CARED Report Summary

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STUDY OBJECTIVES: To investigate the response to interval exercise (IE) training by looking at changes in morphologic and biochemical characteristics of the vastus lateralis muscle, and to compare these changes to those incurred after constant-load exercise (CLE) training.

DESIGN: Randomized, controlled, parallel, two-group study (IE vs CLE training).

SETTING: Multidisciplinary, outpatient, hospital-based, pulmonary rehabilitation program.

PATIENTS: Nineteen patients with stable advanced COPD (mean +/- SEM FEV1, 40 +/- 4% predicted).

INTERVENTIONS: Patients (n = 10) assigned to IE training exercised at a mean intensity of 124 +/- 15% of baseline peak exercise capacity (peak work rate [Wpeak]) with 30-s work periods interspersed with 30-s rest periods for 45 min/d. Patients (n = 9) allocated to CLE training exercised at a mean intensity of 75 +/- 5% Wpeak for 30 min/d. Patients exercised 3 d/wk for 10 weeks.

MEASUREMENTS AND RESULTS: Needle biopsies of the right vastus lateralis muscle were performed before and after rehabilitation. After IE training, the cross-sectional areas of type I and IIa fibers were significantly increased (type I before, 3,972 +/- 455 microm2; after, 4,934 +/- 467 microm2 [p = 0.004]; type IIa before, 3,695 +/- 372 microm2; after, 4,486 +/- 346 microm2 [p = 0.008]), whereas the capillary-to-fiber ratio was significantly enlarged (from 1.13 +/- 0.08 to 1.24 +/- 0.07 [p = 0.013]). Citrate synthase activity increased (from 14.3 +/- 1.4 to 20.5 +/- 4.2 micromol/min/g), albeit not significantly (p = 0.097). There was also a significant improvement in Wpeak (by 19 +/- 5%; p = 0.04) and in lactate threshold (by 17 +/- 5%; p = 0.02). The magnitude of changes in all the above variables was not significantly different compared to that incurred after CLE training. During training sessions, however, ratings of dyspnea and leg discomfort, expressed as fraction of values achieved at baseline Wpeak, were significantly lower (p < 0.05) for IE training (73 +/- 9% and 60 +/- 8%, respectively) compared to CLE training (83 +/- 10% and 87 +/- 13%, respectively).

CONCLUSIONS: High-intensity IE training is equally effective to moderately intense CLE training in inducing peripheral muscle adaptations; however, IE is associated with fewer training symptoms.

Reported by

NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS - DEPARTMENT OF PULMONARY AND CRITICAL CARE MEDICINE
Ploutarou street, 3
10675 Athens
Greece