

## Effect of Respiratory Muscle Training on 20km Cycling Time-Trial Performance

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**PURPOSE:** We examined the effects of inspiratory and expiratory muscle training (RMT) on the pulmonary, physiological, and perceptual responses to maximal, sub-maximal, and 20km time-trial (TT) performance. **METHODS:** Ten trained cyclists ( $27 \pm 5.7$  y,  $76.3 \pm 8.9$  kg,  $57.8 \pm 7$  ml·kg<sup>-1</sup>·min<sup>-1</sup>) were randomly assigned to experimental (EG; n=5) or control (CG; n=5) groups. EG trained  $2 \times \text{d}^{-1}$  with the Powerlung™, a handheld pressure device, while CG trained  $1 \times \text{d}^{-1}$  with a sham device. Both groups completed 30 repetitions per training session for 6 wk and were blinded to study intent, believing they completed strength (EG) vs. endurance (CG) exercises. Pulmonary, physiological, and perceptual responses to maximal, sub-maximal, and 20km time-trial tests were assessed pre- to post-training. **RESULTS:** RMT increased inspiratory muscle strength by 28% across time in EG ( $p < 0.05$ ). Respiratory muscle endurance increased 131% ( $p < 0.025$ ) in EG across time and was 260% greater than CG ( $p < 0.023$ ) after training. RMT lowered the TT rating of perceived exertion by 9.7% across time in EG ( $p < 0.038$ ). Compared to CG after training, EG sub-maximal heart rate, sub-maximal rating of perceived exertion, sub-maximal rating of ventilatory exertion, and TT time were 8.5, 14.1, 48.5, and 4.4% lower, respectively ( $p < 0.05$ ), while TT power output and respiratory muscle endurance were 16.6 and 159.7% higher, respectively ( $p < 0.025$ ). **CONCLUSIONS:** Six weeks of RMT in trained individuals enhances respiratory muscle performance and decreases perceived exertion during intense 30 min efforts, but does not improve maximal, sub-maximal, or 20km TT performance.