Supplemental Oxygen During High-Intensity Exercise Training in Nonhypoxemic Chronic Obstructive Pulmonary Disease

BACKGROUND: Physical exercise training is an evidence-based treatment in chronic obstructive pulmonary disease, and patients' peak work rate is associated with reduced chronic obstructive pulmonary disease mortality. We assessed whether supplemental oxygen during exercise training in nonhypoxemic patients with chronic obstructive pulmonary disease might lead to superior training outcomes, including improved peak work rate.

METHODS: This was a randomized, double-blind, controlled, crossover trial. Twenty-nine patients with chronic obstructive pulmonary disease (aged 63.5 ± 5.9 years; forced expiratory volume in 1 second percent predicted, 46.4 ± 8.6) completed 2 consecutive 6-week periods of endurance and strength training with progressive intensity, which was performed 3 times per week with supplemental oxygen or compressed medical air (flow via nasal cannula: 10 L/min). Each session of electrocardiography-controlled interval cycling lasted 31 minutes and consisted of a...
warm-up, 7 cycles of 1-minute intervals at 70% to 80% of peak work rate alternating with 2 minutes of active recovery, and final cooldown. Thereafter, patients completed 8 strength-training exercises of 1 set each with 8 to 15 repetitions to failure. Change in peak work rate was the primary study end point. RESULTS: The increase in peak work rate was more than twice as high when patients exercised with supplemental oxygen compared with medical air (0.16 ± 0.02 W/kg vs 0.07 ± 0.02 W/kg; P < .1 for all exercises). CONCLUSIONS: We report that supplemental oxygen in nonhypoxemic chronic obstructive pulmonary disease doubled the effect of endurance training but had no effect on strength gain.

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