Physiological Effects of Exercising at Different Intensities Wearing TNT or Double-layer Cotton Facemasks Compared to Not Wearing a Mask .

FABRICIO BRAGA DA SILVA, GABRIEL ESPINOSA, AMANDA MONTEIRO, BEATRIZ MARINHO e EDUARDO R F DRUMMOND

Laboratório de Performance Humana, Rio de Janeiro, RJ, BRASIL - Casa de Saúde São Jose, Rio de Janeiro, RJ, BRASIL.

Purpose: We compared the physiological differences between exercising wearing a TNT or a double-layer cotton (DLC) facemask (FM) and not wearing a mask (NM).

Methods: Sixteen volunteers underwent 4 sets (S) of 2 sequential bouts (B) based on ventilatory threshold (VT) work rate: 80% of VT1 and VT2 for B1 and B2, respectively. FMs were used as follows: S1: NM, S2: TNT or DLC, S3: DLC or TNT and S4: NM. Oxygen and carbon dioxide output, heart rate, tidal volume (V_T), breath frequency (B_f), minute ventilation (V_E), end tidal (E_TCO_2) and mixed-expired ($PECO_2$) CO_2 pressure, oxygen saturation (SpO_2), duty cycle (T_i/T_{TOT}), rate of perceived effort, subjective thermal perception and FM microclimate temperature were monitored throughout exercise.

Results: < a>Results are expressed as the respective effect sizes (ES [95%CI]) for TNT and DLC unless otherwise indicate. Compared to NM, FM increased T_i/T_{TOT} (B1=1.11[0.58-1.61] and 1.53[0.81-2.18]; B2=1.27[0.63-1.84] and 1.93[0.97-2.68]) and decreased B_f (B1=0.59[0.23-0.94] and 1.43[0.79-2.07], B2=0.39[0.05-0.71] and 1.33[0.71-1.94]). Only B1 V_T increased (0.33[0.09-0.56] and 0.62[0.18-1.05]) enough to avoid a V_E reduction with TNT but not with DLC (B1=0.52[0.23-0.79]; B2=0.84[0.44-1.22]). Both FMs reduced SpO_2 in B1 (0.56 [0.07-1.03] and 0.69 [0.09-1.28]) but only DLC did in B2 (0.66 [0.11-1.13]). Both E_TCO_2 (B1=0.23[0.05-0.4] and 0.71[0.38-1.02]; B2=0.56[0.2-0.9] and 1.20[0.65-1.68]) and $PECO_2$ (B1=0.74[0.38-1.08] 1.71[1.03-2.37], B2=0.94[0.45-1.38] and 1.78[0.97-2.42]) increased with FMs.

Conclusion: Ventilatory adaptations imposed during FM exercising influenced blood-lung gas exchange. Larger ESs were seen with DLC. No adverse changes to human health were observed.