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Title: Effect of exercise training on ventilation in patients with COPD or chronic heart failure

Dr. Marta 8725 Gudjonsdottir marta@reykjalundur.is [1,2], Mr. Egill 8726 Thoroddsen egill.thoroddsen@gmail.com [1], Mrs. Arna E. 8727 Karlsdottir arnaek@reykjalundur.is [2], Mrs. Asdis 8728 Kristjánsdottir asdiskri@reykjalundur.is [2], Dr. Magnus R. 8729 Jonasson magnusj@reykjalundur.is MD [2] and Dr. Magdalena 8731 Asgeirsdottir magdalena@reykjalundur.is MD [2]. [1] Department of Physiology, University of Iceland, Reykjavik, Iceland, 101 and [2] Department of Heart and Lung Rehabilitation, Reykjalundur, Rehabilitation Centre, Mosfellsbaer, Iceland, 270 .

Body: Ventilatory efficiency is reduced in patients (pts) with COPD or chronic heart failure (CHF) resulting in abnormal dyspnoea during exercise. The aim of the study was to evaluate the effect of exercise training on ventilation in these pts. Methods: 25 COPD pts (11 males; 64±9 years old, GOLD 3-4) and 25 CHF pts (23 males, 55±10 years old, NYHA class II-III, ejection fraction ≤ 35%) underwent maximal exercise test pre and post rehabilitation programme (RP) measuring oxygen uptake ($V'O_2$), carbon dioxide output ($V'CO_2$) and ventilation (V'E). The ventilatory efficiency was evaluated using the $V'E/V'CO_2$ slope. Breathing pattern was evaluated using iso-ventilation, i.e. maximal V'E, tidal volume (VT) and respiratory rate (RR) pre RP compared to the same parameters during iso-$V'O_2$ post RP. Exercise training in the RP consisted of endurance and strength training 5 days a week for six weeks. Results: Exercise endurance increased and ventilatory requirements reduced post RP. Breathing pattern was improved in COPD pts but ventilatory efficiency was unchanged in both groups (Table 1).

Table 1

	COPD pts		CHF pts	
	PRE	POST	PRE	POST
V'O2max (ml/kg/min)	9.8 ± 4.5	10.9 ± 5.4*	14.4 ± 6.9¥	17.5 ± 9.1*
V'E/V'CO2 slope	36.2 ± 7.2	34.7 ± 7.6	35.0 ± 9.1	34.3 ± 9.7
Iso-V'E (L/min)	30.9 ± 9.6	28.3 ± 8.7*	45.7 ± 17.6¥	40.9 ± 15.6*
Iso-VT (L)	1.07 ± 0.33	1.17 ± 0.36*	1.58 ± 0.56¥	1.56 ± 0.56
Iso-RR (per min)	29.4 ± 5.1	24.4 ± 2.3*	29.8 ± 6.1	26.9 ± 5.6*

Data are presented as mean ± SD. *p<0,05 post RP vs pre; ¥ p<0,05 CHF vs COPD

Conclusion: Exercise training did not improve ventilatory efficiency but reduced ventilatory requirements

during heavy exercise giving prospect of less dyspnoea during effort in these pts.