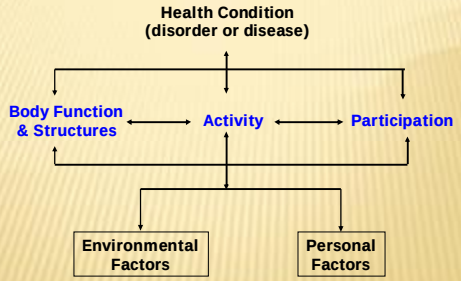
REHABILITATION METHODS FOR PARKINSON'S DISEASE

Cyndi Robinson, PT, PhD
University of Washington
Seattle, Washington, USA

PARKINSON'S DISEASE

- 4.1 - 4.6 million people
  - 50+ years old
  - 10 most populated countries
- Progressive neurodegenerative disorder
  - Selective neuronal loss in the motor circuits of the basal ganglia
- Affects
  - Neurophysiologic function
  - Movement abilities
  - Quality of life

INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH



IMPAIRMENTS IN BODY FUNCTION

- Postural instability
- Hypokinesia
- Rigidity
- Tremor
- Forward flexed posture **à** pain

ACTIVITY LIMITATIONS

- Balance task performance
- Transfers
- Walking
- Reaching and grasping
- Physical capacity

PARTICIPATION RESTRICTIONS

- ê ability to walk in the home and community
- é falls compared to neurologically healthy
  - Typically occur during transfers and freezing during gait
  - If more than 1 fall in previous year, likely to fall in next 3 months
- Decreased quality of life (QOL)
  - Social isolation

PERSONAL FACTORS

- ê self-efficacy
  - Fear of falling
- Depression

PATIENT EXAMINATION

HISTORY AND PHYSICAL EXAMINATION

- History
  - Systematically assess all levels of ICF
- Physical Examination - 6 specific core areas
  - Transfers (bed mob and sit to stand)
  - Posture (including back and neck problems)
  - Balance and falls (including fear of falling)
  - Gait
  - Reaching and grasping
  - Physical capacity and inactivity

INTERVENTION

INTERVENTION

- Specific plan of care is based on results of the history and physical examination
- Incorporate 6 specific core areas
  - Transfers (bed mob and sit to stand)
  - Posture (including back and neck problems)
  - Balance and falls (including fear of falling)
  - Gait
  - Reaching and grasping
  - Physical capacity and inactivity

KEY RECOMMENDATIONS FOR PT

- Cueing strategies to improve gait
- Cognitive movement strategies to improve transfers
- Specific exercises to improve balance
- Training of joint mobility and muscle power to improve physical capacity

CUEING STRATEGIES TO IMPROVE GAIT

- Stimuli from the environment or generated by the patient
  - Rhythmical- continuous, serial set of stimuli, which pace walking (freq determined from 10-MWT)
- 4 groups of stimuli
  - Auditory
  - Visual
  - Tactile
  - Cognitive

CUEING STRATEGIES TO IMPROVE GAIT

- Stimuli from the environment or generated by the patient
  - Rhythmical- continuous, serial set of stimuli, which pace walking (freq determined from 10-MWT)
  - "One-off" cues-focus point used to maintain balance and for initiating activities
- 4 groups of stimuli
  - Auditory
  - Visual
  - Tactile
  - Cognitive

CUEING STRATEGIES TO IMPROVE GAIT

- Mechanism
  - Provide external rhythm to substitute for loss of internal rhythm from basal ganglia
  - Visual cues may generate optical flow pattern that activates a cerebellar visual-motor pathway
- Results in improved gait

COGNITIVE MOVEMENT STRATEGIES

- Complex automated movements are transformed into a series of sub-movements that are performed in a fixed sequence
  - All sub-movements consist of simple movement components
  - Does not become automated, but remains under conscious control
  - Avoid dual task
- Mechanism
  - Bypass disturbed internal control (BG)
- Results in improved transfers

SPECIFIC EXERCISES TO IMPROVE BALANCE

- Postural instability
  - Strong determinant of perceived disability
  - Increased morbidity and mortality
  - Therefore….. Balance-related interventions and outcomes very important in rehabilitation
- Interventions
  - Use visual and vestibular feedback
  - Combine with LE strength training
  - Combination is more effective than balance exercises alone

IMPROVE PHYSICAL CAPACITY

- Improve joint ROM
  - Combined with gait and balance training
- Strength training to increase muscle power
- Cardiovascular training
- Results in increased ability to participate in functional activities

GENERAL RECOMMENDATIONS

- Involve the partner or caretaker
- Recognize “on” and “off” periods
- Preferentially select functional exercises
- Avoid dual tasking
- Evaluate treatment outcomes every 4 weeks

OUTCOMES ASSESSMENT

ASSESSING OUTCOMES

- Repeated clinical evaluations must be performed when the patient is in a comparable clinical state
  - Same time after medication intake
  - Standardized on/off periods if receiving deep brain stimulation
- Select outcome measures relevant to all levels of the ICF

OUTCOME MEASURES

- Body function – postural stability
  - Postural sway
  - Stability in altered sensory environments
  - Biomechanical responses to internal or external perturbations

OUTCOME MEASURES

- Activity limitations - balance task performance
  - Berg Balance Scale (BBS)
  - Functional Reach Test (FRT)
  - Timed Up and Go (TUG)
  - Tinetti Balance Assessment Tool
  - 10-meter walk test
  - 6-minute walk test

OUTCOME MEASURES

- Participation restrictions
  - Frequency of falls in everyday life
  - Quality of Life (QOL) measures
    - Euro-Quol EQ – 5D
    - PD Questionnaire
    - PD Quality of Life (QOL) Scale
    - Medical Outcomes Scale SF-36
    - Sickness Impact Profile

OUTCOME MEASURES

- Personal factors - self-efficacy
  - Activities-specific Balance Confidence Scale
  - Falls Efficacy Scale (Swedish Version)
- Personal Factors – depression
  - Geriatric Depression Scale

IS REHABILITATION EFFECTIVE?

- Dibble LE, Addison O, Papa E. (2009). The effects of exercise on balance in persons with Parkinson's Disease: A systematic review across the disability spectrum. Journal of Neurologic Physical Therapy, 33, 14-26.

IS REHABILITATION EFFECTIVE?

IS REHABILITATION EFFECTIVE?

Body Function- postural instability

- Intervention
  - Traditional PT, exercise, balance training
  - Highly variable intensity, frequency and duration
- Outcomes
  - Significant improvements in posturography variables

IS REHABILITATION EFFECTIVE?

Activities- balance task performance

- Interventions
  - Dance, BWS treadmill training, LE strengthening
  - Highly variable intensity, frequency and duration
- Outcomes
  - Statistically significant improvement in balance task performance

IS REHABILITATION EFFECTIVE?

- Participation- QOL and falls
- Interventions
  - Qigong, music therapy, traditional exercise (strengthening, stretching, aerobic, treadmill)
  - Highly variable intensity, frequency and duration
- Outcomes
  - 2/7 report improved QOL
    - Clinically relevant improvement in movement-related QOL
  - Significant decrease in near-falls
    - Non-significant decrease in total falls

IS REHABILITATION EFFECTIVE?

- PT is not likely to influence the disease process of PD, BUT...
  - can improve daily functioning by training patients to use compensatory movement strategies

IS REHABILITATION EFFECTIVE?

- There is evidence supporting exercise and physical activity as an effective intervention to improve the symptoms of PD
  - Moderate evidence
    - Postural instability (body function)
    - Balance task performance (activity)
  - Limited evidence
    - QOL outcomes (participation)

IS REHABILITATION EFFECTIVE?

- Can reduce 2° health problems
  - disuse atrophy
  - loss of endurance
  - cardiovascular disease
  - osteoporosis

Thank You!

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