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SEX-BASED DIFFERENCES IN THE CHILDREN`S PLAQUE MICROBIOTA

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Background:
Severe early childhood caries (S-ECC) can lead to suffering and reduced oral health related quality of life in young children and it is a huge burden to the health care system. The fungal composition of dental plaque and how children`s sex is associated with S-ECC are largely unknown.

Objective:
We aimed to identify potential sex-based differences in the supragingival plaque microbiota of young children with S-ECC and those caries-free.

Methods:
The V4-16S rRNA and ITS1 rRNA gene amplicon sequencing was used to compare the supragingival plaque bacteriome and mycobiome of children <72 months of age, 40 with S-ECC (15 boys, 25 girls) and 40 caries-free (19 boys, 21 girls), by testing the differences in microbial abundances among the groups and using machine learning approaches. Health- and nutrition-related questionnaire data were also investigated.

Results:
Behavioral and nutritional differences were observed between boys and girls ($p<0.05$). Overall higher levels of *Veillonella*_sp._HMT_780, *V. dispar*, and *Streptococcus mutans* were found when comparing the S-ECC and control groups ($p<0.05$). A significant difference in *Corynebacterium durum, Rothia aeria, V. dispar, Lautropia mirabilis* and *Cardiobacterium hominis* levels were also observed between girls with S-ECC and caries-free girls ($p<0.05$), but the same was not true for boys. Fungal taxonomic analysis showed higher levels of *Candida dubliniensis* in the plaque of children with S-ECC ($p<0.001$), but no differences were observed in the abundance of *Ca. albicans* among groups ($p>0.05$). A significant difference in the relative abundance of *Mycosphaerella tassiana* was observed between caries-free boys and girls ($p=0.02$). Machine learning analysis revealed different patterns of cross-talk between microbial species in boys and girls.

Conclusion:
Sex-based differences in the plaque microbiota were observed. Plaque microbiome and sex may be important determinants for S-ECC and could be factors to consider for inclusion in caries risk assessment tools.