



Online Perspectives Journal: Biological & Health
Proceedings of the 7th International Congress on Scientific Knowledge
6th Research & Development PROVIC/PIBIC
v. 11, n° 38, Supplement, 2021

Effects of face mask use on exercise during the covid-19 pandemic: the principal component analysis (PCA)

Paloma Priscila Porreca¹, Mayara Jeronymo Uébe Mansur¹, Victor Paes Dias Gonçalves^{2,3}, Bárbara Vieira Bolckau Miranda¹, Anderson Pontes Morales³, Marlana Ribeiro Monteiro⁴

(1) Scientific Initiation Volunteer Student at PROVIC/ISECENSA – Physical Education Course; (2) Dental Surgeon at the Club de Regatas Vasco da Gama-RJ; (3) Collaborating Researcher at the Human Motricity Biosciences Laboratory – LABIMH/ISECENSA; (4) Research Advisor LABIMH/ISECENSA – Physical Education Course – CENSA/ISECENSA Higher Education Institutes, Rua Salvador Correa, 139, Centro, Campos dos Goytacazes, RJ, Brazil

The COVID-19 pandemic also raised questions about the practice of physical activity using a face mask and how this would affect breathing and performance. The aim of this study was to investigate the effects of using a tissue face mask recommended by the World Health Organization (WHO) on the variation of heart rate (HR), minute volume (VE), and muscle O₂ saturation (SO₂ m) parameters during performing the incremental load exercise and verifying the maximum time obtained at the end of the exercise. A 21-year-old male, 85 kg of total body mass and 1.68 m of height were selected. The individual performed an incremental load test to maximum exhaustion on the XT cycle ergometer (TRG Fitness®) in two moments: No mask - Control (C); Cloth Mask (CM). The individual was instructed to maintain a cadence of 61-65 rpm and every 2 minutes a load of 30.8 watts was added until maximum exhaustion. A ventilometer VO₂ Pro (Cefise®) and a near infrared spectroscopy sensor (Moxy®) were used, placed in the vastus lateralis muscle of the right leg. Data were analyzed every 20% of the total time (20%, 40%, 60%, 80% and 100%) under conditions C and CM. The parameters of HR, VE and SO₂ m were monitored throughout the test and the data were statistically processed by a software (Origin Pro® 3.226) using a multivariate analysis technique (Principal Component Analysis - PCA) to analyze interrelationships between the variables. In test condition C, an eigenvalue of 2.979 was observed with two variables (VE and SO₂ m) associated with greater variation (PC1). The maximum time obtained at the end of the test was 1535 seconds. In the CM condition, an eigenvalue of 2.881 was observed with two variables (HR and SO₂ m) associated with greater variation (PC1). The maximum time obtained at the end of the test was 1330 seconds. It is concluded that the use of CM reduces VE variation, which may be associated with greater airflow resistance. The greatest variation observed in HR was due to the use of CM, impacting the delay in the appearance of the plateau. In addition, the use of a tissue mask recommended by the WHO reduces the maximum exercise time performed on the cycle ergometer in a healthy individual. These findings are useful for evaluating the effects of using CM in high-performance sports. Additional studies in the elderly and people with lung or heart disease are needed.

Keyword: Performance. Principal Component Analysis. Exercise Test.

Supported by: ISECENSA.