Acute effects of sprint interval and steady-state handcycling exercise in Parkinson's disease: a randomized crossover pilot study

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Introduction



Parkinson's disease (PD) can cause motor symptoms, including tremor, that may impair hand dexterity and everyday function.

Exercise improves PD related symptoms, including motor function, mobility and quality of life. Handcycling may be an accessible upper-body exercise option for people with PD, but the acute effects of different handcycling intensities on hand function remains unclear.



The objective of this study was to compare the acute effects of sprint interval handcycling (SPRINT) and steady-state handcycling (STEADY) on hand dexterity in people with PD.



Methods

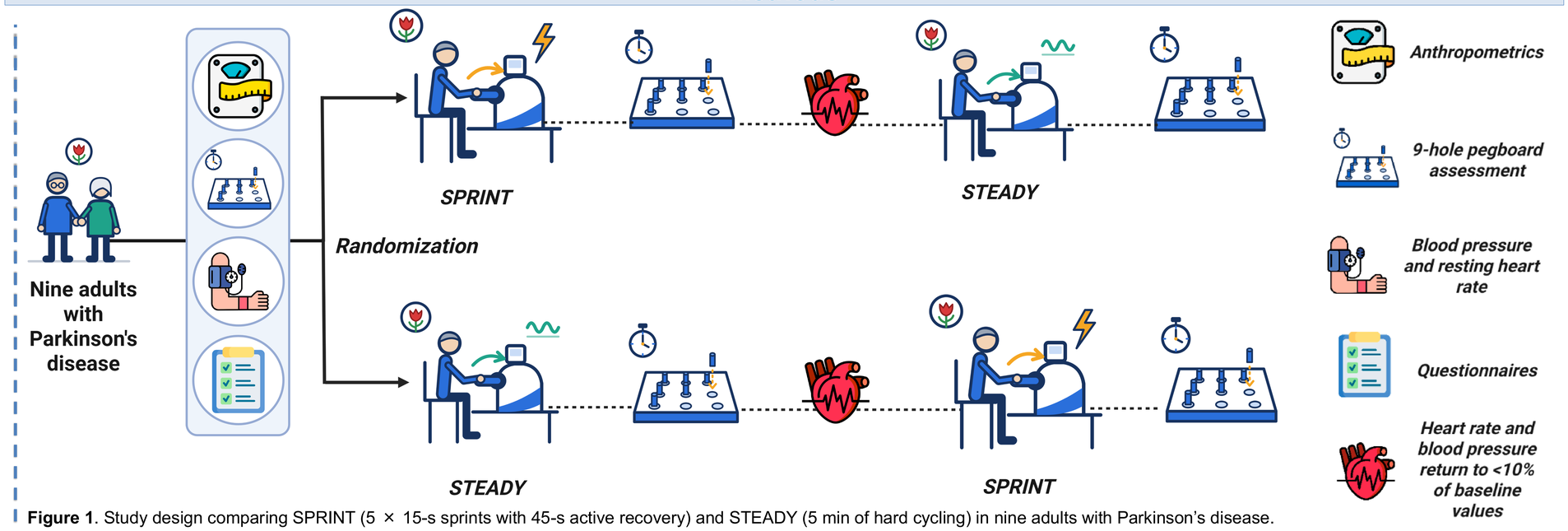

Figure 1. Study design comparing SPRINT (5 × 15-s sprints with 45-s active recovery) and STEADY (5 min of hard cycling) in nine adults with Parkinson's disease.

Results

Outcome	Males	Females	Combined
N	5	4	9
Age (years)	70±8	64±4	67±7
Physical Characteristics			
Height (cm)	176±6	167±7	172±7
Weight (kg)	77±7	61±6	72±15
BMI (kg/m^2)	25±2	22±2	23±2
SBP (mmHg)	117±19	144±35	129±29
DBP (mmHg)	66±13	76±16	70±14
RHR (BPM)	63±7	82±18	72±15
Clinical Measures			
Days since symptom onset	2968±1770	2440±1421	2733±1550
Days since diagnosis	2061±1121	1941±1322	2008±1134
MDS-UPDRS III Score	37±15	11±4	25±17
Hoehn-Yahr Score	3±1	1±1	2±1
Levodopa Equivalent Daily Dose (LEDD; mg)	780±291	638±342	717±303
PDQ-39 Summary Index	16±5	14±8	15±6

Table 1: Baseline characteristics disaggregated by sex.

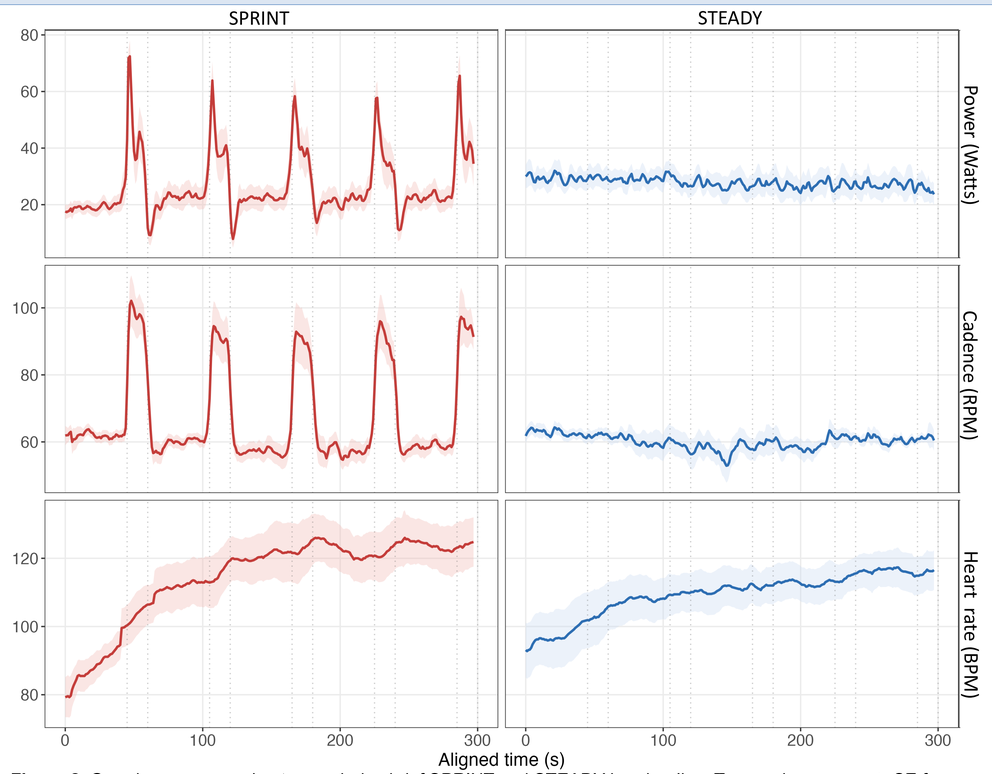

Figure 2: Grand-average session traces during brief SPRINT and STEADY handcycling. Traces show mean ± SE for power, cadence and heart rate.

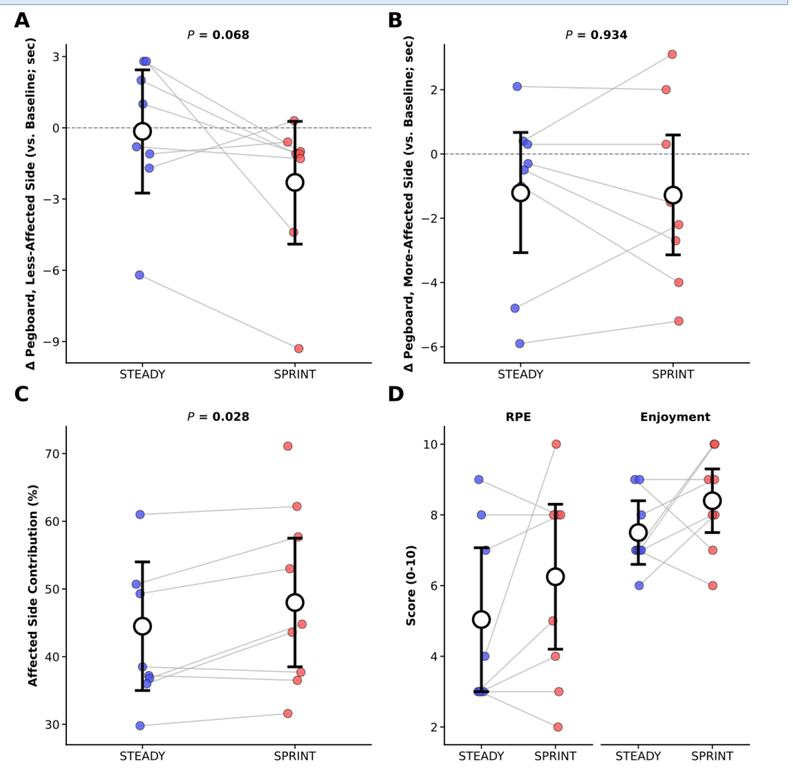

Figure 3. Responses to SPRINT and STEADY handcycling for (A-B) pegboard performance, (C) affected-side contribution, and (D) perceived exertion and enjoyment.

Conclusion

Sprint interval handcycling shows promise for improving hand dexterity in people with Parkinson's disease. Exploratory analysis revealed greater affected side contribution during SPRINT. Larger studies are needed to optimize exercise prescription.

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