Intra-familial Cariological Studies on a Saudi Population

Akademisk avhandling

som för avläggande av odontologie doktorsexamen vid Sahlgrenska Akademin vid Göteborgs universitet kommer att offentligen försvaras i föreläsningssal 3, institutionen för odontologi, Medicinaregatan 12 E, Göteborg, onsdagen den 8 maj 2013 kl. 09.00

av

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This thesis is based on the following studies, referred to in the text by their Roman numerals:

I. Mannaa A, Carlén A, Lingström P. Dental caries and associated factors in mothers and their preschool and school children – A cross-sectional study. *J Dent Sci* 2013; http://dx.doi.org/10.1016/j.jds.2012.12.009

II. Mannaa A, Carlén A, Dahlén G, Lingström P. Intra-familial comparison of supragingival dental plaque microflora using the checkerboard DNA-DNA hybridization technique. *Arch Oral Biol* 2012; 57: 1644-1650.

III. Mannaa A, Carlén A, Campus G, Lingström P. Supragingival plaque microbial analysis in reflection to caries experience. *BMC Oral Health* 2013; 13: 1-5.

IV. Mannaa A, Carlén A, Zaura E, Buijs MJ, Bukhary S, Lingström P. Effects of high-fluoride dentifrice (5,000 ppm) on caries-related plaque and salivary variables. (*Submitted)*

V. Mannaa A, Campus G, Carlén A, Lingström P. Caries-risk profile variations after short-term use of 5,000 ppm fluoride toothpaste. (*Submitted*)

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Abstract

Objectives: The aims of this thesis were to describe the caries experience and caries-related factors in mothers and their preschool and school children, correlate quantified supragingival plaque bacteria between mothers and their children and identify possible microbial associations, examine if bacteria in pooled supragingival plaque samples quantified using a "checkerboard DNA-DNA hybridisation"-based panel of caries-related bacteria, could reflect the caries experience in a manner similar to saliva samples analysed using chair-side methods, measure the effects of six weeks' use of a 5,000 ppm fluoride toothpaste on caries-related factors in dental plaque and saliva and consecutively assess the caries risk following six weeks' use of 5,000 ppm fluoride toothpaste using the "Cariogram". **Materials and methods:** A total of 258 individuals (86 mothers and two of their children, 4-6 and 12-16 years old) were enrolled in Studies I, II & III; out of which 17 mothers and their 13-17 years old children participated in Studies IV & V. Anamnestic data, oral examinations, salivary chair-side tests, and pooled supragingival plaque sampling for checkerboard DNA-DNA hybridisation analysis, were performed for Studies I-III. In Studies IV & V, 5,000 ppm fluoride toothpaste was given along with consecutive sampling of approximal fluid for fluoride analysis, sampling of approximal plaque for organic acid analysis, tongue and salivary chair-side tests, approximal plaque pH registration and caries risk assessment using the "Cariogram" software. **Results:** The mean caries experience was high in the mothers and their younger and older children, with varying caries-related contributions and associations. Similar microbial associations with three main clusters were detected in the mothers and their children with significant correlations between them. No significant relationships were found between the bacterial scores and caries experience in the mothers and their children. The use of 5,000 ppm fluoride toothpaste significantly increased the approximal fluid fluoride concentration, and salivary buffer capacity. It also decreased the lactic acid production rate, plaque acidogenicity, and salivary mutans streptococci counts. It also resulted in a statistically significant modification of the caries-risk profile, increasing the actual chance to avoid caries in the future among the mothers and teenagers. **Conclusions:** The caries experience in Saudi mothers and their children is high, with similar contributory caries-related factors. Supragingival plaque microbiota are correlated between the mothers and their children with similar microbial associations. No significant relations are found between the bacterial counts in supragingival plaque and the caries experience. The 5,000 ppm fluoride toothpaste has the ability to reduce the cariogenic potential of dental plaque and saliva as well as the caries risk profile.

Key words: Caries, Cariogram, Families, Fluoride, Microbiology, Plaque, Risk Assessment
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