG® in OT/PT collaborative model to address amplitude and provide HEP—4x per week for 4 weeks
- Task specific training for jewelry, clothing fasteners–flicks, high repetition, increasing cognitive and motor demands
- Practice of LSVT HEP in afternoon to prevent fatigue

58

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62

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Questions?

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Thank you for your attention!

63