Acute respiratory muscle unloading improves time-to-exhaustion during moderate and heavy-intensity cycling in obese adolescent males.

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Obesity significantly impairs breathing during exercise. The aim was to determine, in male obese adolescents (OB), the effects of acute respiratory muscle unloading, obtained by switching the inspired gas from ambient air (AIR) to a normoxic helium + oxygen gas mixture (HeO_2) (AIR → HeO_2) during moderate [below gas exchange threshold (GET)] and heavy [above GET] constant work rate cycling. Ten OB [age 16.0 ± 2.0 years (mean ± SD); body mass index (BMI) 38.9 ± 6.1 kg/m2] and ten normal-weight age-matched controls (CTRL) inspired AIR for the entire exercise task, or underwent AIR → HeO_2 when they were approaching volitional exhaustion. In OB time to exhaustion (TTE) significantly increased in AIR → HeO_2 vs. AIR during moderate [1524 ± 480 s vs. 1308 ± 408 (P = 0.024)] and during heavy [570 ± 306 s vs. 408 ± 150 (P = 0.0154)] exercise. During moderate exercise all CTRL completed the 40-min task. During heavy exercise no significant differences were observed in CTRL for TTE (582 ± 348 s [AIR → HeO_2] vs. 588 ± 252 [AIR]). In OB, but not in CTRL, acute unloading of respiratory muscles increased TTE during both moderate- and heavy-exercise. In OB, but not in CTRL, respiratory factors limit exercise tolerance during both moderate and heavy exercise.

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