

Acute respiratory muscle unloading by normoxic helium-O₂ breathing reduces the O₂ cost of cycling and perceived exertion in obese adolescents.

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Purpose: In obesity, an increased work of breathing contributes to a higher O₂ cost of exercise and negatively affects exercise tolerance. The purpose of the study was to determine whether, in obese adolescents, acute respiratory muscle unloading via normoxic helium-O₂ breathing reduces the O₂ cost of cycling and perceived exertion.

Methods: Nine males [age 16.8 ± 1.6 ($x \pm SD$) years, body mass 109.9 ± 15.0 kg] performed on a cycle ergometer, breathing room air (AIR) or a 21% O₂-79% helium mixture (He-O₂): an incremental exercise, for determination of $\dot{V}O_2$ peak and gas exchange threshold (GET); 12 min constant work rate (CWR) exercises at 70% of GET (<GET) and 120% of GET (>GET) determined in AIR.

Results: $\dot{V}O_2$ peak was not different in the two conditions. From the 3rd to the 12th minute of exercise (both during CWR < GET and CWR > GET), $\dot{V}O_2$ was lower in He-O₂ vs. AIR (end-exercise values: 1.40 ± 0.14 vs. 1.57 ± 0.22 L min⁻¹ <GET, and 2.23 ± 0.31 vs. 2.54 ± 0.27 L min⁻¹ >GET). During CWR > GET in AIR, $\dot{V}O_2$ linearly increased from the 3rd to the 12th minute of exercise, whereas no substantial increase was observed in He-O₂. The O₂ cost of cycling was ~10 % (<GET) and ~15 % (>GET) lower in He-O₂ vs. AIR. Heart rate and ratings of perceived exertion for dyspnea/respiratory discomfort and leg effort were lower in He-O₂.

Conclusions: In obese adolescents, acute respiratory muscle unloading via He-O₂ breathing lowered the O₂ cost of cycling and perceived exertion during submaximal moderate- and heavy-intensity exercise.

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