

**537** Early Childhood Caries and Nutritional Status: A Longitudinal Study in Peru. J.O. Alvarez<sup>1</sup>, J. Caceda, and H. Aguayo (University of Alabama at Birmingham, USA and University of Cayetano Heredia, Lima, Peru)

In 1986, 209 Peruvian children from a low socioeconomic, periurban community of Lima were recruited at age 6-11 months into a longitudinal study of Nutrition and Oral Health and categorized as either: (N) Normal, (W) Wasted or Acutely Malnourished, (S) Stunted or Chronically Malnourished, or (S&W) Stunted and Wasted. As reported previously, S&W children not only had delayed tooth eruption but by age 4yr showed significantly higher caries experience in the primary teeth (J. Dent Res 1993;72: 1573-6). In 1992, 94 of these children were examined again at age 6yr and S&W children, in addition to increased caries in the primary teeth, showed abnormal craniofacial growth that resulted in smaller mandibles relative to the maxillary and upperfacial bones (i.e., higher risk for malocclusion).

In 1994, 90 of these children were re-examined at age 8 yr. Sample size distribution according to their nutritional categorization at infancy (i.e., in 1986) was: (N)31, (W)17, (S)21, (S&W)21. Decayed and filled deciduous surfaces (dfs) was significantly higher in (S&W) than in (N) children ( $17.6 \pm 24.6$  vs  $11.9 \pm 10.6$ ;  $p=0.02$ ). Also stunted children (S+S&W) had more caries than non-stunted children (N+W) ( $15.6 \pm 13.8$  vs  $12.04 \pm 8.6$ ;  $p=0.02$ ).

In summary, early childhood caries resulting from one episode of mild to moderate malnutrition occurring at infancy is a long-lasting health problem and the higher caries experience in the primary teeth may increase the risk for infection in the permanent dentition of these children.

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**539** Mucin Secretion from the Submandibular Salivary Glands of Rats in Essential Fatty Acid Deficiency. S.M. Abdel-Hakim, B.S. Alam and S.Q. Alam\* (LSU Medical Center, New Orleans, LA).

Previous studies have shown that adenylate cyclase activity is altered in the submandibular salivary glands (SMSG) of rats in essential fatty acid (EFA) deficiency. Since the secretion of mucin from SMSG is stimulated by cyclic AMP, the purpose of the present study was to determine the effects of an EFA deficiency on mucin secretion from the SMSG. Three groups of rats were fed diets containing 7% hydrogenated coconut oil (HCO) (Group I, EFA-deficient, EFAD), 6.6% HCO + 0.4% corn oil (Group II, marginally deficient, MEFAD) or 7% corn oil (group III, control). Rats were sacrificed after 5 months on their respective diets, SMSG were dissected out and the gland slices were incubated in a medium containing <sup>14</sup>C-glucosamine. The secretion of <sup>14</sup>C-labelled trichloroacetic acid-precipitable glycoproteins into the incubation medium was measured for up to 2 hours in the presence of isoproterenol. No significant differences were observed among the 3 dietary groups in basal or stimulated mucin secretion. The fold-stimulation of mucin secretion was (mean  $\pm$  SE)  $9.2 \pm 2.4$  in EFAD,  $11.3 \pm 1.5$  in MEFAD and  $10.9 \pm 2.4$  in the control group. The lack of significant functional changes in the SMSG as evaluated by mucin secretion in EFA deficiency is consistent with our previous study in which no significant differences were observed in the  $\alpha$ -amylase activity or total protein concentrations in whole saliva from rats in EFA deficiency. (Supported by NIH Grant # DE 05978 and Egyptian Ministry of Higher Education).

**538** Relationship Between Nutrient Intake and Dental Caries Experience. H. K. Kwon\* (Dept. of Oral Biology, College of Dentistry, Yonsei University, Seoul, Korea)

This study is designed to investigate relationship between nutrient intake and caries experience of middle school students. The sample consisted of 297 boys and 365 girls in Kangwha County. Dependent variables were both experience of dental caries and DMFS score. Both variables were measured by two dentists through oral examination. Independent variables such as pit and fissure retentiveness of first molars, and oral hygiene status were measured by dentists, too. Other explanatory variables such as tooth brushing habits, socioeconomic condition, between-meal diet habit, with Resazurin Dye Test response. Logistic regression and multi-variate regression analyses were performed to evaluate how independent variables influence on the dependent variables, caries experience and the severity of caries experience. The major findings are summarized as follows: First, experience and occlusal caries experience of moderate retentiveness group were 4.5 times higher than those of low retentiveness group ( $p<0.001$ ). And caries experiences of high retentiveness group were 9.3 times higher than those of low retentiveness group ( $p<0.001$ ). Second, logistic regression analyses showed that total caries experience was negatively correlated with daily intake amount of dietary fiber ( $p<0.05$ ). Also, occlusal caries experience was negatively correlated with daily intake amount of dietary fiber ( $p<0.05$ ). Smooth surface caries experience was positively correlated with daily intake amount of niacin ( $p<0.05$ ). Third, Regression analysis represented that DMFS was positively associated with daily intake amount of carbohydrate ( $p<0.05$ ) and niacin ( $p<0.01$ ). The above results suggested that, in group of age 12-13, pit and fissure retentiveness was the most influential factor on caries experience. However, in this study, niacin were identified to influence the caries experience in addition to confirm the well known relationship between carbohydrate intakes and caries experience.

**540** A Rapid PCR-method for Concomitant Detection of *Actinobacillus actinomycetemcomitans* and *Porphyromonas gingivalis*. J.H. MEURMAN\*, J. WAHLFORS, P. ALAKUJALA and J. JÄNNE (Univ. of Kuopio, Fac. of Dent. and Dept. of Biochem. and Biotech., Kuopio, Finland).

A multiplex polymerase chain reaction (PCR) method was developed for simultaneous and rapid detection of *Actinobacillus actinomycetemcomitans* (A.a.) and *Porphyromonas gingivalis* (P.g.), risk-indicator bacteria in human periodontal disease. The PCR primers were designed to hybridize to variable regions of 16S rRNA gene. ATCC 29523 (serotype a), 43718 (serotype b), 22284 (serotype c), and 6 clinical isolates of A.a., and ATCC 33277 and 7 clinical isolates of P.g. were used to test the sensitivity and specificity of the method. Subgingival plaque samples from 36 periodontitis patients were also used. Conventional cultivation of the bacterial and plaque samples was used for comparison. Bacterial samples were added directly to the PCR mixture without additional processing steps. Plaque samples were added after 1 min centrifugation; 5  $\mu$ l aliquot of the supernatant was taken into PCR. DNA amplification was carried out using hot-start technique and 36 PCR cycles were run. Specificity was confirmed by analysing several bacterial species of normal flora and the different strains of A.a. and P.g. Sensitivity was studied with titrated cultures of the strains. Detection limit was determined for the simultaneous PCR with known number of bacteria diluted into water or gingival fluid. The results showed that both A.a. and P.g. could be detected in gingival fluid even if their number was less than 50 cells per sample. In water suspension, the sensitivity was 10 times better. The percent of positive patient samples were 44% vs. 25% of A.a. and 56% vs. 42% of P.g., with PCR and cultivation, respectively. Because the PCR could be performed in less than 4 hours and both the strains could be detected simultaneously in one reaction, the identification of A.a. and P.g. with our primers is superior to any previously published method.

**541** Gingival Bleeding Response in Smokers and Non-Smokers. C.K.Y. FUNG\* and E.F. CORBET\* (Department of Periodontology and Public Health, The University of Hong Kong)

Some previous studies have reported reduced gingival bleeding on probing in tobacco smokers compared to non-smokers, whereas other studies have not shown a difference. One possible explanation for such a discrepancy could be that inflamed gingiva of smokers require a longer time following probing before bleeding is apparent. The aim of this study therefore was to investigate the gingival bleeding response to probing among smokers and non-smokers. Gingival bleeding was recorded as occurring immediately on probing or after a period up to approximately 25 - 30 seconds after probing six sites on each tooth. 24 male smokers and 23 male non-smokers with shallow probing pocket depths were examined before and one-month after a course of non-surgical periodontal therapy. Before treatment a mean of 37% of sites in smokers and 40% of sites in non-smokers exhibited immediate gingival bleeding, whereas 30% of sites in smokers also exhibited delayed bleeding on probing compared to only 15% of sites in non-smokers. After treatment 29% of sites in smokers exhibited delayed gingival bleeding compared to only 11% of sites in non-smokers. These differences in delayed bleeding were significant at  $p < 0.001$  using paired t-tests. It was concluded that delayed gingival bleeding on probing was more prevalent in these smokers before and after periodontal treatment, and thus the interval between probing and recording may influence reported gingival bleeding responses in smokers. This study was supported by the Committee for Research and Conference Grants 334/254/0004 H.K.U.

**542** Gingival Suppuration in Smokers and Non-Smokers. C.K.Y. FUNG\* and E.F. CORBET\* (Department of Periodontology and Public Health, The University of Hong Kong)

Gingival suppuration has been investigated as a sign of periodontal inflammation and as a predictor for attachment loss in studies which have not reported the smoking habits of the subjects. It is not known if tobacco smoking affects gingival suppuration. The aim of this study was to investigate gingival suppuration in smokers and non-smokers before and one-month after non-surgical periodontal therapy. 24 smoking and 23 non-smoking male dental hospital attenders with only shallow probing pocket depths (4 - 6 mm) were included. Gingival suppuration was recorded for buccal and lingual sites after exerting gentle pressure on the gingiva 1 - 2 mm from the gingival margin using a ball burnisher. Before treatment a mean of 9.4% of buccal and lingual sites in smokers compared with only 1.6% of sites in non-smokers, exhibited suppuration. This difference was significant at  $p < 0.001$  using paired t-test. Suppuration was found to be most prevalent around anterior teeth in smokers which might be suggestive of a local effect of tobacco smoking. One month after treatment gingival suppuration was reduced to negligible levels in both smokers and non-smokers. It was concluded that in these subjects with shallow probing pocket depths gingival suppuration was more prevalent in smokers than in non-smokers before treatment and that this sign resolved in response to non-surgical periodontal therapy. This study was supported by the Committee for Research and Conference Grants 334/254/0004 H.K.U.

**543** Local Application of a Metronidazole Dental Gel. S.G. GROSSI\*, R. DUNFORD, R.I. GENCO, B. PHILSTROM, C. WALKER, H. HOWELL, U. THORØE (SUNY Buffalo, Univ. MN, Univ. FL, Harvard Univ., USA, and Dumex Ltd., Denmark).

The extent to which topical antibiotics assist in the treatment of destructive periodontal disease was assessed. The specific aim of this multi-center study was to compare the effect of local subgingival treatment with a 25% metronidazole dental gel (GEL) with that of subgingival scaling and root planing (SRP). Patients previously treated for adult periodontitis and still exhibiting probing pocket depth (PPD)  $\geq 5$  mm were randomized into 2 treatment groups, GEL and SRP. Clinical efficacy was measured by changes in PPD, clinical attachment level (CAL), and bleeding on probing (BoP) at 3, 6 and 9 months post-treatment. A total of 164 patients from 4 centers were examined at 6 months, and 78 from 2 centers contributed to the 9 month assessment. Patients in the GEL group (n=82) showed at 6 months a reduction in PPD of  $0.91 \pm 0.52$  mm (mean  $\pm$  SD), a gain in CAL of  $0.76 \pm 0.64$  mm, and reduction of 24% in BoP. These changes were maintained through 9 months (n=39). No statistically significant differences were observed between the GEL and SRP groups, except for changes in PPD at 9 months where the SRP group exhibited a greater reduction compared to the GEL group ( $1.03 \pm 0.52$  mm and  $0.79 \pm 0.65$  mm, respectively;  $p = 0.047$ ). A minor but frequent complaint during the treatment period was after-taste. The number of complaints was statistically greater in the GEL group. In the follow-up period, however, the GEL group had a statistically significant lower frequency of tooth disorders compared to the SRP treated group. We conclude that the use of a 25% metronidazole dental gel showed comparable improvement in measures of periodontal status as compared to scaling and root planing over a 6 to 9 month period after treatment. The long term effects of these therapies require further study. Supported by USPHS Grant No. DE04898 and Dumex Ltd., Denmark.

**544** Are Oral Contraceptives Affecting Clinical Signs of Gingival Health? N. GROGNARD\*, M. MORADI SABZEVAR and P.A. ADRIAENS. Dept. of Periodontology, Free University Brussels, Belgium.

The aim of this single-blind, descriptive study was to compare the gingival conditions in young females taking low-dose oral contraceptives with those in young females not taking any oral contraceptive medication and in young males. 87 females and 67 males (age:  $23.6 \pm 0.3$ ; mean  $\pm$  SEM) participated. The interview for the use of oral contraceptives and the oral screening were performed by separate investigators in separate rooms to avoid bias. Modified Gingival Index (mGI) (Lobenz *et al.*, 1988), gingival crevicular fluid flow (GCFF) (Periotron 6000), Plaque Index (PI) (Turesky *et al.*, 1970), bleeding on probing (BOP) (Florida Probe) were scored on teeth 12, 16, 44, 24, 32 and 36. The bleeding/plaque ratio (Van der Velden *et al.*, 1985) was calculated for each subject. Significance of differences in gingival parameters between females taking no oral contraceptives (NOC), subjects taking oral contraceptives (OC) and males (M) was analyzed by one-way ANOVA. 55 females (63.2%) were taking oral contraceptives, 32 females (36.8%) did not. The difference in mean mGI between NOC ( $2.04 \pm 0.08$ ), OC ( $1.94 \pm 0.05$ ) and M ( $2.06 \pm 0.06$ ) was not significant. Neither were significant differences found for mean GCFF (Periotron units) (NOC:  $17.7 \pm 1.7$ , OC:  $17.8 \pm 1.8$ , M:  $18.0 \pm 0.9$ ); mean PI (NOC:  $2.2 \pm 0.1$ , OC:  $2.1 \pm 0.1$ , M:  $2.0 \pm 0.1$ ), mean BOP (NOC:  $0.46 \pm 0.03$ , OC:  $0.48 \pm 0.03$ , M:  $0.45 \pm 0.02$ ). The mean bleeding/plaque ratio was not significantly different between the groups (NOC:  $0.22 \pm 0.02$ , OC:  $0.25 \pm 0.02$ , M:  $0.27 \pm 0.01$ ). These findings suggest that low-dose oral contraceptives do not affect clinical signs of gingival health. Supported by grant NFWO S2/5 ND E209