

Coffee and Tea Consumption and the Diversity of the Oral Microbiome in Postmenopausal Women

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Objectives: The oral microbiome plays a central role in oral health. Coffee and tea are popular beverages, and their consumption may benefit health due to their polyphenol content. Impact of these beverages on the oral microbiome is not well understood; we examined associations of coffee and tea consumption with diversity of the oral microbiome among postmenopausal women.

Methods: This cross-sectional analysis used data from 1,124 postmenopausal women who participated in an ancillary study (1997–2001) of periodontal disease within the Women's Health Initiative Observational Study. Frequency of consumption for coffee was categorized as < 1 cup/week (w) (n = 171), ≥1 cup/w to < 1 cup/day (d) (n = 220), ≥1 to ≤ 2 cups/d (n = 178), >2 to ≤ 3 cups/d (n = 344), >3 cups/d (n = 211), and for tea as < 1 cup/w (n = 229), ≥1 cup/w to < 1 cup/d (n = 528), ≥1 to ≤ 2 cups/d (n = 152), >2 cups/d (n = 215). The oral microbiome was assessed in subgingival plaque samples by 16S rRNA gene sequencing. The microbiome operational taxonomic units (OTUs)

data were transformed using the centered log-ratio transformation to account for the compositional data structure and reduce spurious associations with beverage intake. PERMANOVA was used to examine β -diversity (between-sample diversity) and ANOVA for α -diversity (within-sample diversity) of the microbiota across categories of coffee or tea. α -diversity was examined using OTU count, Chao1 Index, and Shannon Index. Models were adjusted for age, race, education, smoking status, body mass index, diabetes, antibiotic use, and dental hygiene behaviors.

Results: β -diversity did not differ across categories of beverage consumption (PERMANOVA $p_{\text{coffee}} = 0.123$, $p_{\text{tea}} = 0.158$). α -diversity measures were lower, but not significantly different, among those who consumed coffee or tea more vs. less frequently. For example, the adjusted means (SE) for the Shannon Index were 4.95 (0.10) vs. 5.00 (0.10), $P = 0.871$ in high (>3 cups/d) vs. low (<1 cup/w) coffee consumption and 4.90 (0.10) vs. 5.02 (0.10), $P = 0.333$ for high (>2 cups/d) vs. low (<1 cup/w) tea consumption.

Conclusions: In this study of postmenopausal women, we found no statistically significant associations between coffee or tea consumption and the diversity of oral microbiome.

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