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Randers Sundhedscenter

Feasibility of web-based protocol in a 12 weeks home-based IMT program for individuals with COPD

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Background

Although inspiratory muscle training (IMT) has been proven effective in inspiratory muscle function, exertional dyspnoea, and exercise tolerance and is frequently applied in individuals with COPD; training-adherence remains a challenge. Furthermore, participants' inability to maintain effective training levels with mechanical threshold loading (MTL) is a well-known issue in IMT

Aim

To investigate the feasibility and adherence of a web-based protocol with a feedback function using mechanical threshold loading (MTL) as home based IMT in individuals with COPD.

Method

Thirty-six individuals with inspiratory muscle weakness were randomly selected from a pulmonary rehabilitation program to perform 12 weeks of MTL with either a web-based protocol (n=17) or a usual protocol with a paper logbook (n=19). All participants performed two daily sessions of 30 breaths.

In the intervention group, training was executed with the highest tolerable intensity of maximal inspiratory mouth pressure (PI_{max}), and feedback was web-based on effort scores that used the 10-Item Borg Category Ratio".
Training in the control group was executed with 30% of PI_{max} with no feedback.

Feasibility, adherence, training intensity, PI_{max}, and six minute walk tests were evaluated. Student's t-tests and Fischer's exact test were used for statistics.

Results

Groups were comparable in terms of gender, age, marital status, spirometry, BMI, pre- PI_{max}, walk test and dropout rates.

The intervention group reported a mean of 210 (168;251) training sessions versus the control group 161 (116;205), p=0.05.

The intervention group increased the walk distance by 46 meters versus 15 meters in the controls. Differences in PI_{max} were insignificant, with a trend towards the intervention group. The average improvements in PI_{max} was 10 cmH_2O in the intervention group and 5.5 in the controls, however difference was insignificant between the groups.

| Baseline caracteristica	Intervention	Control	Non-participant
N = 47, n	17	19	11
Female, n (%)	10 (59%)	16 (84%)	10 (90%)
Married, n (%)	14 (82%)	13 (68%)	9 (81%)
In work, n (%)	5 (29%)	5 (26%)	3 (27)
FEV1, %pred mean (SD)	61.4 (13.1)	57.8 (12.6)	61.6 (14.8)
Age, year mean (SD)	64.8 (6.3)	63.7 (9.5)	64 (7.3)
BMI, kg/m² mean (SD)	26.5 (4.9)	24.5 (4.3)	23.0 (2.5)

Pre-intervention	Intervention	Control	Non-participant
prePI$_{max}$, CM H2O (mean)	67 (18)	58 (20)	58 (19)
pre 6MWD, meter (mean)	416 (40)	371 (106)	350 (104)

Post-intervention	Intervention	Control
Drop-outs, n	5	4
Training sessions, mean (SD)	88 (47)	67 (50)
Training as by protocol, n (%)	10 (56)	8 (44)
post PI$_{max}$, CM H2O, mean (SD)	77.9 (19)	61.1 (23)
post 6MWD, mean (SD)	463 (61)	370 (121)

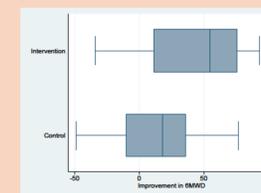| Training sessions	Intervention	Control
<35%, n (%)	1 (8%)	4 (27%)
35-69%, n (%)	1 (8%)	3 (20%)
>70%, n (%)	10 (83%)	8 (53%)
Total	12 (100%)	15 (100%)
100% training sessions = twice a day i 120 days		

IMT intensity
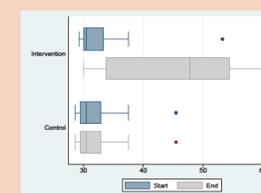
Improvement in 6 minutes walk distance

Conclusion

IMT with mechanical threshold loading executed with the highest tolerable intensity based on effort scores showed adequate feasibility, significant better training adherence, significant better outcome in six minutes' of walk test and better improvements in PI_{max} than IMT with executed with 30% of PI_{max}.