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HGS-3 The Influence of a Tandem Cycling Program in the Community on Physical and Functional Health, Therapeutic Bonds, and Quality of Life for Individuals and Care Partners Coping with Parkinson's Disease

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Effects of a Tandem Cycling Community Exercise Program on Physiological & Functional Health, Therapeutic Relationships, & Quality of Life in Persons & Caregivers with Parkinson's Disease

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Introduction/ Background

- Parkinson's Disease (PD) is a movement disorder that interferes with patients' ability to complete associated tasks of daily living. Symptoms include dyskinesia, freezing gait, tremors, bradykinesia, etc.
- Multiple studies have demonstrated a beneficial effect of aerobic exercise and lessening symptoms in patients with Parkinson's Disease (PD). However, the benefits of exercise for both patients with PD and their care partners (PD dyad) has yet to be studied. This research project examined the efficacy, therapeutic partnerships, and physical effects of a VR tandem cycling program on PD dyads
- Due to significant impairment, often caregivers are required to step up and take on a new role of aiding their partner to complete such tasks.
- Interventions to decrease caregiver burnout and enhance the relationship between caregivers and partners could lead to better outcomes.
- This study focused on the association between completing an 8-week tandem cycling program on both improvement of the PD patients' symptoms and their therapeutic relationships.
- Our goal is to demonstrate the importance of exercise for not only the patient but their caregiver as well.



Methods

Upon Prisma Health Institutional Review Board approval, patients with PD were identified and screened by their neurologists. Pre-testing measures for PD dyads (N=6) involved emotional and cognitive status questionnaires, including the Patient-Reported Outcomes Measure Information System (PROMIS-29), Geriatric Depression Scale (GDS), and the Revised Dyadic Adjustment Scale (RDAS). Patients with PD had their physical function assessed using the Functional Gait Analysis (FGA) and 10-meter gait speed. The dyads cycled for 8 weeks, 2x/week progressing from 15 to 45 minutes/session in duration as well as varied from light/moderate to higher intensity. Post-testing was performed 48 hours after the final cycling session. Changes due to the intervention were statistically analyzed via paired t-tests, with significance set at $p < 0.05$.

Physical Function

1. Functional Gait Analysis
2. 10 meter Gait Speed
3. Timed Get Up and Go

Cognitive/Behavioral Function

Brief Cope Scale, Brief Resilience Scale, GAD-7, Geriatric Depression Scale, Montreal Cognitive Assessment (MoCA), PDQ-39, PROMIS-29, Revised Dyadic Adjustment Scale

Pre-Testing: PD patients (n=6) were identified and recruited by neurologists at Patewood Neuroscience Associates. PD patients and their care partners who consented to participate in the study completed a pre-intervention assessment consisting of two parts: Physical Function and the PDQ-39 were only administered to PD patients. Baseline heart rate data was collected continuously over 48 hours for each dyad using FirstBeat monitors 2 days prior to the first cycling session.

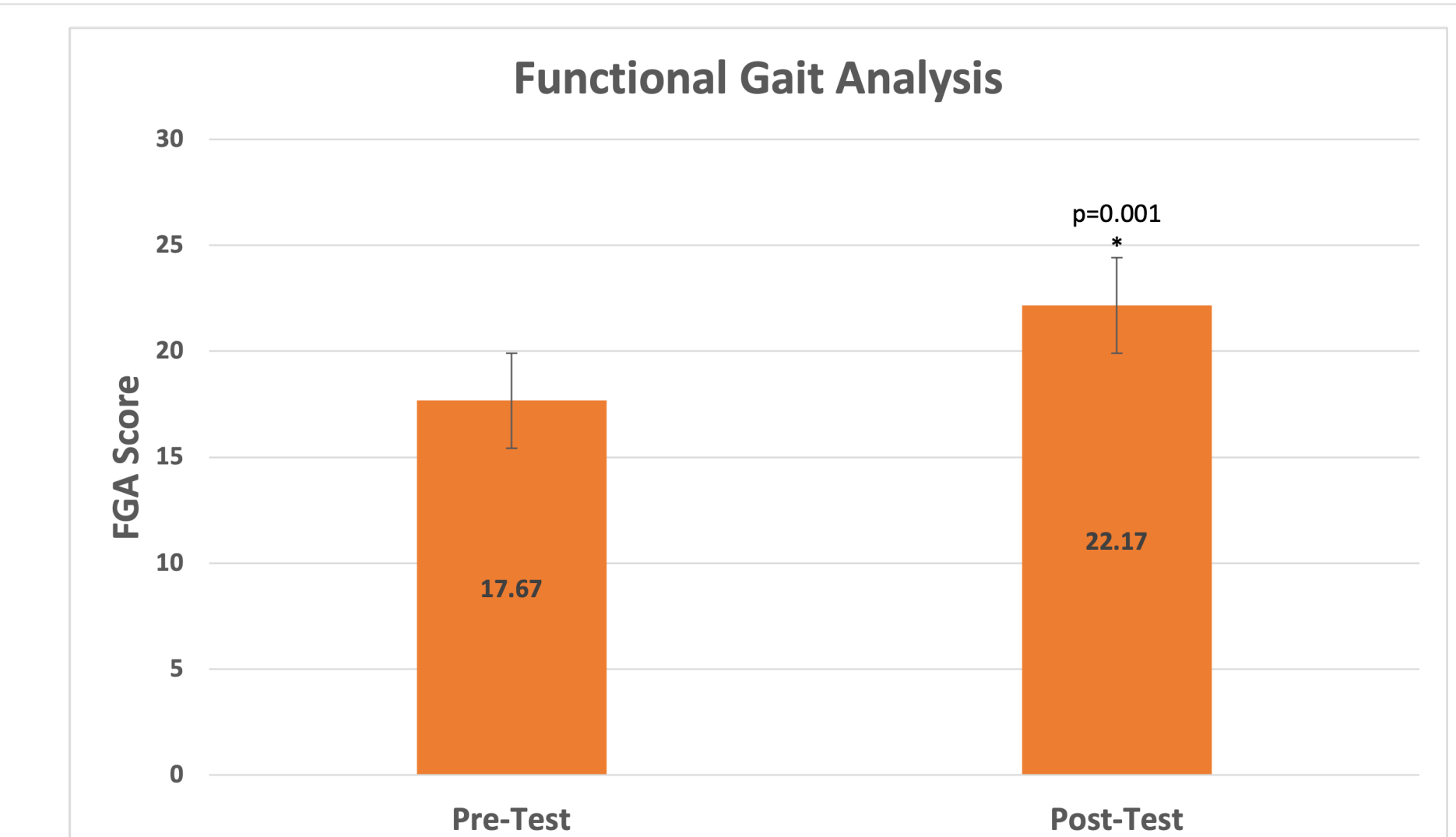
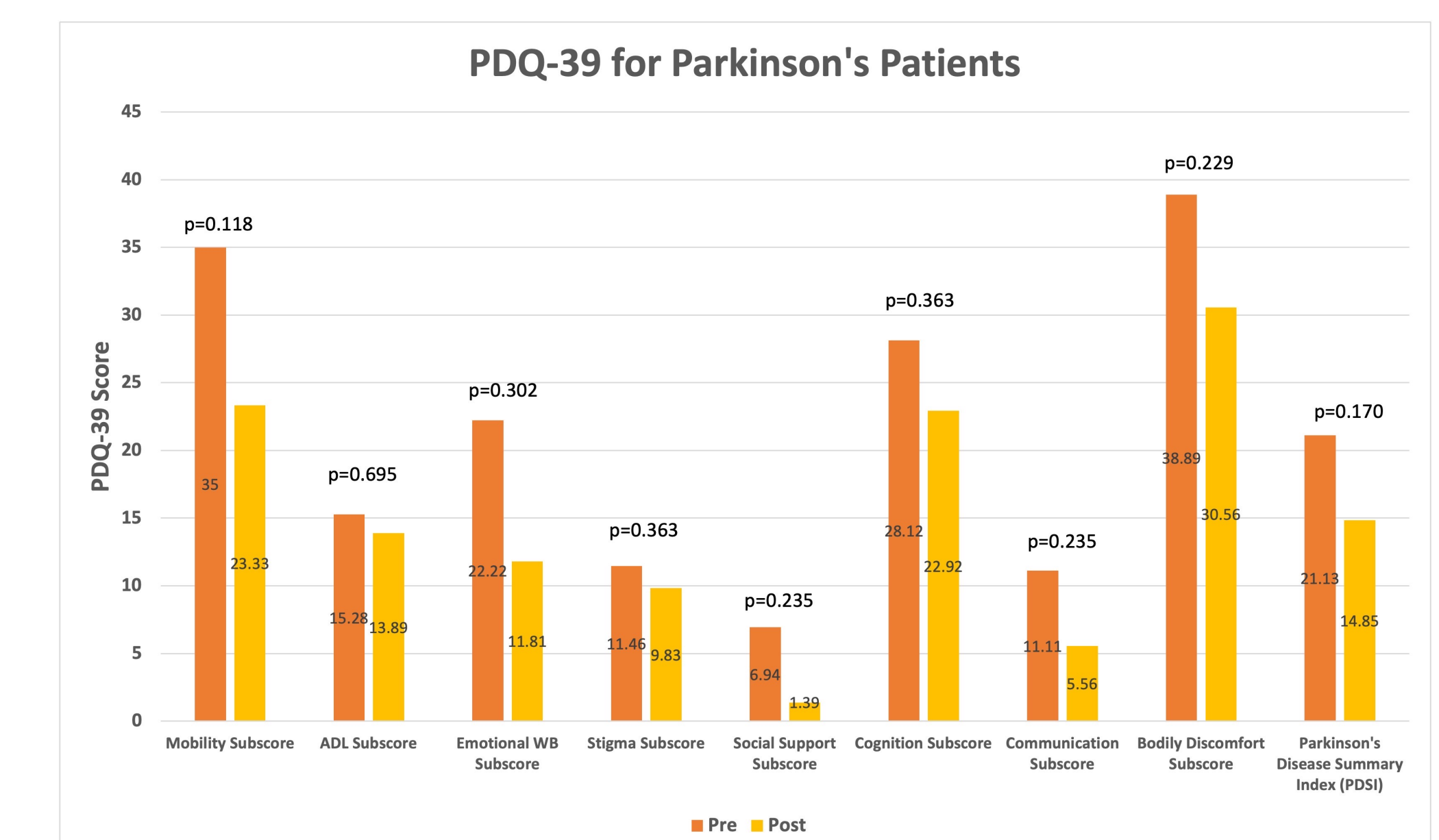
Intervention: PD Dyads completed tandem cycling two days per week at an indoor multi-sport and cycling studio under the supervision of a certified cycling professional. Over the course of 8 weeks, cycling time and intensity was progressed, with participants concluding the study cycling with 45 minute sessions by the end of the intervention.

Post-Testing: 1 week following the conclusion of the intervention, PD dyads were readministered the pre-testing battery. HR data was collected for 48 hours after the last cycling session.

Analysis: All measures were grouped by pre vs. post testing, and PD patients vs. care partners, then statistically analyzed via paired t-tests, with significance set at $p < 0.05$.

Results

- Patients with PD reported a significant increase in perceived ability to participate in social roles and activities (+4.41, $p = 0.022$; CI: -7.90, -0.93) via the PROMIS-29.
- Both patients and their care partners also reported less depressive symptoms on the GDS ($p = 0.099$; CI: -0.24-1.84; $p = 0.304$; CI: -1.87-4.87), respectively).
- Functionally, patients' total FGA scores significantly increased (+4.5, $p < 0.001$; CI: 1.08, 3.25) and 10-meter gait speeds significantly improved with an average decrease of 2.17 seconds ($p = 0.004$; CI: -5.95, -3.05).



Conclusion

- An 8-week PD tandem cycling exercise program may provide functional benefits and reduce symptoms for patients with PD, and also strengthen caregiver/partner relationships.
- Early next year, we plan on completing a 3rd wave of the study to further evaluate the efficacy of the PD tandem exercise intervention.
- In the future, this could lead to partnerships with gyms in the community to open up the opportunity to more patients.