

Cariological Studies on Endodontically Treated Teeth

Akademisk avhandling

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av

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Avhandlingen är av sammanläggningstyp och baseras på följande fyra delarbeten:

- I. Merdad K, Sonbul H, Gholman M, Reit C, Birkhed D. Evaluation of the caries profile and caries risk in adults with endodontically treated teeth. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2010;110:264-269.
- II. Merdad K, Sonbul H, Bokhary S, Reit C, Birkhed D. Caries susceptibility of endodontically versus non-endodontically treated teeth. *J Endod* 2011;37:139-142.
- III. Frisk F, Merdad K, Reit C, Hugoson A, Birkhed D. Root-filled teeth and recurrent caries - a study of three repeated cross-sectional samples from the city of Jönköping, Sweden. Submitted.
- IV. Merdad K, Al-Hezaimi K, Al-Fouzan K, Birkhed D, Reit C. Micro-computed tomography (micro-CT) analysis of the effect of different irrigation solutions on dentin quality. In manuscript.

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Abstract

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Caries might jeopardize the long-term successful outcome of endodontic therapy. Therefore, it is of an interest for the endodontist to evaluate caries susceptibility of root-filled teeth (RFT). In the present thesis, several studies were conducted to explore this relationship. In the first study, caries risk profile of 200 Saudi adults, using the Cariogram, and the frequency of recurrent caries in RFT were evaluated. All 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. The findings from this study did not show any significant difference in caries risk profile, at the individual level, except for the mutans streptococcus count. A significant difference was detected, however, in the proportion of recurrent caries, which was higher in RFT compared to vital teeth. Caries susceptibility of RFT can be attributed to both extrinsic and intrinsic factors. In the second study, caries susceptibility of RFT was compared with contra-lateral non-root-filled teeth (NRFT) plaque-related factors. This study was carried out on a sub-sample (20 patients) with two or more RFT, recruited from the participants in the first study. Each patient was examined regarding cariogenic microflora of proximal plaque, in situ plaque pH-drop after a sucrose rinse (the Stephan curve) and de novo plaque formation. Recurrent caries and the quality of the coronal fillings/crowns of the teeth were also evaluated. The results showed that endodontically treated teeth had an increased susceptibility to caries, ascribed either to alteration in their biological environment, or to inadequacy of the marginal fit of the dental restoration. In the third study, the frequency of recurrent caries in RFT versus NRFT was evaluated, retrospectively. The material consisted of totally of 11,554 teeth in 832 subjects, pooled from a large cross-sectional epidemiological study conducted in Jönköping, Sweden. The findings showed a significant association between endodontically treated teeth and recurrent caries. The fourth study assessed the effects of sodium hypochlorite (NaOCl), ethylenediaminetetraacetic acid (EDTA) and chlorhexidine (CHX) in various strengths and combinations on the demineralization of dentin, considering their use as irrigation solutions. Thirty-five single-rooted teeth were extracted and randomly allocated into seven groups. The teeth were analyzed with micro-computed tomography (micro-CT), before and after the treatment. Volume measurements, to assess the demineralization effect, were carried out with software. The data showed that NaOCl and EDTA irrigation solutions changed the quality of dentin, in a way that it may increase the caries susceptibility. To conclude, the results from this thesis should raise the awareness among dental clinicians regarding the potential increase in caries risk following endodontic treatment, and accordingly, precautionary measures should take place.

Key Words: Caries risk. Caries susceptibility. Cariogram. Endodontic treatment. Jönköping, Sweden. Micro-CT. Recurrent caries. Saudi Arabia.

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