

Effects of Dynamic Cycling on Motor Function, Gait, and Balance in Individuals with Parkinson's Disease

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Parkinson's disease (PD) is a progressive neurodegenerative disease that affects more than half a million people in the United States and leads to difficulties in performing activities of daily living, such as standing and walking. Dynamic high cadence cycling has been shown to improve motor function; however, it is not known if multiple bouts of dynamic cycling lead to improvements in gait and balance in individuals with idiopathic PD. **PURPOSE:** To assess if six bouts of dynamic cycling, on a motorized recumbent cycle, improves motor function, gait and balance in individuals with PD. **METHODS:** Sixteen subjects (9 males and 7 females; age 70 ± 7 years; Hoehn and Yahr score of 1.57 ± 0.51) with moderate idiopathic PD were randomized into a dynamic cycling or a control (stretching) group. For the dynamic cycling sessions, a motorized recumbent bicycle was programmed to maintain various revolutions per minute (RPM). Dynamic cycling consisted of a 5 minute warm-up at 50 rpm, 30 minutes of high cadence cycling between 75-85 rpm, and a 5 minute cool down at 50 rpm. Motor function, balance and gait were assessed after every cycling bout using the UPDRS Motor III scale, Kinesia One, Timed up and Go (TUG), and the Modified Clinical Test of Sensory Interaction in Balance (mCTSIB). **RESULTS:** Six bouts of dynamic cycling significantly improved UPDRS scores ($P = .030$), kinetic tremor ($P = .001$), hand movement amplitude ($P = .006$), rapid alternating hand movement speed ($P = .001$), gait ($P = .004$), and TUG time ($P = .012$) from baseline testing to end of treatment. Additionally, a significant interaction for main effect of group occurred in UPDRS scores ($F = 20.051$, $P = .001$), kinetic tremor ($F = 6.141$, $P = .027$), hand movement amplitude ($F = 10.879$, $P = .005$), rapid alternating hand movement speed ($F = 16.579$, $P = .001$), gait ($F = 9.417$, $P = .008$), and TUG ($F = 6.977$, $P = 0.12$). Lastly, six bouts of dynamic cycling resulted in a 17% improvement in UPDRS scores, 11% improvement in kinetic tremor, 36% improvement in hand movement amplitude, 23% improvement in rapid alternating hand movement speed, 60% improvement in gait, and 22% improvement in mobility from baseline testing to end of treatment. However, six bouts of dynamic cycling did not improve balance in individuals with PD. **CONCLUSION:** Six bouts of dynamic cycling improves motor function and gait in individuals with PD.