ORAL PRESENTATION
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Eccentric Cycling Versus Concentric Cycling Exercise in Patients with Type 2 Diabetes: A Feasibility Study

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ABSTRACT

Background and Objectives: Exercise plays a crucial role in managing type 2 diabetes mellitus (T2DM). Eccentric cycling offers an innovative solution to deliver low cardiopulmonary-demand exercise in patients with impaired exercise capacity. This study sought to assess the feasibility, focusing on safety, adherence, enjoyment and changes in outcomes of eccentric cycling compared to concentric cycling in T2DM patients. **Methods:** This pilot experimental three-armed, controlled trial included three male patients with T2DM, randomly assigned to moderate-intensity eccentric cycling (MI-ECC), high-intensity eccentric cycling (HI-ECC), or moderate-intensity concentric cycling (MI-CON, control group). Participants completed supervised cycling twice weekly for 10 weeks (20 sessions; 3x10 min/session). Key outcomes included adherence rate, adverse events, exercise enjoyment, perceptual response (Borg CR-10 scale), glycated hemoglobin (HbA1C), lipid profiles, and physical performance. **Results:** Exercise adherence and enjoyment were excellent (≥80%) for all groups. Mild to moderate muscle soreness (Numerical pain rating scale 3/10 – 5/10) was reported in MI-ECC and HI-ECC groups in the first 2 weeks and resolved thereafter with no other adverse events observed. MI-ECC showed lower perceived breathlessness and leg fatigue (0–1) compared with HI-ECC (0–4) and MI-CON (3–6). Improvements were observed in triglyceride levels (−0.27 to 0.74 mmol/L), 6-minute walk distance (30–63 meter), and maximal oxygen consumption (0.06–0.16 L/min) across groups. **Conclusion:** This study provides preliminary evidence that eccentric cycling is feasible, safe, and improves health outcomes in patients with T2DM. Further large-scale randomized controlled trials are required to establish the efficacy and safety of eccentric cycling in this population.

Keywords: Diabetes mellitus; eccentric cycling; eccentric exercise; feasibility; physical performance

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