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Oral Session O20 – Prevention 2

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# Oral Session O20/Prevention 2

#### O20-144

# New method of in vivo monitoring of the enamel surface

J. HANDZEL<sup>1</sup> & M. MARYŠKA<sup>2</sup>

<sup>1</sup>Stomatological Clinic, Faculty of Medicine, Charles University Prague; <sup>2</sup>Institute of Chemical Technology, Department Glass and Ceramics, Prague, Czech Republic

**Introduction:** Up to the present the enamel surface of human teeth was examined either in vitro on extracted teeth or in vivo on positive replicas of teeth mostly by scanning electron microscopy. Therefore, more efficient attempts should be made for in vivo monitoring of enamel surface changes. In our study smooth surfaces of primary and permanent teeth were investigated under different conditions and time intervals and regarding the presence of porosities.

**Materials and methods:** The method consists of 3 steps: 1) Replicas of professional cleaned and dried enamel surfaces were prepared using acetate cellulose tape shortly exposed to acetone. 2) For imaging of the sharpened enamel surface we used an optical microscope Microthek S/N S 234056 with a lateral resolution of  $< 1.5 \mu m$ , CCD Camera and image analysis software NIS Elements AR 3.0. 3). Measurements of porosities and/or other microdefects on enamel surfaces were done. The extent of porosity was measured using feature equivalent analysis.

**Results:** After several weeks of different toothbrushing schemes and/or application of remineralizing agents a stagnation of present carious lesions was observed.

**Conclusions:** Our methodology enables the dentist to analyze processes on the same area of enamel surface after application of different preventive procedures and to evaluate initial carious lesions over a period of time.

#### 020-145

#### The richest infant feed - a tested approach

A. M. XAVIER, K. RAI & A. M. HEGDE

Department of Pedodontics and Preventive children dentistry, Rajiv Gandhi University of health sciences, Mangalore, India

**Introduction:** Milk is the nutrionally complete food with biological antioxidants fortifying immunity, during the 'critical window' period of developing dentition. The present environmental scenario demands enhancement of antioxidant levels to ward off oral diseases. Feeding infants with stored milk by working parents is on the rise. This study evaluates the effects of storage and temperature treatment on the total antioxidant levels of milk.

**Materials and methods:** 10 samples of breast milk (at various stages of lactation - same mothers, pre-term mothers and mothers picked at random - 5<sup>th</sup> month to 1 year post delivery) were assessed immediately, 48hrs, 1 week post refrigeration ( $^{4}C$ ) and freezing (- $^{8}C$ ). 10 samples of cows' and pasteurized milk, 4 different infant formulas subjected to various temperature treatments were also assessed for total antioxidants by Phosphomolybdenum method. The institutionalized ethical clearance and written consent from all the mothers was obtained. Data was analyzed using Students *t*-test, one way Anova, with Bonferroni multiple comparison test. *P* < 0.05 was considered significant.

**Results:** Colostrum had the highest antioxidant levels reducing with time in the same mothers and further on post refrigeration and freezing (P < 0.0005). Freshly prepared infant formulas had more antioxidants than when refrigerated and frozen (P < 0.0005). Pasteurized cow's milk had less antioxidants (P < 0.0005).

**Conclusion:** Breast milk had the highest antioxidants than milk from other sources on various temperature treatments. Anticipatory guidance by pediatric dentists through dental homes regarding the compromised levels of antioxidants due to storage of milk must be imparted, emphasizing their role in preventing oral diseases.

#### O20-146

# Effect of xylitol-containing chewing gum on *S. mutans* scores in pregnant women

N. S. POPOVA, L. P. KISELNIKOVA, O. A. OKSENTJUK, J. N. JAKOVLEVA & E. V. KIRILLOVA Moscow Medical-Stomatological University Chair of children's

Moscow Medical-Stomatological University Chair of children's stomatology, Russia

**Introduction:** The transmission of *S. mutans* from mother to child is well documented and the influence on the development of early childhood caries is known. The aim of this study was to test the antimicrobial effect of 70% xylitol-containing chewing gum's use in pregnant women to lower the risk of a bacterial transmission from mother to child.

**Materials and methods:** 22 pregnant women aged 22 to 36 years and at gestational age from 15 to 36 weeks were included in this study. All women received xylitol-containing chewing gum (LOTTE xylitol spearmint) for three times a day over a period of 3 months. The women's saliva was examined for *S.mutans* at the beginning of the study and 3 months later using the semi-quantitative microbiological assays Dentocult SM (Orion Diagnostica).

**Results:** All women showed a high caries experience (DMFT = 14.2). The baseline value of *S.mutans* was  $2.4 \pm 0.2$ , which corresponds to high caries risk. This score decreased to  $1.4 \pm 0.1$  after 3 months (reduction of 43%). This difference was tested as statistical significant ( $P \le 0.05$ ).

**Conclusions:** The use of xylitol-containing chewing gum in pregnant women leads to decreasing *S.mutans*' levels in their saliva. This may have implications for early childhood caries prevention.

#### **O20–147**

# A statherin-like peptide reduces the rate of enamel demineralisation *in vitro*

M. P. HECTOR, P. ANDERSON, J. KOSORIC, P. GROSVENOR & R. A. D. WILLIAMS

Centre for Oral Growth and Development, Barts and The London School of Medicine and Dentistry, London, UK

**Introduction:** The synthetic peptide STN21 (first 21 N-Terminal residues of salivary Statherin) has been shown to reduce demineralisation in hydroxyapatite blocks subjected to artificial caries and erosion conditions *in vitro*. This study investigated the influence of STN21 on the rate of demineralisation of human enamel under artificial caries and erosion conditions.

Materials and methods: STN21 was prepared using solid-state FMOC synthesis and dissolved in phosphate buffer at pH 7.4 at

a concentration of 0.2 mM. Enamel pieces (2.0 x 2.0 mm, thickness 2.5 mm) were cut from caries-free human molars. The pieces were varnished (except for the natural surface) and located in scanning microradiography (SMR) cells. Treatment consisted of rinsing the exposed surfaces with buffer, then with STN21 (or buffer alone for controls) for 3 min. For demineralisation, the pieces were exposed to either; artificial caries conditions (acetic acid, 0.1 M, pH 4.5), or artificial erosion conditions (citric acid, 0.02 M, pH 3.8). The first treatment took place after 80 h demineralisation, and repeated thereafter every 12h for a further 72h.

**Results:** The average reduction in the rate of demineralisation of enamel following repeated STN21 treatments was; 45% under artificial caries conditions, and 25% under artificial erosion conditions. Mann–Whitney tests showed a significance of P < 0.001 between respective treated and control samples.

**Conclusion:** Statherin plays an important role as an inhibitor of enamel mineral destruction. STN21 shows promise as a potential therapeutic treatment for reducing the rate of demineralisation in human enamel during an acid challenge. Supported by the Heptagon Fund (QMUL/TC03).

#### **O20–148**

### Effect of CCP-ACP and APF on *S.mutans* biofilm: an in vitro study

<u>A. PINAR ERDEM<sup>1</sup></u>, E. SEPET<sup>1</sup>, T. AVSHALOM<sup>2</sup>, V. GUTKIN<sup>3</sup> & D. STEINBERG<sup>2</sup>

<sup>1</sup>Department of Pediatric Dentistry, Istanbul University, Istanbul, Turkey; <sup>2</sup>Institute of Dental Sciences, Hebrew University, Jerusalem, Israel; <sup>3</sup>The Harvey Krueger Center for Nanoscience and Nanotecnology, Hebrew University, Jerusalem, Israel

**Introduction:** Casein phosphopeptide–amorphous calcium phosphate (CPP–ACP) and fluoride slows the progression of caries and enchance remineralization of enamel lesions. The aim of this study was to determine the effect of CPP–ACP and APF on *S.mutans* viability, to observe its effect on biofilm structure and to examine the element content of the hydroxyapatite (HA) surfaces after exposure to CCP–ACP and APF.

Materials and methods: Hydroxyapatite discs were coated with GC Tooth-Mousse (CPP–ACP), APF, GC Tooth-Mousse + APF (1/1) and uncoated discs were used as controls. Following application of the materials, the discs were coated with human saliva and incubated with *S. mutans* for 24 h. Growth of the bacteria on the discs was evaluated by microbial culturing methods. The structure of the biofilm was obseved with confocal laser scanning microscopy (CLSM).The change in element content of HA surfaces (without biofilm) was evaluated with SEM-EDX. The values were statistically evaluated using Kruskal–Wallis and Dunn's test.

**Results:** The total number of bacteria of APF and GC Tooth-Mousse + APF applied groups were significantly lower than the control group (P < 0.05). All specimens showed similar microbial colonization structure. No statistically differences were observed in C, O, F, Na, P, Ca content on HA surfaces after exposure to GC Tooth-Mousse, although F concentration of the APF treated HA surfaces were increased.

**Conclusion:** CPP-ACP did not show any effect on the viability of *S.mutans*. The use of CPP-ACP with APF could be considered as an alternative prophylactic application in order to reduce bacterial viability and biofilm. Little differences were observed in mineral content on HA surfaces after the applications in our system.

#### O20–149

## Effect of xylitol on some salivary risk factors of caries in schoolchildren

A. TRUMMLER<sup>1</sup> & W. STRÜBIG<sup>2</sup>

<sup>1</sup>Childrens Dental Clinic, St. Gallen, CH; <sup>2</sup>School Dental Clinic, Bern, CH

**Introduction:** The aim of this study was to evaluate the effect of 100% xylitol containing chewing gum on salivary *S.mutans* and lactobacilli levels in schoolchildren over a period of 3 months. Also the saliva flow rate and the buffer capacity were examined. A second aim was to explore the outcome of a school-based oral health program.

**Patients and methods:** A random sample was selected of 70 children, aged 10 to 13 years in four school classes. Two classes chewed a 100% xylitol-sweetened chewing gum  $3 \times 2$  per day ('Xylix 100', Topcaredent, Zürich), total dose 6 g/day. The control group used a commercial sorbitol-mannitol gum (COOP) for a minimum of 5 min each time for 3 months. The teachers controlled the procedure and the parents agreed with the study. For the saliva test we used the 'CRT-Test' (Vivadent). The statistical evaluation was carried out by 'SPSS Software 14.0, Chicago, IL, U.S.A'.

**Results:** After 3 months of gum chewing increased flow rate and buffer capacity of stimulated whole saliva were found. The levels of lactobacilli were mainly unaffected. The shift from higher *S.mutans* scores to lower was greater (44%) in the xylitol group than in the control group (8%) (P < 0.005). The acceptance and the motivation for our study for pupils and teachers was very high.

**Conclusion:** Xylitol chewing gum may provide a feasible caries prevention for school children and risk patients. Our study supports the findings of other authors and confirms that chewing xylitol gum may reduce *S.mutans* levels.

#### O20-150

### The Effect of CPP-ACP and fluoride on salivary parameters in Malay adolescents

A. VENKITESWARAN, H. AWANG & Z. H. A. RAHIM University of Malaya, Kuala Lumpur, Malaysia

**Introduction:** New materials containing CPP–ACP have been introduced as preventive agents to reduce caries susceptibility. However, the full extent of its effect on saliva has not been widely reported. The aim of this study was to ascertain the effects of two different paste preparations containing CPP–ACP on saliva flow rate, buffering capacity and its effect on salivary calcium and phosphate concentrations.

**Patients and methods:** Written consent was obtained from parents/ guardians of subjects. A total of 40 Malay subjects between the ages of 13 and 14 years were selected for the study. The study utilized a cross-over design with 3 groups: (i) no treatment, (ii) use of CPP–ACP paste and (iii) use of CPP–ACP with added fluoride (900ppm). Subjects were asked to use each paste given over a period of 5 days. with a two-week wash-out period between each intervention. Statistical analysis was done using Repeated Measure ANOVA. Approval for study was obtained from the Dental Ethics Committee, University of Malaya.

**Results:** The mean saliva flow rate in the adolescent group was found to be lower than that reported for adults. The baseline levels of salivary calcium and phosphate were within the ranges reported by previous studies, increasing significantly with the use of CPP–ACP paste with or without added fluoride (P < 0.05).

**Conclusion:** The short term use of oral pastes containing CPP–ACP with or without fluoride increased saliva buffering capacity and the salivary concentration of calcium and phosphate. There is much potential for the extended use of these CPP–ACP-containing materials.

#### O20-151

# Examination of antimicrobial and clinical effect of chlorhexidine-containing oral health care gel in children

<u>A. BEGZATI<sup>1</sup></u>, S. KNEIST<sup>2</sup>, A. RAKA<sup>1</sup>, T. ADEMAJ-KUTLLOVCI<sup>1</sup> & G. DAVID<sup>3</sup>

<sup>1</sup>Department of Pedodontics and Preventive Dentistry, University of Prishtina, Dental School of Prishtina, Kosova; <sup>2</sup>Department of Preventive Dentistry, Friedrich-Schiller-Uniersity of Jena, Jena, Germany; <sup>3</sup>Ivoclar Vivadent, Liechtenstein

**Introduction:** Dental caries and gingival inflammation are indicators of poor oral health. Poor oral health usually is associated with a high number of Streptococcus mutans. The aim of the study was to evaluate the antimicrobial and clinical effect of a chlorhexidine containing gel (Cervitec Gel, Ivoclar Vivadent).

**Materials and methods:** The study includes the evaluation of *S. mutans* colonies, plaque index, bleeding index, DMFT index of 30 children of the age 12–16 years. The same parameters were

evaluated at the end of the study after 3 months. Children were instructed to brush their teeth under parents supervision on a regular basis, and then to apply Cervitec Gel with a toothbrush for a 3-month period daily in the evening at home. The oral health care gel contains 0.2% chlorhexidine and 0.2% sodium fluoride. The statistical analysis was done using *t*-test and Anova. The study was permitted by the ethical committee of the Dental School in Prishtina.

**Results:** The baseline count of *Streptococcus mutans* was very high  $(CFU \ge 10^5)$ , and after the application Cervitec Gel, the microbiological analysis showed a significant reduction of *S.mutans* in saliva. Daily tooth brushing with the oral health care gel caused a decrease of the plaque index and bleeding index (from 0.23 to 0.12). The baseline DMFT was 6.3, and didn't show significant difference after the treatment.

**Conclusion:** The daily application of a chlorhexidine containing gel resulted in a significant reduction of *S. mutans* within 3 months. The results suggest that the gel application may help to improve the oral health status in children with high *S. mutans* counts.

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