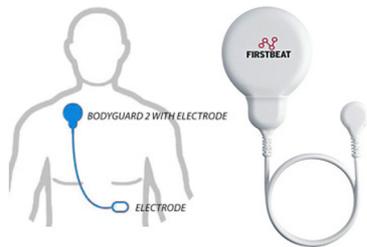


**Background**

- The therapeutic effects of forced aerobic exercise cycling on Parkinson's Disease is well established, as is the link between Parkinson's Disease (PD) patients' health, and the health of their primary caregivers. Caregiver health often suffers due to the effort involved in caring for a PD patient.



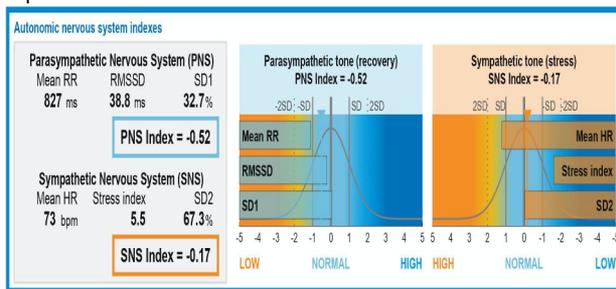
FirstBeat Heartrate Monitor

**Purpose**

This study aims examine the feasibility and limited efficacy of combining the two into a novel therapy where patient and caregiver undergo an 8-week training regimen of VR tandem cycling together aimed to improve physiological and psychological health as well as their relationship metrics.

**Methods**

Ten patient dyads (PD and caregiver) will undergo 16 sessions of VR tandem cycling with a world class trainer for 8 weeks, 2x/week. They will be clinically evaluated pre/post-intervention for physiologic benchmarks such as Heart Rate Variability (HRV), Sleep Quality, and Stress Response via 48-hr heart rate monitoring and Kubios software. Psychological benchmarks will be determined by Parkinson's Disease Quality of Life Measurement System (PD-QOL), Montreal Cognitive Assessment (MoCA), GAD-7, and a Dyadic Relationship Scale among others. Functional health will be examined by Functional Gait Analysis (FGA). Statistically significant differences will be established at  $p < 0.05$ .



Kubios Software Data Analysis

**Expected Results**

We hypothesize that HRV, sleep quality, and stress response will improve. PD-QOL and the Dyadic Relationship Scale and other QOL metrics are expected to improve for both caregiver and patient. The MoCA and Hoen and Yar scales are not expected to change due to primarily being used as exclusion criteria, however the Unified Parkinson Disease Rating Scale (UPDRS) metrics are expected to improve for the patient in concordance with previous research.



VR Tandem Cycling Program - Greenville Cycling and Multisport

**Discussion**

The ongoing study hopes to demonstrate that the novel tandem VR cycling training improves the motor functions, gait, cognitive performances, dyadic relationship, and overall quality of life for PD patients and their caregivers.

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