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Abstract

**BIOLOGICAL MONITORING OF
OCCUPATIONAL EXPOSURE TO NITROUS
OXIDE IN DENTAL OPERATORIES**

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The purpose of this study was to use biological monitoring to evaluate occupational exposure to nitrous oxide in dental operatories and to determine relationships between nitrous oxide concentration in ambient air, urine, and exhaled breath. This study also evaluated the effectiveness of a ventilation intervention in decreasing occupational exposure levels to nitrous oxide. Biological monitoring (urine, breath) and ambient air exposure monitoring was performed on participants in the University of Washington School of Dentistry. Participants consisted of 3 dentists (2 male, 1 female) and 3 dental assistants (3 females) with monitoring being performed both before and after intervention. A total of 46 samples were collected over a six-month period, 22 pre-intervention samples and 24 post-intervention samples. Breath and urine samples were taken before and after the dental procedure. Passive dosimeters were worn during the entire procedure. Urine and passive dosimeters were analyzed using gas chromatography. Breath samples were analyzed using Fourier Transform Infrared (FTIR) Spectroscopy. The ventilation intervention did not result in a significant decrease in nitrous oxide exposure levels. Breath concentrations increased from 14.1 ppm to 23.1 ppm, urine increased from 0.074 $\mu\text{g}/\text{ml}$ to 0.079 $\mu\text{g}/\text{ml}$, while ambient air concentration decreased from 94.5 ppm-hrs. to 88.5 ppm-hrs. A moderate correlation between the 3 monitoring techniques, urine, breath and ambient air was found. There was a significant correlations between adjusted Δ breath and Δ urine concentrations, $r = 0.610$ ($p < 0.01$),