Exercise and activity for PD: Evidence and unanswered questions

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Objectives

- Discuss evidence for benefits of exercise and activity
- Examine vigorous activity and the possible neuroprotective benefits
- Discuss implications for living well with PD
‘Exercise’ vs. ‘Activity’

- **Exercise** refers to specific regimens to improve specific underlying problems (e.g., balance, gait, flexibility etc); often is supervised.

- **Physical activity** refers to any movement of the body that uses energy (e.g., walking, hiking, gardening).
**Which is more important?**

- **Exercise** – helps correct specific underlying problems that interfere with daily function and lead to falls

- **Activity** keeps you going, and is critical after supervised exercise

- Activity, and particularly vigorous activity, is just as important as structured ‘exercise regimens’
“The handle on your recliner does not qualify as an exercise machine.”
Focus of exercise

Cardinal signs
- Rigidity
- Tremor
- Bradykinesia
- Postural instability

Other impairments
- Musculoskeletal (e.g. Range of motion, flexibility, strength)
- Cardiovascular (e.g., Endurance)
- Balance and Gait
- Non motor (e.g., depression, cognition, sleep)
Physiotherapy vs. placebo or no Intervention
39 studies in qualitative synthesis; 1518 participants
24 studies in quantitative synthesis (meta-analysis)

Conclusions
- Most short-term benefits were small but of a size that patients would consider meaningful.
Benefits of Exercise

- General physical therapy vs. Control
- Exercise vs. Control
- Treadmill vs. Control
- Cueing vs. Control
- Dance vs. Control
- Martial arts vs. Control
Short Term Improvements...

- Gait
  - Velocity, step length, two- and six-minute walk
- Functional reach
- Timed Up and Go
- Berg Balance Scale
- Clinician-rated UPDRS

Absence of evidence in other outcomes does not necessarily mean lack of benefit
Findings From 5 Additional Recent Studies

- Flexibility (Schenkman)
- Aerobic endurance (Schulman)
- Resistive strengthening (Corcos; Li)
- Tai Chi (Li)
Exercise is important

- Long-term exercise habits are necessary because PD is chronic and progressive
- Most appropriate exercise prescription is not yet known
- We don’t yet if one exercise approach is best
People with PD (n=699) are 1/3 less active than older adults generally (n=1,959)

Activity levels decline with increasing disease severity

In a longitudinal study: daily steps declined 12% and moderate intensity walking declined 40% in a year

van Nimwegen et al, J Neurol. 2011;258:2214-21.
The ParkFit trial (n = 586)

- A 2-year study comparing
  - physical therapy with a specific emphasis on promoting a physically active lifestyle (ParkFit Program)
  - general physical therapy (ParkSafe Program)

- Included goal setting, overcoming barriers to exercise, recruiting social support, coaching by the physical therapist (PT), and activity monitor with visual feedback for daily activity levels.

- Lasting change in exercise behavior

Outcomes - ParkFit

- 14 day physical activity improved
  - 90 min. / week increase with ParkFit
  - 30 min. / wk increase with ParkSafe.

- Walking endurance (6 min walk test) greater at 24 mo. With ParkFit

van Nimwegen et al BMJ. 2013;346:f576
Regular activity is important

- For sedentary people – just get up and move
- For more active people – build up to regular, vigorous activity
Is vigorous activity important?

- Midlife, regular exercise reduces risk of subsequent PD
- Exercise reduces cognitive impairment in older people with / without dementia
- Animal models – physical exercise enhances brain plasticity

J Eric Ahlskog. *Neurology* 2011;77;288
Comparison of forced pedaling rate vs. self selected rate during tandem biking

Ten participants, random assignment

Forced rate – 30% greater than the individual's voluntary rate

3 sessions (1 hr each) for ten weeks

Ridgel et al, Neurorehabilitation & Neural Repair, 2009
Studies are needed in humans but are expensive.

Before asking this question, first need to determine:

- What is the **best dose** of aerobic exercise?
- Does exercise provide benefits for people prior to initiation of dopaminergic or other dopamine related therapies?
Current Study - Multicenter Trial

Does exercise slow PD symptoms?
Purpose: Define the right intensity of exercise in preparation for a clinical trial of neuroprotection

- Compare aerobic exercise at 2 intensities & no exercise
- People recently diagnosed with PD; not on medications for PD
- Expect to complete the study (126 participants) next year
- Funded by the National Institutes of Health (NIH)
- Compare 2 intensities of aerobic exercise on a treadmill to no exercise:
  - 60-65% HRmax
  - 80-85% HRmax
  - Wait listed control
- Exercise 4X / wk for 6 mo. with option to exercise for another 6 mo.

- Moore et al. Contemporary Clinical Trials 2013;36:90-98
90 participants randomized to date
- 61 completed 6 mo. (primary end point)
- 36 completed 12 mo. end point
- Only 2 withdrew to date prior to 6 mo. (5 prior to 12 mo.)

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- Toby Wellington: 720-848-6376
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Exercise and activity across stages of PD
Live an active lifestyle with continued involvement at home, work and leisure

- **Activity**: Engage in activities that are fun, challenge balance, aerobic condition, multi-tasking

- **Exercise**: Think prevention (e.g., prevent future falls through treating relevant problems)
  - Begin a general exercise program
  - Aerobic
  - Flexibility
  - Strength
Stay active!

**Activity:** Vigorous activity that is fun and safe (e.g., walking program, regular dance, kick boxing)

**Exercise:** Review underlying issues with a professional

- targeted exercise to prevent / reduce musculoskeletal and cardiovascular problems and falls
- Combined training (e.g., balance, strength, flexibility, aerobic)

Reduce multi-tasking
Stay active within abilities!
  - e.g., Walk to get your meds; don’t ask your spouse!!!

**Activity:** Engage in safe fun activities

**Exercise:** May be appropriate to improve balance and even in later stages of PD if able to walk.
  - Few studies have been published from which to identify guidelines for intervention

- Ellis et al: *Phys Ther*, 2009
Does running late count as exercise?
Many participants over many years

Many collaborators

National Institutes of Health

- R01 HD043770 and MO1 RR00051
- R01 NS0743

Davis Phinney Foundation