

The Science of Intense Exercise and Parkinson's

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Objectives

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- Share the role of exercise in managing Parkinson's symptoms and its neuroprotective benefits
- Explain the concept and significance of “forced intense exercise”
- Describe the term “dual task training” and why this is beneficial for those living with Parkinson's
- Describe the latest research regarding exercise and Parkinson's
- Review the benefits of group exercise
- Share action steps you can implement into your daily routine

The Role of Exercise & Parkinson's

Positive Benefits of Exercise

- Improves balance & walking function
- Decreases rigidity & improves joint mobility
- Decreases depression
- Combats fatigue
- Improved bone health
- Increased cognitive function
- Increases cardiovascular health
- Can decrease tremor
- Assists with digestion and decreasing constipation



Neuroprotective Benefit of Exercise

- Helps protect cells that are at risk for damage or degeneration
- Increases neuroplasticity
 - Ability of the brain to reorganize or compensate for injury and/or disease
- Greater benefit with more vigorous exercise



Brain Derived Neurotrophic Factor (BDNF)

- A protective protein (neurotrophin) in the brain
- Research shows decreased BDNF levels in those with Parkinson's¹
- BDNF release increases with exercise!^{2,3}
- Could potentially slow the progression of the disease
 - Leads to increased quality of life!

What Is Forced Intense Exercise?

Forced Intense Exercise

- Intensity is not self-selected
- Intensity controlled by outside forces
 - Speed of treadmill
 - RPM's of tandem cycle
 - Target heart rate
- Allows for more high-intensity exercise



Why Is This Important If You Live with Parkinson's?

- Increased neuroprotective benefit with higher intensity exercise
- Higher intensity exercise may slow the progression of the disease⁴

High Intensity Treadmill Training

- High intensity treadmill training is safe & effective⁴
 - High intensity group did not decline after 6 months
 - Moderate intensity group declined by 7.5%
 - Non-exercise group declined by 15%

High Intensity Bootcamp Training

- High intensity bootcamp type exercise is safe & feasible for individuals with Parkinson's⁵
 - Aerobic, strength and balance training
- High intensity bootcamp type exercise is more beneficial than the “usual care, low intensity exercise program”.
- Bootcamp group:
 - More time at higher intensities
 - No increase in adverse events (i.e., falls)
 - Significant improvement in a variety of measures compared to lower intensity group

High Intensity Cycling

- Both voluntary and forced intensity cycling can improve aerobic fitness in individuals with Parkinson's
 - Forced intensity group cycled at 60-80% of individual max heart rate
- Significant improvements in motor function and hand dexterity only seen in forced intensity group⁶
 - Pedaled with trainer at rate 30% greater than their preferred voluntary rate
 - UPDRS motor score increased 35%; no change in voluntary group

Action Item #1

- EXERCISE AT HIGHER INTENSITY
- Target Heart Rate = 80-85% maximum HR
 - Calculate your estimated maximum HR by subtracting your age from 220

consult with your physician before beginning any new exercise regimen



Are You Working Hard Enough?

- Don't want to be out of breath, but breathing more forcefully at rest
- Shouldn't be able to hold a full conversation; breath required every 3-4 words
- Would be likely that you may be sweating
- Should be able to maintain this effort without breaks for 20-30 minutes, if you aren't significantly deconditioned

Dual Task Training

What Is Dual Tasking?

- Completing two or more tasks simultaneously
- Required throughout many situations in everyday life
- May involve both cognitive and motor tasks

How Does This Relate To PD?

- Decreased ability to dual task with PD⁷
 - Executive function deficits
 - Limited attentional resources
 - Less automaticity in performing the tasks
- Significant gait impairments related to PD
 - Increased disability
 - Increased fall risk
 - Decreased quality of life
- Gait impairments exacerbated under dual task conditions

The Good News!

- Dual task ability can be improved!
- Need to practice dual tasking in order to make positive changes

Dual Task Training Benefits

- Motor cognitive dual task training can be improved in PD⁸:
 - Single-task gait velocity
 - Single-task stride length
 - Dual-task gait velocity
 - Dual-task stride length
 - Balance
 - Cognition

Dual Task Training Impacts On Automaticity

- Challenging training (gait and balance program) can improve automaticity of cognitive processing during walking⁹
 - Ability to respond more automatically to cognitive tasks while walking
 - Significantly impacts walking safety in the community
 - Improves independence
 - Increases quality of life

Examples of Motor Dual Task Training

- Walking with head turns
- Marching in place while reaching overhead
- Squats while threading a bead on a string
- Stepping to a target and punching a heavy bag



Examples of Cognitive/Motor Dual Tasking

- Serial Subtraction
 - Counting backward from 100 to 0 in 3's while walking
- Visual Scanning
 - Identify all objects in the room of a certain color while marching in place
- Naming Activities
 - Name as many foods as you can that start with the letter B while stacking blocks
- Calling out a number or color on a target while reaching to that target



Action Item #2

- INCORPORATE DUAL TASK CHALLENGES INTO YOUR EXERCISE REGIMEN

What Type of Exercise Is Best For You?

General Considerations

- Choose a type of exercise or activity you enjoy
- Participate in exercise that targets multiple aspects of fitness:
 - Aerobic/Cardiovascular
 - Strength training
 - Balance training
 - Flexibility
 - Fine motor
 - Weight bearing

Types of Exercise

- Walking/Jogging
- Cycling
- PWR! Moves
- Rock Steady Boxing
- Dancing
- Yoga
- Tai Chi
- Swimming
- Water Aerobics
- Cardio Drumming



Action Item #3

- Think about what types of activities you enjoy
- Do these activities target different aspects of fitness?
- **MAKE A LIST OF THE FORMS OF EXERCISE YOU WOULD BE WILLING TO TRY**

How Often Should You Exercise?

- Minimum exercise guidelines
 - At least 3 times per week
 - 150 minutes of moderate intensity aerobic activity per week
 - 75 minutes of high intensity physical activity per week
- Increase exercise frequency and intensity gradually

Action Item #4

- EXERCISE CONSISTENTLY
- The more you do, the more you benefit!

Benefits of Group Exercise

Group Exercise Benefits

- Socialization
- Accountability
- Motivation
- Camaraderie



Action Item #4

- RESEARCH GROUP CLASSES OFFERED IN YOUR AREA
- Consider what may be available online as well
- Resources available through the Michigan Parkinson Foundation

Who Can Benefit From Exercise?

- EVERYONE!
- Exercise is beneficial for all stages of PD
- Remember, any exercise is better than no exercise!

Remember Those Action Items!

1. Exercise at a higher intensity
2. Add dual task training
3. Make a list of types of exercises to try
4. Exercise consistently
5. Research available group exercise classes

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