Background: A significant proportion of patients with COVID-19 have developed persistent symptoms, described as post-acute COVID-19 syndrome (PACS). A specific PACS variant is the postural orthostatic tachycardia syndrome (POTS). POTS is a cardiovascular autonomic dysfunction characterized by an excessive increase in heart rate in standing, deconditioning and low quality of life. Studies that have evaluated the effect and feasibility of individual tailored physical training in POTS associated with COVID-19 are sparse.

Purpose: To evaluate the effects and feasibility of individualized exercise on physical and psychological function in patients with POTS after COVID-19.

Method: Patients with POTS + PACS were enrolled between Dec 2021 and Dec 2022. The intervention consisted of individually tailored training, including endurance and muscle-strengthening exercises with a gradual progression of time, dose and position. The training was based on the study subject’s heart rate and/or self-estimated exertion using BORG RPE. The intervention lasted 12 weeks. Progression of the exercise was halted if the study subject described increased symptoms >24h after the last exercise session. Measurements were carried out at baseline and after intervention: 6-minute walking test (6MWT), Active Standing Test (AST) and self-assessment of symptoms through forms; Malmö POTS scale (MaPS), Vanderbilt Orthostatic Symptom Score (VOSS), Fatigue Severity Scale (FSS) health-related quality of life (EQ-5D-5L), anxiety (GAD) and depression (PHQ-9). Physical activity and time in different positions (lying, sitting, standing and walking) were measured using accelerometers (ActivPAL). Recruitment rate, compliance and adverse events was registered as feasibility.

Results: A total of 24 patients were enrolled and 23 patients completed the intervention (19 women; mean age, 40.9 years (SD 10.7). No severe adverse events occurred however some of the patients described symptoms as post exertion malaise (PEM). After the intervention, patients demonstrated improvement in physical (6MWT, p<0.005) and psychological functions (PHQ-9, p<0.001), less symptoms related to POTS (MaPS p<0.01, VOSS p<0.02, FSS p<0.045) and improved HrQoL (EQ-5D p<0.001) (Table 1). The primary outcome, time spent in upright position increased by 1.5h/day i.e. by 49% (Figure 1).

Conclusion: In patients with COVID-19-related POTS, an individually tailored training seem to contribute to increased time in upright position, reduction of POTS-specific symptoms and improved functions. The intervention seems to be feasible in terms of recruitment, compliance and safety. Further studies are needed to verify these results and compare disease progression with and without intervention.

Table 1
Figure 1