

Bicycle Handlebar Width Does Not Affect Spirometry, Ventilation, or Gas Exchange

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Category: Masters

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ABSTRACT

Bicycle fit may affect comfort, aerodynamics, efficiency, ventilation, and power generation. Handlebars determine how the rider interacts with the bicycle. A wide range of handlebar widths are commercially available, but it is unclear if the resultant position affects lung function, ventilation, gas exchange, or efficiency. **PURPOSE** We aimed to measure the effects of handlebar widths on ventilation, gas exchange, spirometry, and comfort during moderate constant power exercise. **METHODS** Twenty-four recreationally active adults completed the study (32 ± 5 yrs., 175 ± 9 cm, 74 ± 12 kg, 8 women, 16 men). Participants completed three moderate constant power bouts of exercise on a cycle ergometer (Lode Excalibur PFM) while using handlebars set equivalent to, or ± 4 cm in width to the participant shoulder width. We used a one-way RMANOVA to compare the three handlebar widths. **RESULTS** There was no difference in gas exchange and ventilation between the three handlebar widths: $\dot{V}O_2$ ($F[2, 23] = 0.99, p = 0.38$), $\dot{V}CO_2$ ($F[1.47, 23] = 0.39, p = 0.62$), \dot{V}_E ($F[2, 23] = 0.53, p = 0.59$), V_T ($F[2, 23] = 0.44, p = 0.65$), f_{Br} ($F[2, 23] = 0.17, p = 0.84$), $P_{et}O_2$ ($F[2, 23] = 0.45, p = 0.64$), $P_{et}CO_2$ ($F[2, 23] = 0.25, p = 0.78$). Similarly, there were no differences in inspiratory capacity during the bout ($F[1.49, 22] = 1.34, p = 0.27$) or any spirometry variables immediately following exercise: FVC ($F[1.43, 22] = 0.88, p = 0.39$), FEV_1 ($F[2, 22] = 0.30, p = 0.74$), FEV_1/FVC ($F[2, 22] = 0.18, p = 0.84$), PEF ($F[2, 22] = 0.14, p = 0.87$). There was no difference in the overall comfort ($F[2, 23] = 0.90, p = 0.41$) or shoulder discomfort ($F[2, 23] = 0.90, p = 0.42$). **CONCLUSIONS** Bicycle handlebar widths within 4 cm shoulder width do not result in changes to ventilation, gas exchange, efficiency, spirometry, or comfort during moderate power cycling exercise. Within the limits of rider preference, comfort, and safety, handlebar width can be adjusted substantially for aerodynamic purposes without affecting rider physiology.