

Abstract

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The Acute Effects of Tobacco Use on Arterial Stiffness and Platelet Function in Tobacco Users

BACKGROUND: Nicotine, the addictive ingredient in tobacco, is believed to be responsible for the negative cardiovascular responses to cigarette smoking. The difference in nicotine absorption may result in different acute responses in cigarette smokers versus smokeless tobacco users.

OBJECTIVE: The purpose of this study was to assess the differences in arterial stiffness and platelet function.

METHODS: All 22 participants (Control: $n = 11$, age = 20.1 ± 1.14 years, height 185.72 ± 5.82 cm, weight 89.82 ± 9.96 kg, BMI 26.05 ± 2.82 kg/m²; Smokeless Tobacco: $n = 7$, age = 19.7 ± 1.21 years, height 176.71 ± 3.73 cm, weight 82.71 ± 8.85 kg, BMI 26.46 ± 2.50 kg/m²; Smokers: $n = 4$, age = 21.4 ± 1.10 years, height 180.50 ± 12.45 cm, weight 72.00 ± 6.48 kg, BMI 22.38 ± 3.98 kg/m²) underwent two days of testing. The first required a one mile run and body fat percentage analysis (BodPod). The second required all participants to come in eight hours fasted and undergo three measurement periods, each consisting of a blood draw for platelet analysis and use of the Arteriograph. The first measurement period took place after ten minutes rest and was followed by a twenty minute tobacco intervention. Afterward participants rested and measurements were taken again at ten minutes and sixty minutes post intervention. During the intervention, smokeless tobacco users used Grizzly mint smokeless tobacco and control used BaccOff non-nicotine smokeless tobacco, and smokers smoked one Marlboro cigarette.

RESULTS: Mean arterial pressure, aortic augmentation index, and heart rate had a significant main time effect, while heart rate had a time effect within each group ($p < 0.05$). There was no significant main time effect of time effect among groups for pulse pressure, aortic pulse wave velocity, epinephrine area under the curve, or adenosine diphosphate area under the curve ($p > 0.05$).

CONCLUSION: The study failed to find a statistically significant effect of acute tobacco use on measures of arterial stiffness and blood platelet aggregability. Both interventions were effective in disrupting bodily equilibrium as demonstrated by changes in HR and MAP over time for both the smokeless tobacco and smoking groups.