

Abstract

Facial masks are used as an alternative to the traditional mouthpiece with a nasal clip for gas collection during cardiopulmonary exercise testing. These masks bring potential issues (gas leakage or increased dead space) that may affect the results of measured metabolic and ventilatory parameters. The aim of this thesis was to compare measured parameters and subjective assessment of exercise intensity during 2 maximal exercise tests in 26 subjects (8 women and 18 men, aged 25.3 ± 2.7 years). A statistically significant difference at maximum exercise intensity was found in parameters $\dot{V}E_{max}$ (N 112.62 ± 23.35 L/min, M 127.55 ± 29.42 L/min), DF_{max} (N 39.6 ± 6.6 breaths/min, M 46.9 ± 9.0 breaths/min), DO_{max} (N 2.89 ± 0.63 L, M 2.75 ± 0.56 L), RER_{max} (N 1.15 ± 0.05 , M 1.17 ± 0.04). No statistically significant difference at maximum exercise intensity was found in the parameter $\dot{V}O_{2max}$ (N 48.13 ± 6.14 ml/kg/min, M 47.47 ± 6.46 ml/kg/min), which is considered as the gold standard for assessing endurance fitness. This parameter was also plotted in the Bland-Altman diagram, visually confirming the agreement between methods N and M at all stress levels. A statistically significant difference at a exercise intensity of 2W/kg was found in parameters $\dot{V}E_{2W/kg}$ (N 53.04 ± 8.42 L/min, M 58.38 ± 11.76 L/min), DF (N 23.4 ± 5.4 breaths/min, M 28.6 ± 4.3 breaths/min), and DO (N 2.38 ± 0.64 L, M 2.08 ± 0.51 L). A statistically significant difference in the initial phase of exercise (after 3 minutes of 1W/kg intensity) was found in parameters $\dot{V}O_{2 1W/kg}$ (N 19.17 ± 1.20 ml/kg/min, M 18.55 ± 1.22 ml/kg/min), $\dot{V}CO_{2 1W/kg}$ (N 1.30 L/min, M 1.18 L/min), $RER_{1W/kg}$ (N 0.94 ± 0.07 , M 0.89 ± 0.05), DF (N 19.2 ± 4.4 breaths/min, M 22.7 ± 4.3 breaths/min), and $DO_{1W/kg}$ (N 1.86 ± 0.66 L, M 1.54 ± 0.31 L). Differences in parameters TF and rate of perceived exertion were not statistically significant at any exercise intensity level. Based on statistical analysis and clinical evaluation of average differences and despite existing statistically significant differences in measured parameters, the facial mask can still be used as an alternative to a mouthpiece during both maximal and submaximal stress tests. However, when selecting a mask or mouthpiece, potential influences on measured parameters should be considered, especially when comparing tests measured with different collection devices.