

Treatment effect of respiratory therapy with intermittent hypoxic-hyperoxic training (IHHT) on functional capacity in patients with post COVID19 conditions: a controlled treatment trial

A. Shafieesabet¹, B. Alimi², J. Muhar², P.O. Schueller², W. Doehner¹

¹Charite - Campus Virchow-Klinikum (CVK), Berlin, Germany

²MEDIAN Klinik Flechtingen, Flechtingen, Germany

Funding Acknowledgements: Type of funding sources: Foundation. Main funding source(s): BMBF

Introduction: COVID-19 can cause long-term lung and systemic damage that will lead to increasing numbers of patients disabled by reduced functional capacity. Intermittent hypoxia-hyperoxia training (IHHT) is a respiratory therapeutic concept which has been suggested to improve exercise performance via controlled hypoxic conditioning. The purpose of the present study is to investigate the therapeutic effect of IHHT on the recovery process during inpatient rehabilitation in post-COVID conditions.

Methods: A prospective, single-center, randomized controlled trial was conducted in 145 (37 men) patients with post COVID19 conditions aged 27-84 years, who were admitted to a hospitalized rehabilitation program (duration 27±5 days). Patients were 1:1 allocated to the standard rehabilitation program or IHHT on top of standard rehabilitation. The patients in IHHT group attended regular (alternate days) treatments of hypoxia-hyperoxia breathing sessions (10–12% O₂ hypoxia breathing followed by 30-35% O₂ hyperoxia breathing in 6-8 cycles for a total of 45 min). The primary endpoint of the trial was improvement in walking distance in a six-minute walk test (6MWT) between groups. Further endpoints of functional testing included stair climbing test (SCT), patient global assessment, fatigue assessment scale (FAS) and Quality of life (QoL) assessed by EQ5-D analog scale. Subjective perceived health was assessed by Median Corona Recovery Score (MCRS).

Results: The IHHT group demonstrated in comparison to controls a significant improved primary endpoint (6MWT difference, IHHT group vs controls: 91.7 vs. 32.5m, P<0.001), improved stair climbing (SCT -1.9 vs. -0.5 sek, P<0.001), improved QoL (EQ5-D analog scale change 31.3 vs. 2.9, P<0.001), improved fatigue (FAS -8.9 vs. 3.6, P<0.001) and improved perceived health (MCRS -10.3 vs. -2, P<0.001, all IHHT group vs. controls). The IHHT group exhibited a significant increase in hemoglobin content and a significant decrease in CRP compared to baseline (P<0.001), whereas these changes were not observed in the control group.

Conclusion: Respiratory treatment by IHHT in patients with post COVID conditions resulted in improved functional capacity in multiple of functional tests and in improved QoL and perceived health.