Caries Research

Including the Abstracts of the 55th Annual ORCA Congress

June 25–28, 2008, Groningen, The Netherlands
The objective of this in vitro study was to investigate the surface roughness of enamel after exposure to acidic beverages or microbial acids, alone or in combination. 240 slices, cut from 48 dental crowns of impacted wisdom teeth, were fixed in 12-well plates and incubated for 48 h at 37°C with one of two alcopops or one of two acidic soft drinks, or with Schaedler broth, inoculated with S. mutans 10449 or S. oralis H1. Subsequently the specimens were incubated either first with an acidic beverage (24 h) and then with the streptococcus (24 h) or vice versa. In previous studies, the amounts of released calcium from enamel had been determined. In this study, the roughness (R_a) of these dental surfaces was measured using an optical profilometric device (phtometers, Mahr, Göttingen, Germany) and compared with the control specimens, incubated in saline for 48 h. 10 measurements of a length of 1.75 mm in randomly chosen areas were performed for each sample and evaluated with MarSurf X20 software. R_a values were also compared by Wilcoxon-test (α = 0.05). The specimens were also examined by SEM. Incubation with an acidic beverage led to a significant reduction in R_a (median 1.94–2.48 μm) compared with the controls (median 3.97 μm) (p = 0.03–0.05). Exposure of the dental slices first to acidic beverages and then to bacteria caused higher R_a values (median 2.57–3.87 μm) than after exposure to S. mutans or S. oralis alone.

* Presenting authors.
(range 23–1,635) and mean LD was 93 µm (range 3–139). After 3 weeks mean IML was 726 vol% - µm (range 64–2,116) and mean LD was 95 µm (range 9–197). We conclude that the advanced dentine lesions are suitable for studying different oral hygiene protocols on de- and remineralisation.

Supported by GABA.

---

**Dentine Regeneration in the Carious Cavity**


* JCS 'LitAr', Samara, Russia; † University of Medicine and Pharmacy, Kishinev, Moldova; ‡ Emergency Dental Service, Samara, § Orenburg Academy of Medicine, Russia

The purpose was to test the possibility of completely regenerating lost dentine in the carious cavity using a polymer-salt-based composite material (LitAr) to restore the mantle and circumpulpal dentine. A caries treatment method using LitAr was developed [Litvinov et al.: Caries Res 2007;41:272]. LitAr was laid in caries cavities up to the enamel-dentine junction in 25 patients with extensive caries. X-ray examination was conducted after 2 weeks and after 1, 3 and 6 months. After 2 weeks it was possible to detect on the radiographs under the filling material a carious cavity with distinct limits and low X-ray density which differed markedly from the sound dentine. After 1–3 months optical density was diminished and after 6 months the differences in optical density between the carious cavity and the surrounding dentine became more marked. Morphological investigation of the cavity after 6 months revealed for all patients complete biodegradation of the LitAr with the formation of isocaries cavity. This fact was connected with the trend for restoring the cavity up to the enamel-dentine junction. All the data suggest restoration of the physiological processes in the carious cavity.

---

**The Influence of Ozone on Cariogenic Bacteria in Deep Cariogenic Lesions ex vivo**

W. Dukic*, H. Juric

* walter.dukic@zg.t-com.hr

School of Dental Medicine, University of Zagreb, Croatia

The aim of this study was to evaluate the efficacy of ozone in reducing ex vivo the total bacteria count and the counts of the bacteria *Streptococcus mutans* ATCC 33402 and *Lactobacillus paracasei* ATCC 11974 ex vivo. From 20 patients aged between 7 and 18, during clinical work, samples of cariogenic dentine from deep lesions were taken ex vivo, before and after the treatment with ozone. The samples were placed in Stuart transport medium and afterwards cultured to ascertain the influence of ozone on the total bacteria count (CFU) and on *S. mutans* and *L. paracasei*. The results showed decrease of the total bacteria count (CFU) by 72.2%. After treatment with ozone, the reduction of *S. mutans* was 71.5%, and of *L. paracasei* 61.4%. All results showed statistically significant difference in the number of bacteria before and after the ozone treatment (p < 0.05). Ozone is a very useful disinfectant and it appears that it can successfully eliminate most of the cariogenic bacteria in human dentine samples ex vivo. Because of its antimicrobial properties, its usage is recommendable in the therapy of deep carious lesions as a cavity disinfectant.

---

**Immunological Response in the Dental Pulp after Caries Treatment**

A. Sotirovska-Ivkovska*, L. Ivkovski, L. Zabokova, L. Popovska

* anasotirovska@yahoo.com

School of Dentistry, Skopje, Republic of Macedonia

The class II major histocompatibility complex (MHC) molecule-expressing cells, termed dendritic cells, and lymphocytes present in human dental pulp, are highly sensitive to exogenous antigenic stimuli. Their drastic changes in number and localization have been induced by dental caries. This study investigated the responses of the immune system under 3 different clinical conditions: shallow and deep cavities and treated caries. Teeth were extracted and immediately cut longitudinally, pulp tissue was extirpated and fixed in paraffin for 24 h at 4°C. The specimens were embedded in paraaffin, according to standard laboratory procedure, sectioned at 5 µm thickness and stained the streptavidin–biotin complex immunoperoxidase method. Cells were identified immunohistochemically using the monoclonal antibodies HLA-DR, CD45 and CD20. Initial pulpal response was characterized by a localized accumulation of HLA-DR antibody-positive cells in the pulp tissue beneath the caries lesion. In the pulp of advanced caries, large number of HLA-DR-positive cells were observed with a marked increase of CD45- and CD20-positive cells. This might indicate the occurrence of antigen presentation locally in the pulp tissue which is very important for the immune response. However, six months after treatment, clusters consisting of HLA-DR-positive cells and CD45-positive T lymphocytes were recognized locally in the pulp tissue. CD20-positive B cells were seen only under the deeper cavities. Present study demonstrated that dental pulps respond to cavity preparation and restoration. Antigen presentation and cellular or humoral immunoresponses persist for many months after caries treatment, which indicates that antigenic substances remain deep in the dentinal tubules.
A Clinical Trial of Tooth Mousse to Remineralize White Spot Lesions in a Post-Orthodontic Population


* dbailey@unimelb.edu.au
CRC for Oral Health Science, School of Dental Science, The University of Melbourne, Australia

The aim was to investigate the progression and regression of white spot lesions (WSL) in post-orthodontic adolescent subjects using Tooth Mousse in a twelve-week, double-blind, randomized, positive-controlled, parallel-group clinical trial. Subjects, who were recruited from private orthodontic practices, exhibited at least two WSL on the buccal surfaces of teeth 14-24 and 34-44. In the 45 subjects (age 12-18 years) recruited, 408 WSL (mean 9 WSL per subject) were recorded. 23 subjects were randomised into the intervention (Tooth Mousse) group and 22 subjects into the control (placebo cream) group. Subjects were instructed to apply the study product twice daily for 12 weeks after normal oral hygiene procedures (subjects were supplied with toothpaste containing 1,000 ppm F as NaF). Clinical assessments were undertaken by three examiners at baseline (within 7 days of bracket removal), and at weeks 4, 8 and 12. WSL were scored for lesion severity and activity using the ICDAS II criteria. A transition matrix was used to assess changes in severity and activity of a WSL between two examinations. Transitions were coded as either progressing, regressing or stable. Ordinal logistic regression models were used to analyse the transition scores. 92% of WSL were assessed as severity code 2 or 3. At 12 weeks, 31% more of these lesions had regressed with Tooth Mousse than with the placebo control (OR 2.3; p = 0.04). Differences in the regression rates between the two treatments were not statistically significant at 4 and 8 weeks. In both treatment groups, active lesions were more likely to regress than inactive lesions (OR 5.07; p < 0.001). In conclusion, significantly more post-orthodontic WSL regressed with Tooth Mousse compared to a placebo control over a 12-week period.

Supported by CRC for Oral Health Science and GC Corporation, Japan.

26

27

Antimicrobial Effect of Chlorhexidine Varnish in Orthodontic Patients

H. Juric*, I. Masek, D. Matosevic, S. Mestrovic, W. Dukic

* juric@sfzg.hr
School of Dental Medicine, Zagreb, Croatia

The aim of this study was to evaluate the effect of 1% chlorhexidine-1% thymol varnish (Cervitec, Ivoclar Vivadent, Schaan, Liechtenstein) on mutans streptococci (MS) and Lactobacillus spp. (LB) counts in patients with fixed orthodontic appliances. 24 patients were divided into two groups of 12 according to baseline bacterial counts, creating high (≥10^5 CFU/ml saliva) and low (≤10^4 CFU/ml saliva) bacterial colonization groups. Bacterial analysis was performed using the CTR-bacteria chair-side test (Ivoclar Vivadent). Patients then went through an intensive mode of application: chlorhexidine varnish was administered three times within one week according to the manufacturer's recommendations. The baseline MS and LB determinations before varnish application were followed by sampling 1 and 2 months after the period of varnish application. For hypothesis testing, χ^2 test, Mann-Whitney and Kruskal-Wallis tests were used. One month after administration the group with high colonization levels exhibited a statistically significant reduction of MS and LB counts when compared with baseline (p < 0.05). In this group, reduction for MS was from 10^6 CFU/ml to slightly below 10^5 CFU/ml. For LB, reduction was from more than 10^4 CFU/ml to 10^2 CFU/ml. The group with low colonization levels exhibited a no statistically significant reduction. Two months after treatment a slight growth of MS and LB counts was observed but did not reach the baseline values. This indicated a time period of chlorhexidine efficiency and a necessary schedule for varnish application. In conclusion, for patients with high baseline MS and LB counts, therapy with 1% chlorhexidine-1% thymol varnish every 3 months suppresses salivary MS and LB.