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Title: Effects of 8-wk muscle training in dyspneic COPD patients: Results from the DICES study

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Body: Background Strength training (ST) and neuromuscular electrical stimulation (NMES) improve muscle function, exercise capacity and health status in dyspneic COPD patients. Differences in effects between low-frequency (LF-NMES; 15 Hz), high-frequency NMES (HF-NMES; 75 Hz) and ST have not been studied in COPD. The aim was to compare effects of LF-NMES, HF-NMES and ST in dyspneic COPD patients with quadriceps weakness. Method Effects on quadriceps function, exercise capacity and health status were studied in the DICES study (Dyspneic Individuals with COPD: Electrical stimulation or Strength training). 120 patients (age: 64 (8) yrs; FEV₁: 33 (13) %pred; all MRC 4/5) were randomly assigned to an 8-wk LF-NMES, HF-NMES, or ST program as part of inpatient pulmonary rehabilitation. Endurance training was not performed. Results Groups were similar at baseline. Quadriceps strength and endurance, exercise capacity and health status improved following HF-NMES or ST. LF-NMES improved quadriceps endurance, exercise capacity and health status. Change in quadriceps strength following HF-NMES was higher compared to LF-NMES (table).

Changes in muscle function, exercise capacity and health status

	HF-NMES (n=33)	LF-NMES (n=29)	ST (n=29)
Peak torque (Nm)	10.8 (2.9)*	1.4 (1.8)#	6.1 (2.0)*
Total work (J)	285 (51)*	101 (45)*#	192 (51)*
6MWD (m)	65.9 (14.2)*	51.1 (14.6)*	28.5 (12.3)*
CWRT time (s)	171 (58)*	167 (46)*	69 (30)*
SGRQ total (pnts)	-10.2 (2.4)*	-10.5 (3.0)*	-11.4 (2.5)*

Mean (SEM), *p<0.05 vs baseline, # p<0.05 vs HF-NMES.

Conclusion Dyspneic COPD patients with lower-limb muscle weakness retain the capacity to improve

lower-limb muscle function, exercise capacity and health status. HF-NMES seems a reasonable option.