

Technology and Parkinson's disease Management

Jay L. Alberts, Ph.D.

Vice Chair of Innovation, Neurological Institute

The Edward F. and Barbara A. Bell Family Endowed Chair

Staff, Biomedical Engineering



Current Technology and Parkinson's disease Management Research Studies at the Cleveland Clinic

1. In-home exercise trial for PD
2. Use of an augmented reality system to train dual tasking (motor + cognitive)
3. Use of virtual reality to assess motor function and cognition
4. Heart-rate controlled treadmill program for de novo PD



In-Home Exercise Trial for PD:

Pragmatic Cyclical Lower Extremity Exercise Trial for Parkinson's Disease

Contact: Liz Jansen

(216) 445-3866

jansena@ccf.org



Problem:

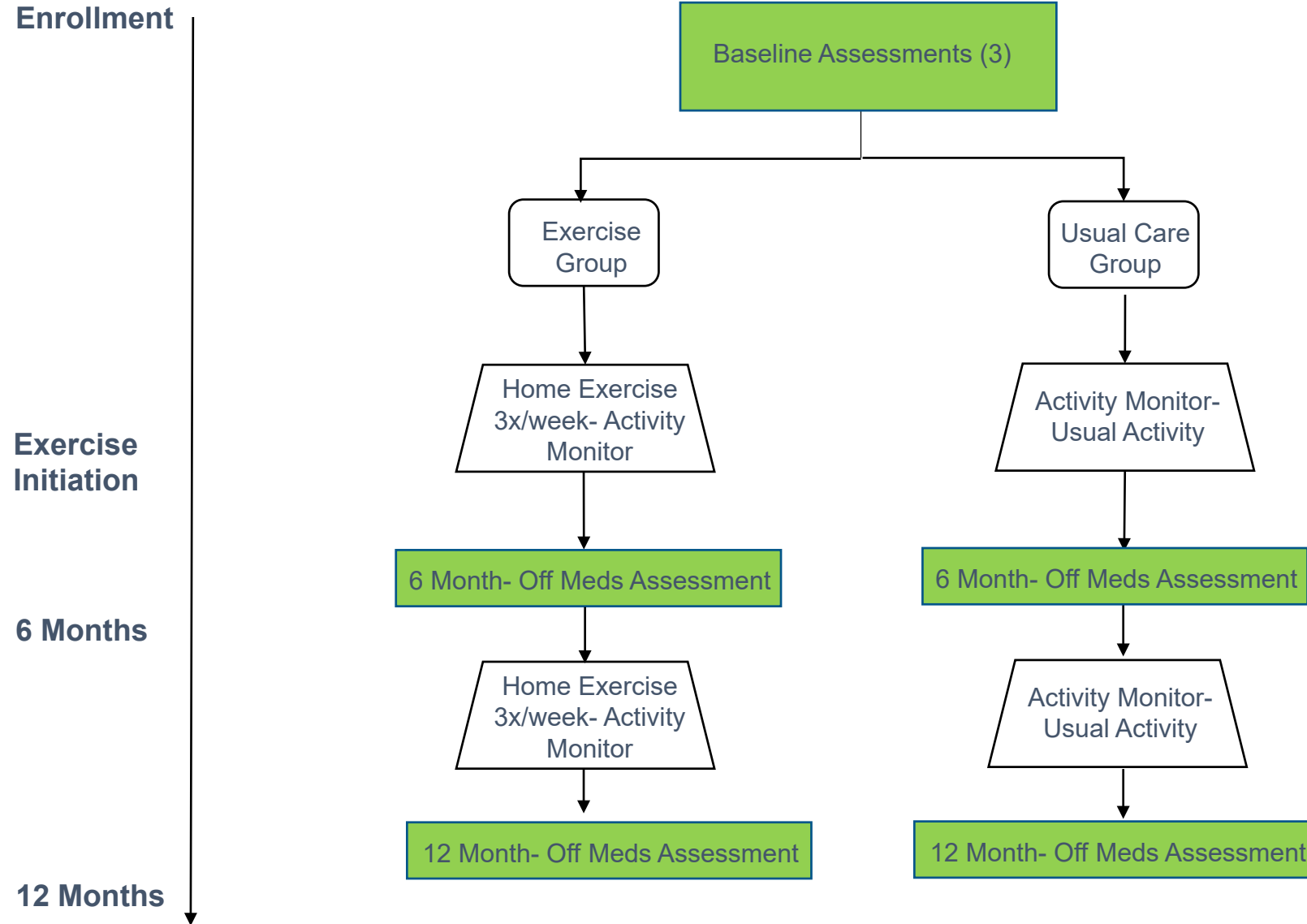
We know that high intensity exercise can improve motor symptoms and may allow for neuroprotection in a laboratory setting, but we don't know if you can get the same result if done in your home.

Purpose of the study:

The goal of this study is to evaluate if regular exercise alters the progression of Parkinson's disease. To do this, we will use the Peloton platform to monitor exercise in individual's homes.



Project Timeline:



Use of virtual reality to assess motor function and cognition:

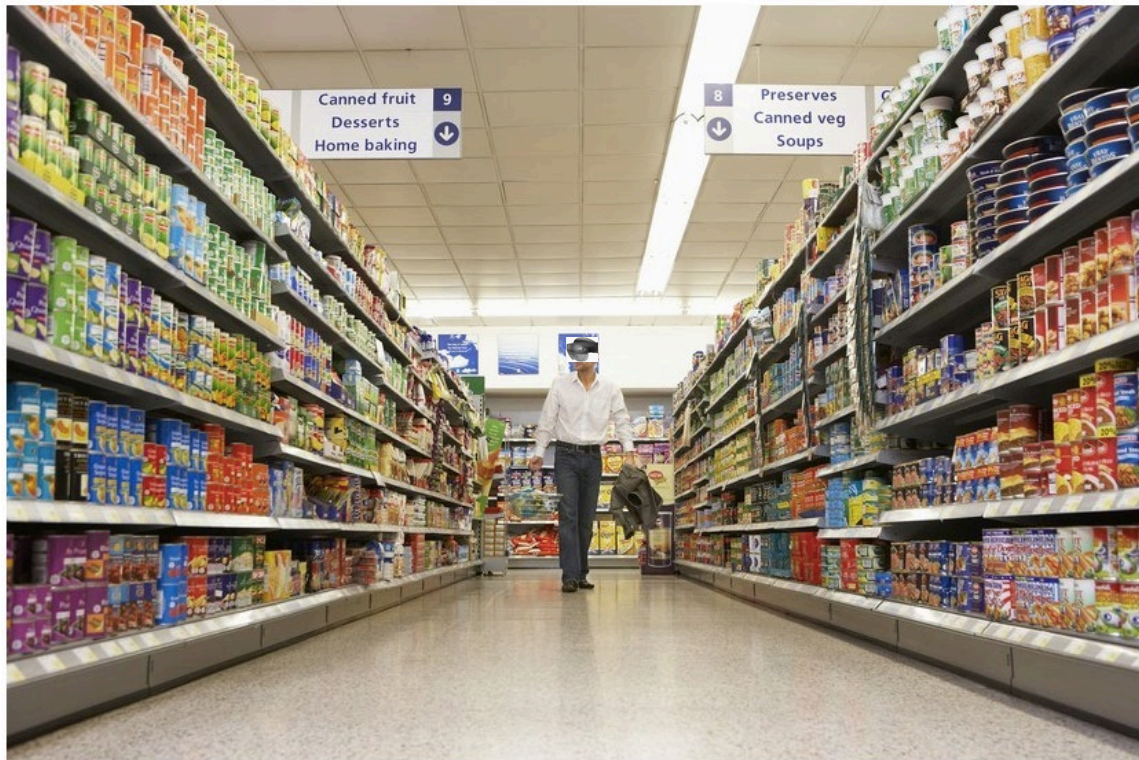
A Virtual Reality Solution for Motor and Cognitive Assessment in Parkinson's Disease

Contact: Morgan McGrath
mcgratm3@ccf.org



Clinical Need in Parkinson's Care:

A **function-led** clinical assessment, offering **experimental control** and **ecological validity**, that can accurately evaluate **cognitive** and **motor** behaviors in during dual-tasking performance



Immersive virtual reality
grocery store experience
combined with an **omni-
directional movement**
platform

Infinadeck + VR



VR headset collects upper extremity position data during task



Omnidirectional platform allows for turning during task performance & collects biomechanical lower extremity data (e.g. step length)



Use of augmented reality as an intervention tool to address gait and falls:

Dual Task Augmented Reality Treatment (DART) for Parkinson's Disease

Contact: Ryan Kaya

(216) 445-3624

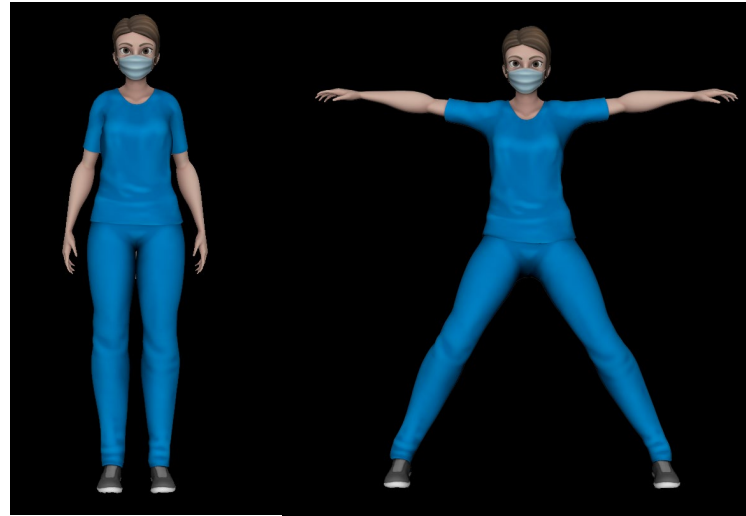
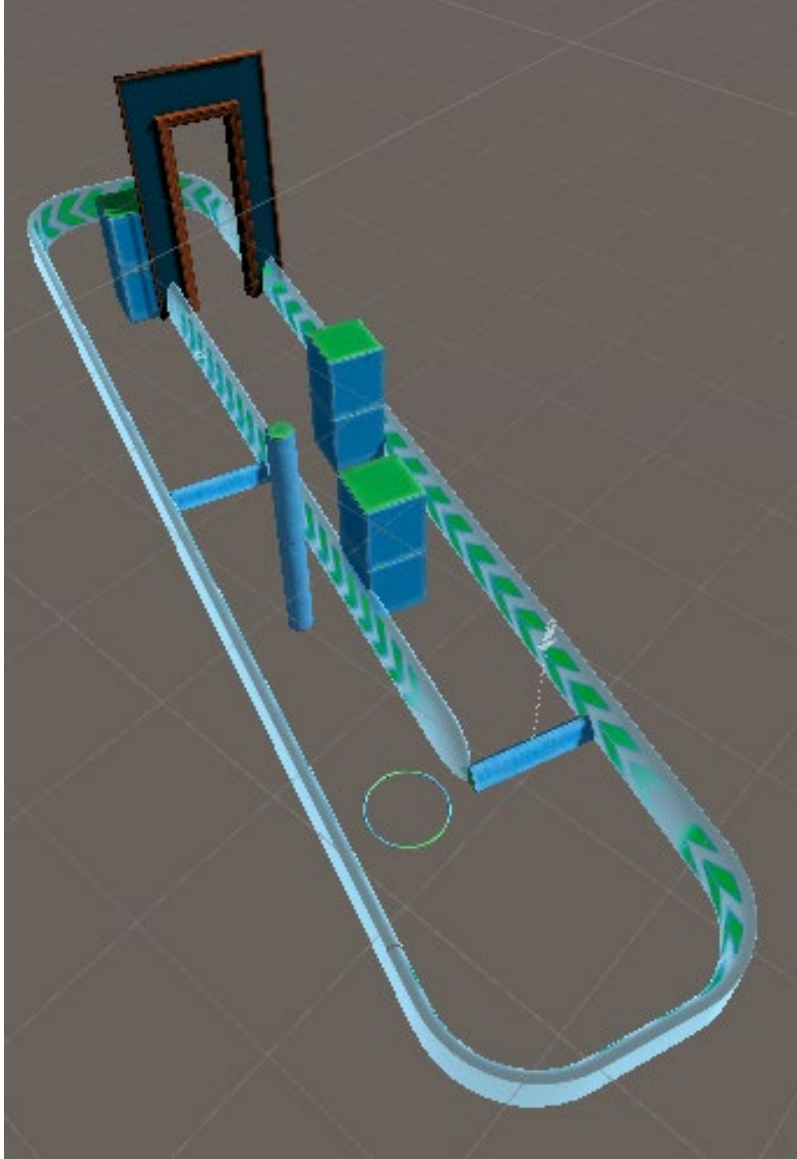
kayar@ccf.org



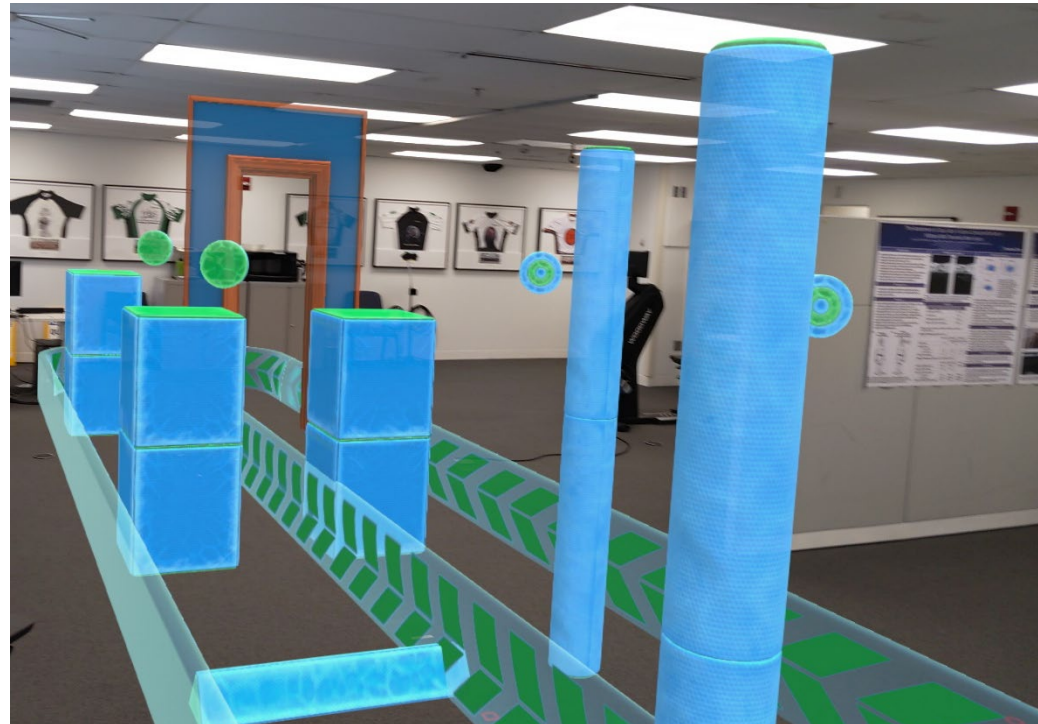
Rationale: Daily tasks (ADLs) require simultaneous performance of motor and cognitive tasks. In persons with PD, dual tasking may lead to increased rates of falls.

Approach: Dual task training delivered by augmented reality program (Microsoft Hololens) vs traditional 1 on 1 therapist lead model.





Digital caregiver (Donna) that leads intervention sessions



Digital environment overlaid on physical environment for patients to perform motor and cognitive tasks



Study in Parkinson's Disease of Exercise Phase 3 Clinical Trial (SPARX3)

Comparing the effects of two different levels of exercise intensity in patients with Parkinson's Disease who are not currently treated with medications

Contact: MacKenzie Dunlap
SPARX@ccf.org





Problem:

Although we know that exercise is therapeutically beneficial for Parkinson's Disease (PD), most clinicians are still unclear about how best to prescribe exercise for their patients. This study aims to test whether the progression of the signs of PD is reduced after 12 months in non-medicated people with PD when they perform high-intensity endurance treadmill walking.

Study Design:

Participants who have been diagnosed with PD within the last 3 years and are not currently being treated with medications will be randomly assigned to 60-65% max heart rate (HR) or 80-85% max HR and will participate in treadmill walking 4 times per week.

Screening and Baseline Assessments
(including imaging)



Randomized to 60-65% HRmax or 80-85% HRmax

Month 3 Assessments

Month 6 Assessments

Month 12 Assessments
(including imaging)

Month 18 Assessments
(End of Intervention)

Month 24 Assessments

Intervention

Participants will complete treadmill walking independently except for supervised visits as follows:

Month 1

Week 1: 4x/week supervised
Week 2: 4x/week supervised
Week 3: unsupervised
Week 4: 1x/week supervised

Months 2-18

2x/month supervised

