

Abstract

Title: Comparison of two analysers of respiratory gases by paired examination of the same persons.

Resource: The basic assumption of laboratory measurements is precision of devices. The aim of this study was to determine if the values of spiroergometric parameters measured at the same load on the same subjects by two different devices are comparable. We compared the respiratory gas analyzer Kardiospirox (Junkalor, CR) and Oxycon Delta (Jaeger, Germany).

Methods: We studied 11 subjects on both devices on the same day. The intensity and duration of load were chosen to be repeatable in the same quality after a short rest. We measured the basic spiroergometric parameters at rest, during exercise 20W, 50W, 100W and 150W for men and at rest, during exercise 20W, 40W, 80W and 120W for women, always at steady state. For statistical comparison method we used Student's paired T test.

Results: Heart rate (HR), oxygen consumption ($\text{VO}_2 \cdot \text{kg}^{-1}$), ventilatory equivalent (VE/VO_2), breathing frequency (DF), respiratory exchange ratio (RER) did not differ significantly. Pulmonary ventilation (VE) and expired carbon dioxide ($\text{VCO}_2 \cdot \text{kg}^{-1}$) were significantly different. The reason could be that the sensor for ventilation of Oxycon works with inhaled and exhaled air while Kardiospirox works with just exhaled air. Kardiospirox had low sensitivity, especially at low air flow rates, because the most remarkable differences in VE and $\text{VCO}_2 \cdot \text{kg}^{-1}$ between the two devices were found at rest conditions. The differences could also be due to the fact that the analysis was not carried out simultaneously.

Conclusions: The respiratory gas analyzers Kardiospirox and Oxycon Delta in most indicators provide comparable results. Pulmonary ventilation and expired carbon dioxide were not comparable. Higher accuracy could be achieved by measuring the same person by both devices simultaneously. This would have required some technical adjustments to analysers by the manufacturers.

Keywords: Analyser of respiratory gases, spiroergometry, VO_2 peak.