On Caries Risk Profile and Prevention in an Adult Saudi Population

Akademisk avhandling

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av

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Avhandlingen är av sammanläggningstyp och baseras på följande fyra delarbeten:

I. Sonbul H, Al-Otaibi M, Birkhed D. Risk profile of adults with several dental restorations using the Cariogram model. Acta Odontol Scand 2008;66:351-357.

II. Sonbul H, Birkhed D. Risk profile and quality of dental restorations: a cross-sectional study. Acta Odontol Scand 2010;68:122-128.

III. Sonbul H, Birkhed D. The preventive effect of a modified fluoride toothpaste technique on approximal caries in adults with high caries prevalence: a 2 -year clinical trial. Swed Dent J 2010;34:9-16.

IV. Sonbul H, Birkhed D. The preventive effect of a modified fluoride toothpaste technique on buccal/lingual enamel caries in adults with high caries prevalence: a 2-year clinical trial. Submitted.

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Abstract

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Objectives. The aims of this thesis were to evaluate: 1) the caries profile in an adult Saudi population with several dental restorations using a computer-based program (Cariogram), 2) the prevalence of primary and recurrent caries and of filled tooth surfaces in relation to the Cariogram outcome, expressed as "the chance of avoiding caries", 3) the quality of dental restorations and the additional value of using bitewing radiographs, 4) the effect of a "modified fluoride toothpaste technique" on the incidence and progression of approximal caries diagnosed on bitewings and 5) the preventive effect of this toothpaste technique on buccal and lingual enamel caries and to determine the role of patient compliance. *Material and Methods.* A total of 175 adults, mean age 30 years, were included. All the individuals were interviewed about their oral health, dietary habits and use of fluoride. Caries was registered both clinically and radiographically. Salivary and microbiological data were obtained using chair-side tests. A risk profile was created using the Cariogram model and the entire population was categorised into various risk groups, based on the Cariogram profile. In 100 adults (as a subgroup from the 175 patients), a total of 803 dental restorations were evaluated, based on the United States Public Health Service (USPHS/Ryge) criteria. Bitewings of Class II restorations were taken to examine the marginal integrity and the anatomic form proximally. Finally, the 175 participants were randomly assigned to either a test (n=88) or a control group (n=87). The test group patients were instructed to use the "modified fluoride toothpaste technique", in which various behavioural factors were standardised in order to improve the caries preventive effect of fluoride toothpaste. The patients in the control group were asked to continue using their regular fluoride toothpaste twice a day without any further instructions. Approximal caries was scored radiographically and enamel buccal/lingual caries clinically at baseline and after 2 years. *Results.* The prevalence of initial, total decayed and recurrent caries was high. Significant differences were found between the Cariogram risk groups with respect to these caries indices; the lower the "chance of avoiding caries", the higher the values of the caries indices. The mean "chance of avoiding caries" according to the Cariogram was 31% for the whole population (n=175). Overall, the anatomic form and surface texture obtained unacceptable scores in the majority of the restorations. After adding the radiographic evaluation, the percentage of unacceptable restorations increased by 28% and 17% with regard to marginal integrity and anatomic form respectively. After 2 years, a significant difference was found in the number of new approximal enamel caries between the test group 0.72 (n=54) and the control group 2.27 (n=52) (p<0.001). When all the data were pooled, the test group had a lower incidence of total approximal caries than the control group (p<0.001). The test group also had a lower progression rate of approximal caries (p<0.01). The test group (n=56) had a lower buccal/lingual caries incidence than the control group (n=57) (p<0.05). Both the total progression and the number of arrested buccal/lingual caries were in favour of the test group, but the differences were not statistically significant. The caries reduction in the subgroup with good compliance was significantly higher than in the subgroup with less good compliance. *Conclusions.* 1) The Cariogram model was able to identify the caries-related factors contributing to the future caries risk. 2) There was an association between various caries indices and the Cariogram risk groups. 3) The main reason for the unacceptable rating of restorations was recurrent caries. Unacceptable anatomic form and surface texture of the dental restorations were also common and the bitewing radiographs were found to be valuable as an aid to clinical quality evaluation. 4) The "modified fluoride toothpaste technique" reduced the incidence of approximal caries by 66%. 5) The corresponding preventive fraction for buccal/lingual enamel caries was 44% and the patients' compliance appeared to play an important role in this result.

Key Words: Adults. Approximal caries. Bitewing. Caries risk. Cariogram. Dental restorations. Enamel caries. Fluoride toothpaste. Saudi Arabia.