Optimal Exercise Strategies for Stability, Stamina & Strength

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Disclosures

- Teaching faculty for the Parkinson’s Foundation Allied Team Training in Parkinson’s Disease (ATTP®).

- LSVT BIG® Training and Certification lab instructor.
Research has found one specific exercise that all people with Parkinson’s disease (PD) should be doing daily.

1) True
2) False
Objectives

Discuss the impact of Parkinson’s disease on strength, endurance and balance.

Describe the role of exercise and the evidence based impact which it may have on strength, endurance & balance.

Offer tips and tricks to overcome barriers to exercise for people with Parkinson’s disease.
What Happens to Strength?

Impact of Aging
- Reduction in muscle size and strength
- Inactivity: if you don’t use it you lose it

Impact of Parkinson’s disease
- Bradykinesia & Hypokinesia → perception of weakness
- Active resistance from rigidity of muscles
- Impaired muscle function
Weakness in Parkinson’s disease

- **Limb weakness**
  - Quadriceps
  - Hamstrings
  - Hip extensors (gluteal)
  - Ankle dorsiflexors and plantar flexors

- **Trunk weakness**
  - Trunk extensors
  - Respiratory muscles
  - Pelvic floor muscles
Exercise Application: Strengthening

Progressive Resistance Training

• Resistance machines
  • Leg press
  • Knee extension
  • Knee Flexion
  • Latissimus Dorsi Pull Down
  • Rowing

• Lower body strengthening using a weighted vest or ankle weights or elastic bands
  • Squats
  • Lunging

• Progression: Increase 2-10% when participant carries out 12 reps in all sets in 2 consecutive sessions

Sports Medicine

American College of
Exercise Prescription: Strengthening

- **Contraction type**
  - Isometric
  - Concentric
  - Eccentric

- **Intensity**
  - 60% or 80% rep max (Legs)
  - 12-20 reps
  - 2-3 sets

- **Frequency**
  - 2x per week
  - 3x per week

- **Duration**
  - 8, 12 or 16 weeks.
  - Ongoing?
The Future of Exercise: Strengthening

Research suggests that a combination of resistance training with other forms of exercise may be the most effective in increasing strength in people with PD.

And so we will learn.
Polling Question #2:

Which of the below statements is correct:

A) Aging and Parkinson’s disease both have an affect on strength.
B) Multiple areas in the body of a person with PD are susceptible to becoming weak
C) Research has yet to support a specific dosage of exercise for strengthening
D) All of the above
What Happens to Stamina?

Stamina: the ability to sustain prolonged physical or mental effort.

• “I get tired faster when I do things”
• “I can’t walk as far anymore”
• “I can’t keep up with my spouse”
• “I am unsure if I can do it”
What Happens to Stamina/Endurance?

• Levels of Daily Physical Activity with Disease Progression:
  - H & Y Stage 1 ~200 minutes
  - H & Y Stage 2 ~175 minutes
  - H & Y Stage 3 ~150 minutes
  - H & Y Stage 4 ~75 minutes

• Even in early PD there is trend towards lower activity levels (8% lower) as compared to healthy controls.

• This disparity will increase with disease duration and motor impairment

• GET STARTED EARLY!

Exercise Application: Endurance Training

The Intensity of Exercise

- Can be measured by how hard the activity feels to you.
  - Subjective measurement
  - Modified Perceived Exertion Scale: 0-10
- Exercise intensity is also shown in breathing and heart rate (American Heart Association)
  - Moderate exercise intensity: 50% to about 70% of your maximum heart rate
  - Vigorous exercise intensity: 70% to about 85% of your maximum heart rate
  - Maximum heart rate = 220 - age

The Mayo Clinic: Exercise Intensity How to Measure It: Web
Aerobic Exercise: Modes

- Aerobic: sustained exercises that stimulate and strengthen the heart and lungs, thereby improving the body's utilization of oxygen.

- Treadmill
- Cycling
- Brisk walking
  - Nordic walking
- Swimming
Exercise Prescription: Cycling

Low-resistance cycling with high speed intervals

• Warm-up & cool-down for first and last 5 minutes at preferred cadence
• 20 minutes - fast cadence for 15 seconds, preferred cadence for 45 seconds each minute

Dosing guidelines: 2x/week x 6 weeks for 30 minutes


Lower intensity

• Overall cadence of 42 - 70 rpm – but HR could not exceed 50-55% of maximum HR

Dosing guidelines: 2x/week for 8 weeks – working up to 40 minutes

Exercise Prescription: Treadmill

- The research is varied
  - Perturbations, robot-assist, virtual reality, music, body-weight supported, split belt, circular…
- **Dosing guidelines**: 3-5x/week at 30-45 minutes
- The results vary
- Studies are examining the cardiovascular response and the quality of the gait (treadmill serving as an external pacer)

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Exercise Prescription: Nordic Walking

• **Dosing Guidelines:** ~ 3x/wk for 10 wks (on average)

• **Benefits in addition to the aerobic exercise**
  • Wider base of support
  • Increased stride length
  • Increased activity of arms

• **Considerations:**
  • Better outcomes seen in those with earlier stage PD
  • Training in proper use is needed
  • Studies have also included stretching and strengthening exercises as part of intervention

Polling Question #3:

Moderate exercise intensity is within the range of what percentage of your heart rate max?

a) < 50%
b) 50-60%
c) 50-70%
d) >70%
e) 70-90%
Exercise Prescription: Endurance Training

- Analysis of registry data: 2252 persons with Parkinson disease
- 150 minutes of moderate to vigorous activity per week
- Improvements in function, quality of life and slower progression of symptoms

Oguh et al, 2014
What Happens to Stability?

- Balance dysfunction and postural instability are common in PD
  - Balance dysfunction: static, dynamic, functional
  - Postural instability: righting reactions → ankle, hip, step strategies

- Risk factors for change:
  - Aging
  - Decreased activity
  - Changes in walking—festination, freezing of gait
  - Cognitive changes

- Decreased strength, impaired balance and changes increase risk for falls

Morris et al. Neurorehabilitation and Neural Repair. 2015, 29 (8) 777-785.
Estimate of 60.5% of PWP have at least 1 fall
39% with recurrent falls
76% require medical services
33% result in fractures
Stability Statistics

• Fall risk is almost 8x greater for those with slow gait speed, decreased stance time, and H&Y III.

• **Timing of intervention is crucial.** Target gait deficits and postural control.

• Research showing trends in reducing falls in lower disease severity...“**stressing early intervention as a priority.**”

Exercise Application: Tai Chi

• Tai Chi facilitates even weight distribution between lower limbs, increases muscle strength of lower limbs as well as joint proprioception

• Examples of Tai Chi movements:
  - *Wave Hands like Clouds:* Stepping sideways: left and right
  - *Part the Wild Horse’s Mane:* Stepping diagonally forward: left and right
  - *Hold a Ball:* Stepping diagonally forward: left and right
  - *Repulse Monkey:* Stepping diagonally backward: left and right

• **Dosage guidelines:** 60 minutes, 2-3x/wk for >12 weeks

Winser et al. Jour of Alt and Compl medicine. 2019 (0)0:1-13.
Exercise Prescription: Postural Instability Exercise Program

- Community training and home exercise program
  - Strengthening (lower limb) and balance training exercises (progressing static and dynamic exercises) in a therapist led group class 1x/wk x 60 minutes x 10 weeks
  - Tailor-made home exercise program (safe to perform without guidance)
  - Decreased # of falls, improved walking, improved balance confidence

- Examples of balance exercises
  - Postural stability: uneven surfaces, perturbations, single leg stance
  - Limits of stability: reaching activities
  - Sensory orientation: eyes open/eyes closed
  - Stability of gait: change of direction, challenging surfaces

Fletcher et al. BMC Health Serv Res 2012;12:426
High Level Balance Challenge
Exercise Prescription: Movement Strategy Training and Skilled Based Exercise

• Practice strategies to prevent falls and improve mobility and balance through use of:
  • Attention
  • Mental rehearsal
  • Visualization of movement
  • Cueing: Verbal, visual, rhythmical

• Under supervision of therapist, family member or carepartner

• Dosage guidelines: 1x/wk for ~12 wks

Morris et al. Neurorehabilitation and Neural Repair. 2015, 29 (8) 777-785.
The Future of Exercise: Stability

• Studies show that multifactorial interventions (muscle strengthening, range of motion, balance training and walking training) have a positive effect on balance dysfunction and postural instability.

• More studies are needed to clarify and quantify the training intensity, duration and modality.

Before starting an exercise program, it is important to discuss your program with your doctor and/or physical or occupational therapist. These health professionals can also design a specific fitness routine for you and keep you updated on current Parkinson’s research.
Barriers to Exercise: Tips and Tricks to Overcome

Low outcome expectation from exercise
- Prior experience with therapy and/or exercise

Lack of time to exercise
- Working vs. Retired

Fear of falling
- Why?
- Has anything been done to resolve this?

Having no one to exercise with or motivate them
- Family, friends and/or groups?

Fatigue
- How is this being addressed?

Depression
- How is this being addressed?
Tips and Tricks to Motivate

Motivations for exercising:
- hope that exercise would slow the disease or prevent a decline in function
- feeling better with exercise
- belief that exercise is beneficial
- encouragement from family members

To encourage ongoing activity:
- wanted evidence supporting the benefits of exercise
- greater availability of programs
- guidance from medical providers toward exercise studies

What is the Best Exercise for PwPD?

**ANSWER** – *The one that they are going to keep doing!*

The Parkinson’s Foundation does not endorse one exercise or functional training program over another.

Despite the growing number of studies, we lack comparative effectiveness data for exercise and functional training programs.

There is no one common approach for dosing and measuring in research.

Clinical decision making of your therapy team must be used to develop comprehensive plans based on the particular needs of the individual.
Meet Glenn
Take Away Message

Yes, yes, yes - now, seriously, what can we do to improve our health?

1. Exercise
2. Exercise
3. Exercise
4. Exercise
5. Exercise
6. Exercise
7. Exercise
8. etc.

ED FISCHER '08
thank you

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Professional News

Nurse Faculty Training Program
THE EDMOND J. SAFRA VISITING NURSE FACULTY PROGRAM at Parkinson’s Foundation

Applications Open
7 host locations/2020
Parkinson.org/EdmondJSafraNursing

Multidisciplinary Training Program

Physical Therapy Faculty Program

Applications Open
3 host locations/Summer 2020
Parkinson.org/PTFaculty

For more information, visit Parkinson.org/ProfEd
Newly Diagnosed with Parkinson’s?
You are not alone. We are here to help.

More than 60,000 individuals are diagnosed with PD every year. Close to 50% of them leave their diagnosing physician without resources or information on what the future holds. The Parkinson’s Foundation announced the Newly Diagnosed Initiative to close this gap and provide ongoing support.

Get connected and your questions answered today:

Visit: Parkinson.org/NewlyDiagnosed  Call: 1.800.4PD.INFO (473.4636)  Email: NewlyDiagnosed@Parkinson.org
Resources

National Helpline
Specialists answer calls about all aspects of Parkinson’s in addition to helping you locate your local PD trained allied health professional therapist.
1-800-4PD-INFO
Helpline@Parkinson.org
Mon- Friday 9 am to 8 pm ET

Podcast: Substantial Matters
New episodes every other Tuesday featuring Parkinson’s experts highlighting treatments, techniques and research.
Parkinson.org/Podcast

Fact Sheets and Publications
Get the resources and information you need to start living a better life with Parkinson’s.
Parkinson.org/Library

Aware in Care Kit
Includes tools and information for people with PD to share with hospital staff during a planned or emergency hospital stay.
Parkinson.org/Awareincare