

Title: Feasibility of Home Sampling by Mothers in Infants for Microbiota Analysis of Multiple Oral Niches

Marije Kaan¹, Mark J. Buijs¹, Bernd W. Brandt¹, Wim Crielaard¹, Bart Keijser², Janne C. de Ruyter³, Pim Jansen³, Egija Zaura¹

¹Preventive dentistry, ACTA, Amsterdam, Netherlands, ²Preventive Dentistry, ACTA, Amsterdam, Netherlands,

³Public Health Service Amsterdam, Amsterdam, Netherlands

Objectives Large longitudinal cohort studies in infants are needed to understand oral microbiome maturation in relation to general health. The logistics of such studies are complex and the involved costs are high. Methods like home sampling by parents would reduce these issues. This study aimed to evaluate the feasibility of home sampling by mothers and to assess which oral niche provides the most reliable sample.

Methods A cross-sectional study was done in 29 mothers and their infants aged 2-15 months. Swabs of the tongue, buccal mucosa, and unstimulated saliva of the infant were collected by the mother after watching an instruction video. Thereafter, the trained researcher repeated the sample collection. Bacterial DNA was quantified and microbial composition was assessed using 16S rDNA amplicon sequencing. Microbiome profiles were analyzed using Principal Component Analysis, Permutational Analysis of Variance, and Bray-Curtis dissimilarity. Bacterial DNA concentration and microbiome dissimilarity indexes were compared using Kruskal-Wallis, Friedman, Wilcoxon signed-rank tests, and Spearman correlation.

Results Bacterial DNA concentration in samples collected by the mothers versus the researcher did not differ ($p > 0.05$). Irrespective of the operator, bacterial DNA concentration correlated with the age of the child ($p < 0.05$). Microbial profiles of the tongue samples differed significantly from those of saliva ($p = 0.02$) and buccal mucosa ($p = 0.02$), but did not differ by the operator for any of the sample types ($p > 0.05$). Tongue microbiome profiles showed the least interindividual differences and the lowest dissimilarity between the related samples collected by the two operators. In saliva, difference between samples collected by the two operators increased significantly with the age of the child ($p = 0.049$).

Conclusions Home sampling by mothers is a feasible method for oral sample collection in infants. Oral samples collected by mothers resemble samples collected by a trained researcher, with tongue sample being the most similar and saliva the least.