

Effects of Vaporized Nicotine on Resting Metabolic Rate and Physical Work Capacity

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ABSTRACT

Vaporized nicotine delivered by electronic cigarettes (e-cigs) is popular with smokers who do not want the negative health consequences associated with traditional cigarettes. The acute effects of vaporized nicotine on resting metabolic rate (RMR) and physical work capacity have not been studied. We tested the hypothesis that inhalation of vaporized nicotine by e-cig would increase resting metabolic rate and decrease physical work capacity in non-smokers. Using a double-blind design, subjects (10 male and 10 female) participated in two randomized trials on separate days: placebo (0 mg nicotine e-cig) or nicotine (18 mg nicotine e-cig). In both trials, subjects inhaled once on the e-cig every 30s over the course of 10 min (20 inhalations total). Urine cotinine was assessed 10 min after the 20 inhalations. RMR was then assessed by indirect calorimetry followed by a cycle physical work capacity test. RMR ($\text{kcal} \cdot \text{min}^{-1}$), predicted VO_2max ($\text{L} \cdot \text{min}^{-1}$), and predicted max Watts (Wmax) were analyzed using a paired t-test with an *a priori* significance level of $p \leq 0.05$. RMR was not different between the two trials ($p > 0.05$; $1.18 \pm 0.20 \text{ kcal} \cdot \text{min}^{-1}$ vs $1.19 \pm 0.23 \text{ kcal} \cdot \text{min}^{-1}$, for nicotine and placebo trials, respectively). Predicted VO_2max was significantly lower in the nicotine trial ($p < 0.05$; $2.53 \pm 0.74 \text{ L} \cdot \text{min}^{-1}$ vs $2.59 \pm 0.78 \text{ L} \cdot \text{min}^{-1}$, for nicotine and placebo trials, respectively). However, there was no statistical difference in predicted Wmax ($p > 0.05$; $265.14 \pm 84.82 \text{ W}$ vs $273.01 \pm 94.27 \text{ W}$, for nicotine and placebo trials, respectively). These data suggests that vaporized nicotine inhaled acutely through an e-cig may lower aerobic capacity.