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Poster Session P14 – Cariology 1



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INTERNATIONAL JOURNAL OF PAEDIATRIC DENTISTRY

# Poster Session P14/Cariology 1

## P14–200

### Caries risk, cariogenic bacteria and the cariostat: from childhood through old age

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**Introduction:** Early caries experience usually leads to future caries and eventual loss of teeth. Japan implemented the 8020 program to encourage citizens to maintain 20 teeth at 80 years of age. However, this goal can never be achieved if tooth loss occurs early in life. The Cariostat, a caries activity test, is a colorimetric test showing acid-producing capacity of cariogenic bacteria from plaque samples. This study summarizes the use of the Cariostat in assessing caries risk and presence of cariogenic bacteria from children, adults and the elderly.
**Patients and methods:** Participants were residents of Okayama Prefecture who gave informed consent. There were 143 mother-child pairs, 399 elementary school children and 160 8020 achievers. Caries risk was assessed by the Cariostat and presence of cariogenic bacteria was checked by DNA detection. Data regarding DNA detection and caries risk were analysed and performed using SPSS statistical software package.
**Results:** Cariostat-assessed high caries risk was seen in 29.4%, 68.5%, 48.1% and 35.6% of young children, their mothers, elementary students and 8020 achievers, respectively. High caries risk was significantly associated with the presence of *S. mutans* and *S. sobrinus* in all age groups while presence of *S. mutans* in children were associated with high risk mothers.
**Conclusion:** Caries risk and presence of cariogenic bacteria should be assessed at regular intervals to prevent early tooth loss. If our long-term goal is to have more teeth as we grow older, then caries risk assessment must be started early in life.

## P14–201

### Levels of S-IgA among the infants with or without early childhood caries

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**Introduction:** Saliva has different immunologic factors which play important roles in protecting the teeth. The aim of this study is to evaluate the levels of total secretory IgA (S-IgA) in two groups of infants with or without severe Early Childhood Caries (S-ECC). As null hypothesis it was presumed that both groups would have equal S-IgA values.
**Patients and methods:** This was a cross sectional study that evaluated 44 infants, 20 infants with S-ECC & 24 infants without S-ECC, 8 to 24 months of age. The infants of three nurseries in Kerman city (Iran) were selected and their saliva samples were collected under defined conditions. The levels of S-IgA were assessed with nephlometric method. The obtained data were analysed with SPSS 15 software. The research was approved by the Ethics Committee of Kerman University of Medical Sciences.
**Results:** The average saliva levels of S-IgA in infants with S-ECC (18.3 mg/dl) was higher than of infants without S-ECC (9.5 mg/dl); the difference was significant ($t$-test, p-value $< 0.05$).
**Conclusion:** According to this study, it can be concluded that the null hypothesis has to be rejected. The higher level of S-IgA in infants with S-ECC may be caused by the more severe immune response.

## P14–202

### The prevalence and etiological factors of dental erosion in children

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**Introduction:** The aim of this study was to assess the prevalence of dental erosion in children and to evaluate the etiological factors.
**Materials and methods:** A total of 170 children aged between 6–12 years old were included in the study and a detailed history was recorded. WHO criteria and the dental erosion index proposed by O'Sullivan were used in the diagnosis of caries and erosion, respectively. In addition, the location, distribution, and extension of affected area and severity of dental erosion were recorded. Salivary flow rate and buffering capacity were also detected from the obtained saliva. All data were analysed by using chi-square and Mann Whitney U tests.
**Results:** The prevalence of dental erosion was found as 25% ($n = 43$). No statistically significant difference was found in the prevalence of erosion between boys and girls. Incisal and occlusal surfaces were the mostly affected surfaces than the others (86%, $n = 37$). Enamel loss was the most prevalent type of dental erosion (67%, $n = 29$). In 98% of the children who exhibited erosion more than half of the surfaces were affected by erosion.
**Conclusion:** The results of this study indicated that gastro-oesophageal reflux, bruxism and consumption of acidic beverages were effective factors for dental erosion. In addition, it could be concluded that the presence of dental erosion could be a diagnostic clue in the early detection of a systemic disease.

## P14–203

### Functional analysis of ATP transporter proteins associated with antibiotic resistance in *Streptococcus mutans*

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**Introduction:** *Streptococcus mutans*, a major pathogen of dental caries, is known to have a large number of sugar metabolism transporters, termed ATP-binding cassette (ABC) transporters, which are involved in the uptake of carbohydrates. The basic structure of ABC transporters consists of four domains; two integral membrane domains and two ATPase subunits. In this

study, we performed a functional analysis of the ABC transporters in *S. mutans*.

**Materials and methods:** The SMu0836 and SMu0837 genes were determined to be possible *S. mutans* ABC transporters based on the complete UA159 genome sequence database. Next, those genes deficient mutant strains were constructed by inserting an erythromycin resistant gene into SMu0836 and SMu0837 genes, respectively, of *S. mutans* MT8148 and the mutant strains were selected. Test strains were then cultured in the presence of tetracycline, chloramphenicol, kanamycin, and penicillin at 37°C for 18 h, after which the optical density values were measured at 600 nm. In addition, the expressions of SMu0836 and SMu0837 with a sublethal concentration of chloramphenicol were analysed using a real-time reverse transcription polymerase chain reaction method.

**Results:** Both mutant strains were significantly less sensitive to chloramphenicol than MT8148, while the expressions of SMu0836 and SMu0837 were elevated in MT8148 when the strain was cultured with sublethal concentrations of chloramphenicol. In addition, chloramphenicol had effects on the expression of SMu0836 and SMu0837 at the transcription level.

**Conclusion:** These results suggest that the ABC transporters of *S. mutans* play an important role in chloramphenicol transport.

## P14–204

## Influence of chlorhexidine and xylitol on oral microflora in children with ECC

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**Introduction:** The aim of this study was to investigate the preventive effect of a remineralization gel with antibacterial properties on the oral microflora in patients with Early Childhood Caries (ECC).

**Patients and methods:** Thirty 12- to 36-month-old children with ECC were included in this study. The patients were splitted randomly into 2 groups ($n = 15$). In the first group a remineralization gel (R.O.C.S.) containing xylitol (10%) and calcium glycerophosphate was applied 5 times per day for 1 month. In the second group 0.1% chlorhexidine was applied once a day during 7–10 days. Additionally, a calcium/phosphate gel was applied 5 times per day within a time interval of one month. Before and after this preventive intervention dental plaque samples were collected and the microflora was investigated by standard microbiological methods.

**Results:** In the first group the following results were registered after intervention: 45.4% reduction of *S. mutans*. 45.5% for Actinomyces spp. and *P.melaninogenica*, 33.5% for F. nucleatum, contamination reduction of *S. mutans* (5.5 ± 0.25 to 4.5 ± 0.2 lg CFU, $P < 0.05$), *S. sanguis* (7.2 ± 0.3 to 6.5 ± 0,2 lg CFU, $P < 0,05$), F.nucleatum (5.3 ± 0,1 to 4.5 ± 0.1 lg CFU, $P < 0.05$); Veillonella parvula population increase in 46.7% of patients, *C. albicans* elimination in all patients. In the second group a slight reduction of cariogenic streptococci and actinomyces ($P < 0.05$) was found, a reduction of *P. gingivalis* (20–6.7%), a reduction of *P. melaninogenica* (5.1 ± 0.2 to 4.6 ± 0.2 lg CFU, $P < 0.05$); an increase of *F. nucleatum* (6.7–33.3%) and *C. albicans* (26.7–40.0%).

**Conclusion:** After application of the remineralization gel a reduction of relevant caries-associated bacteria was measured in comparison to 0.1% chlorhexidine.

## P14–205

## Infiltration of resin adhesive into proximal early caries lesions according to pre-treatment methods

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**Introduction:** Early enamel caries are known to be remineralized by improved oral hygiene including fluoridation, however it may be unreliable since it totally depends on the patient's cooperation. Sealing the earlier lesions with low-viscous light-curing resins has been tried as an alternative to it. However, compared with lesion body underneath, the surface layer of early enamel caries may interfere with the infiltration of resin adhesives due to relatively lower pore volume. Therefore adequate surface treatment was thought important to remove a part or whole of the surface layer to enhance the infiltration. The aim of the study was to search for the adequate pre-treatment method prior to applying resin adhesives on natural proximal early caries lesions.

**Materials and methods:** 39 extracted primary molar teeth showing early caries lesion on proximal enamel were used for this study. The teeth samples were divided into 5 groups and surface treatment was done as follows: Group 1; only carefully cleaned with water, group 2; etched with 15% HCl for 15 s, group 3; etched with 35% phosphoric acid for 15 s, group 4; etched with 35% phosphoric acid for 30s, and group 5; cleaned with 0.5% NaOCl.

**Results:** Following results were obtained by evaluating the surface features with scanning electron microscopy and confocal laser scanning microscopy for the cross-sectioned specimens after infiltration of resin adhesives. (i) Group 2 showed clearly removed surface layer, group 3 and 4 showed partially and irregularly removed surface and group 5 showed slightly removed surface layer. (ii) Average infiltration depth of resin adhesives for each group was 6.85˜23.09 μm. (iii) Group 2 showed the deepest infiltration, followed by group 4, group 3, group 5, group 1, and all groups except group 5 showed significant differences ($P < 0.01$).

**Conclusion:** The most adequate pre-treatment method on early proximal caries lesions for deep infiltration of resin adhesive was to etch with 15% HCl for 15 s.

## P14–206

## The antibiotic activity of Actinomyces isolated from black-stained primary teeth to *S.mutans*

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**Introduction:** Many reports showed that children with black stain have lower caries experience than children with other colored or without tooth stain. The black stain of teeth is made of ferric sulfide, resulted from the reaction between hydrogen sulfide produced by bacterial action and iron in the saliva or gingival exudates. Chromogenic bacteria are known as Actinomyces and Bacteroides melaninogenicus and the main causative bacteria in primary dentition are known as Actinomyces. The aim of this study is to assess the antibiotic activity of Actinomyces in plaque from black stained primary teeth to *Streptococcus mutans*.

**Materials and methods:** Plaque samples were obtained from four children, 2–6 years of age, who had black stains on all erupted primary teeth. 16 different Actinomyces spp. were isolated and antibiotic activities were examined with paper disc method. PCR method was used for identification of Actinomyces spp. This study obtained the approval of IRB and informed consent from parents of children. The results were as follows: (i) No.1 and No.5

Actinomyces spp. showed the antibiotic activity to *Streptococcus mutans* and the activity of No.5 Actinomyces spp. could compete with that of Oxacillin. (ii) No.1 and No.5 Actinomyces spp. also exhibited the antibiotic activity to Bacillus cereus, Bacillus subtilis commonly used as experimental bacteria for testing antibiotic activity. (iii) By PCR analysis which was performed for identification of No.1 and No.5 spp., No.5 spp. matched Actinomyces viscosus at 97% level but No.1 spp. didn't match.

**Conclusion:** Conclusively, this study shows that some species of Actinomyces in plaque from black stained primary teeth have a antibiotic activity against *Streptococcus mutans*.

## P14–207

### Effect of extremely low frequency magnetic field on enamel microhardness in rats

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**Introduction:** Numerous sources of electromagnetic fields exist in nature and in the occupational and residential environments. In nearly all instances, these fields pose no obvious threat to human health or safety and are generally discussed as an inevitable by-product of modern technology.

**Materials and methods:** The experiments were performed on 30 4 months old male Sprague-Dawley rats, obtained from Medical Science Application and Research Center of Dicle University (DUSAM) were divided into three groups: two experimental and one cage-control. Principles of Laboratory Animal Care and the rules of Scientific and Ethics Committee of Dicle University Health Research Center were followed. The first and second experimental group ($n = 10$) were exposed to 100 μT and 500 μT Extremely Low Frequency Magnetic Field (ELF-MF)ELF-MF during 10 months, 2 h a day respectively. For the cage control, nothing applied to rats in this group and they completed their life cycle in the cage during the study period. It was investigated the effect of long term ELF-MF exposure on microhardness of enamel surface in rats was determined for each group.

**Results:** The decrease of microhardness in second experimental group was found to be statistically significant relative to cage-control group ($P < 0.05$). However, no statistical difference was found in between first and second experimental groups ($P > 0.05$). From the results it can be concluded that 500 μT magnetic field strengths may have a certain negative effect on enamel mineralization.

**Conclusion:** Microhardness levels of enamel decreased in exposed groups according to cage-control group. Further investigations are necessary to analyse the effect of ELF-MF on teeth.

## P14–208

### Performance of ICDAS-II and fluorescence methods for detection of occlusal caries

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**Introduction:** The aim of this *in vitro* study was to assess the performance of three fluorescence methods for the detection of dentine caries as compared to radiographic detection.

**Materials and methods:** 53 freshly extracted permanent teeth were available for the study. Informed consent was obtained from patients prior to extraction about the use of teeth for research purposes. Two examiners (A: experienced dentist, B: final-year dental student) examined 99 investigation sites on the occlusal surfaces of the teeth using the following methods: ICDAS-II, the laser fluorescence devices DIAGNOdent (DD) and DIAGNOdent Pen (DDPen), and the fluorescence camera VistaProof (VP). Bitewing radiographs (BW) were taken and assessed for presence of caries at D3-Level (dentine caries). Correlations among all methods were assessed using Spearman's rank correlation coefficient ($r_s$).

**Results:** $r_s$ with bitewing radioagraphy were: Examiner A: 0.60 (ICDAS-II), 0.44 (DD), 0.36 (DDPen), 0.48 (VP); Examiner B: 0.60 (ICDAS-II), 0.39 (DD), 0.41 (DDPen), 0.45 (VP). 30 sites were found by BW to have dentinal caries. The performance of different methods in detecting dentinal caries was: Examiner A: 60% (ICDAS-II), 70% (DD), 73.3% (DDPen), 73.3% (VP); Examiner B: 56.6% (ICDAS-II), 76.7% (DD), 80% (DDPen), 80% (VP).

**Conclusions:** All fluorescence methods showed similar performances in detection of dentine caries, whether they were used by a dental student or an experienced examiner. The correlation with bitewing radiography was moderate for the fluorescence methods and high for ICDAS-II. Supported by Dürr Dental, Bietigheim-Bissingen, Germany.

## P14–209

### Reproducibility of three fluorescence methods for occlusal caries diagnosis in permanent teeth

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**Introduction:** This *in vitro* study aimed to assess the reproducibility of three fluorescence methods for caries detection when used by an experienced and a novice examiner.

**Materials and methods:** 53 freshly extracted permanent teeth were available for the study. Prior to extraction, informed consent was obtained from patients for use of their extracted teeth for research purposes. 99 investigation sites on the occlusal surfaces of the teeth were examined by an experienced dentist (A) and a final-year dental student (B) using the laser fluorescence devices DIAGNOdent (DD) and DIAGNOdent Pen (DDPen) and the fluorescence camera VistaProof (VP). All sites were examined twice within the same day. Intraclass-correlation coefficients (ICC) were calculated for intra/inter-examiner reproducibility. Correlations among the fluorescence methods were assessed using Spearman's correlation coefficient ($r_s$).

**Results:** Intraexaminer-reproducibility (ICC) for examiner A was: DD: 0.95, DDPen: 0.97, VP: 0.81 and for examiner B: DD: 0.98, DDPen 0.98, VP: 0.95. Inter-examiner- reproducibility (ICC) was: DD: 0.86, DDPen 0.93, VP: 0.76. Significant positive correlations were observed among all methods ($P < 0.001$). $r_s$ for examiner A were: 0.93 (DD/DDPen), 0.79 (DD/VP), 0.78 (DDPen/VP) and for examiner B: 0.93 (DD/DDPen), 0.76 (DD/VP), 0.76 (DDPen/VP).

**Conclusion:** All three fluorescence devices showed good reproducibility whether they were used by experienced or less experienced investigators and the results were highly correlated between methods. The findings support the view that final-year dental students are able to apply a fluorescence system as a supportive device for caries diagnostic purposes. Supported by Dürr Dental, Bietigheim-Bissingen, Germany.

## P14–210

### Contribution of recA gene for gtf expression by *Streptococcus mutans*

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**Introduction:** *Streptococcus mutans* has been implicated as a primary causative agent of dental caries and is known to synthesize adhesive glucans from sucrose by the action of glucosyltransferases (GTFs; GTFB, GTFC, and GTFD), which are considered to mediate firm adherence of the bacterial cells to tooth surfaces, leading to biofilm formation. The recombinase A (RecA) protein has been shown to be essential for transformation of plasmid and chromosomal DNA in *Streptococcus pneumoniae*. In this study, we analysed the contribution of RecA of *S. mutans* to biofilm formation.
**Materials and methods:** A RecA-deficient mutant strain (RAD) was constructed from *S. mutans* strain MT8148 by insertional inactivation of the recA gene encoding RecA. Test strains were grown in Todd-Hewitt broth in the presence or absence of sucrose, then inoculated into 96-well multi-titer plates. The quantity of biofilm was determined following crystal violet staining at an optimal density of 570 nm. Furthermore, expressions of the genes encoding GTFs in MT8148 and RAD were investgated using real-time reverse transcription polymerase chain reaction (RT-PCR) assays.
**Results:** The RAD strain was found to have a lower quantity of sucrose-dependent biofilm formation than MT8148. In addition, RT-PCR results showed that the level of expressions of the gtfB or gtfD genes in strain RAD were significantly lower than those in MT8148.
**Conclusion:** These results suggest that RecA may be an important factor for gtfB and gtfD expression in *S. mutans* for biofilm formation.

## P14–211

### Senior dental students' experience with cariogram in a rediatric dental clinic

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**Introduction:** Teaching caries risk assessment at the pre-doctoral level has become an important component of dental school's curriculum to enhance management of dental caries. The study objective was to assess pre-doctoral dental students' experience with caries risk assessment computer program 'Cariogram' at the Pediatric Dentistry clinic at Marquette University School of Dentistry.
**Materials and methods:** In 2005, sophomore dental students were introduced to Cariogram in the spring semester. The students received a 50-min lecture on caries risk assessment and a demonstration of Cariogram use in children in a pediatric dentistry didactic course. Sophomore dental students completed a case-based written examination that tested their knowledge and application of the Cariogram. After a 2-year clinical exposure to the Cariogram, the students now seniors completed an anonymous eleven-item questionnaire on their experience with the caries risk assessment tool. Each item on the questionnaire was scored on a 5-point Likert scale and descriptive statistics was done.
**Results:** Eighty-three percent of the students completed the survey. While 38% were neutral, 44% agreed that cariogram was easy to understand. Thirty-six percent felt it was easy to apply and 22% reported that it was useful in determining preventive procedure. The students reported that 60% of full time and 33% of part-time faculties were knowledgeable about Cariogram. Eighty-two percent reported that they will not be using cariogram in their private offices.
**Conclusion:** A substantial proportion of students felt that Cariogram was easy to understand, however, they do not intend to use it in their private offices.

## P14–212

### Identification of oral Streptococci by denaturing gradient gel electrophoresis (DGGE)

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**Introduction:** Viridans streptococci are considered to be principal species of indigenous microbiota in oral cavity, and are associated with bacteremia and subacute bacterial endocarditis. Therefore, the microbial analysis is of clinical importance in Pediatric Dentistry. Since viridans streptococci are highly homologous, it is difficult to identify them by the conventional methods such as the 16S rRNA gene analysis. Therefore, new attempts have to be made.
**Materials and methods:** We phylogenetically analysed the rod shape-determining protein gene (rodA), which is associated with cellular morphology, cell division, and sensitivity for antibiotics. Streptococcal strains isolated from human saliva and brushing fluid, and reference strains in our laboratory were used. Denaturing gradient gel electrophoresis (DGGE) analyses based on the diversity of the rodA gene (rodA-DGGE) were performed with the DCode universal mutation detection system (Bio-Rad), according to the manufacturers' instructions.
**Results:** The rodA-DGGE analysis clearly identified and classified viridans streptococci. Moreover, we developed a more convenient rodA-DGGE method for detecting 9 popular streptococcal species, namely, *S. sobrinus, S. sanguinis*, *S. oralis, S. mitis, S. vestibularis, S. salivarius, S. infantis, S. gordonii*, and *S. mutans* in the clinical samples derived from oral cavity.
**Conclusion:** This newly developed rodA-DGGE method proved useful in detecting oral streptococci and the species which were difficult to cultivate and/or isolate. Thus, analysis of oral microbiota by rodA-DGGE together with 16S rDNA-DGGE may be a good alternative in the microbial diagnosis of streptococcal infection.

## P14–213

### Correlation of biological properties and expression profile of glucan-binding protein B in *Streptococcus mutans* clinical isolates

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**Introduction:** *Streptococcus mutans* is known to be a primary causative agent of dental caries and its major surface proteins, including glucan-binding proteins (Gbps: GbpA, GbpB, GbpC, and GbpD), are regarded to be important factors related to its glucan-binding properties. In the present study, we focused on GbpB, and investigated the relationships between its expression profiles and glucan-binding in various *S. mutans* clinical isolates.
**Materials and methods:** One hundred *S. mutans* strains isolated from Japanese children at our clinic and 100 from Finnish children who visited the Helsinki University Hospital were analysed. Western blotting analysis of GbpB was performed to assess the expression profile in each strain, while dextran-binding activity was evaluated based on glucan-binding properties of each strain.

 

**Results:** Three types of GbpB expression were identified, which were categorized as single band (S-type), multiple band (M-type), and no visible bands (N-type). More than 80% of the strains isolated in Japan were classified as S-type, while the distribution frequency of S-type in strains isolated in Finland was approximately 40%. In contrast, the distribution frequency of N-type in Japan (4%) was lower than that in Finland (20%). The dextran-binding assay also revealed that the N-type possessed a significantly lower level of activity than the other types.
**Conclusion:** These results suggest geographical differences in GbpB expression profiles in *S. mutans* clinical strains, while strains without GbpB expression have a low level of virulence for development of dental caries.

## P14–214

## Black stain: a PCR microbiological study of cariogenic and periodontopathogenic microflora

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**Introduction:** Black stain is a characteristic extrinsic discoloration on human teeth with microbiological entity, which is associated with a low caries experience. Aim of this study was to compare the cariogenic and periodontopathogenic microflora of black stain and nondiscoloured plaque samples from children.
**Patients and methods:** 46 children with black stain (black stain group) and 47 children with nondiscoloured plaque (control group) aged 6 to10 years were included in this study. The study was approved by the ethic committee of the University Hospital of Jena. Parents of all participating children had given written informed consent. Samples of black stain and nondiscoloured dental plaque were collected from the tooth surfaces by using sterile scalpels. The DNA of 93 samples in total was extracted and real-time PCR was performed to determine the bacterial load of cariogenic and periodontopathogenic species. Mann-Whitney's U-test was used to determine significant differences of the microflora between both groups.
**Results:** Plaque samples of the black stain group contained a significantly higher number of Actinomyces naeslundii ($P = 0.007$) and showed a tendency to more Porphyromonas gingivalis compared to the nondiscoloured plaque samples of the control group. Contrary, there were lower numbers of Fusobacterium nucleatum ($P = 0.001$), lactobacilli ($P = 0.001$) and *Streptococcus mutans* (not significant) in the black stain samples compared to the nondiscoloured plaque samples.
**Conclusion:** The results suggest that the low levels of lactobacilli and mutans streptococci in black stain samples contributes to the low caries experience. Black stain might be associated with pigmented and parodontopathogenic bacterial species (Porphyromonas gingivalis/Actinomyces naeslundii).

## P14–215

## In vitro activity of Scutellaria baicalensis Georgi extracts against Streptococcus mutans biofilms

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**Introduction:** *Scutellaria baicalensis* Georgi has been used for thousands of years in traditional Chinese medicine practice for several purposes. It possesses several biological activities such as anti-oxidative, anti-inflammatory, antibacterial and antiviral activities. Although the antibacterial activity of *Scutellaria baicalensis* Georgi has already been demonstrated, little is known about its antibacterial activity against oral pathogens *in vitro*. Therefore, the aim of this study was to evaluate the antibacterial activity by *Scutellaria baicalensis* Georgi extracts and effect on the *Streptococcus mutans* biofilms.
**Materials and methods:** *Streptococcus mutans* ATCC 25175 was our main test organism. Biofilms were formed on polystyrene microtitre plate. The biofilms of *S. mutans* at different phases of growth were exposed to *Scutellaria baicalensis* Georgi extracts at different concentrations (0, 0.0625, 0.125, 0.25 mg/mL). Biofilm formation was also quantified by a modification of a crystal violet assay. Biofilm formation are expressed as mean ± SD. Results were compared by Schaffer's multiple comparison tests. A value of $P < 0.05$ was considered statistically significant.
**Results:** The activity of *Scutellaria baicalensis* Georgi extracts in removing *S. mutans* biofilm was dependent on the concentration, exposure time and the phase growth of biofilm. A concentration of 0.25 mg/mL of *Scutellaria baicalensis* Georgi extracts completely inhibited biofilm formation by *S. mutans* at adherent phases of growth, whereas Sub-MIC (0.062 mg/mL) concentration removed 60% of biofilm at plateau accumulated phase.
**Conclusions:** *Scutellaria baicalensis* Georgi extracts shows promising effects as an antibacterial agent for inhibiting and removing *S. mutans* biofilms *in vitro*.

## P14–216

## The correlation between the mean DMFT and odontogenic infections in children

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**Introduction:** The aim of this study was to show the correlation between the DMFT index values and odontogenic infections.
**Materials and methods:** We declare that this study was permitted by the ethical committee of the Dentistry School. The study included 337 10- to 15-year-old children. The statistical significance was tested using Chi-square test for $P < 0.05$.
**Results:** The caries prevalence of the examined children was 94.3%, while the DMFT index was 4.55. The structure of DMF was: 68.5% for decay, 17.7% for filled and 13.9% for extracted/missing teeth due to caries. There were 127 teeth found presenting with the following pathologic findings: chronic apical periodontitis, secondary caries with periapical lesion, as well as gangrenous radix relicta with sinuses and periapical lesions, as the causes of the odontogenic infections (abscesses, cellulites and phlegmona). The most affected tooth was the first permanent molar. The most affected teeth were maxillary teeth (54.3%), while mandibular teeth were affected in 45.7% of cases. The Chi-square test showed correlation between mean DMFT and odontogenic infections for $P < 0.05$.
**Conclusion:** It can be concluded that the higher DMFT values are in direct correlation withodontogenic infections.

## P13–217

### A clinical study of enameloplasty applied in deep pit and fissure of young permanent molars

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**Introduction:** Decisions regarding prevention and treatment of dental caries lesions forming in pits and fissures of young permanent molars can be challenging because of their complicated pit and fissure structures and sometimes the lesion may be hidden. This study was to investigate the effect of enameloplasty in treating this kind of molars.
**Patients and methods:** 164 permanent molars were selected from 64 children aged 6–15 year old. The examining indexes were: pit and fissure pigment (±), black immersed around pit and fissure (±), soft on probing (±), probe block (±). The operators made the treatment plan via those indexes first. After using the small bur to open the fissures (enameloplasty technique), the operators determined the final treatment method: pit and fissure sealant, preventive resin restoration (PRR), and filling. Data were analysed using multi-factor regression. Statistical significance was considered to be present at the 0.05 level.
**Results:** Multi-factor regression showed that the indexes of pit and fissure pigment, probe soften and probe block contributed more to the final choice of treatment method. Correlation analyse showed the treatment strategy before and after using enameloplasty technique were highly correlative ($r = 0.897$).
**Conclusion:** The conventional examining indexes of deep pits and fissures were still credible and effective. It is helpful to detect early caries beneath deep pits and fissures by applying enameloplasty technique.

## P14–217a

### An *in vitro* comparison of visual inspection, bite-wing radiography and laser fluorescence methods for the diagnosis of occlusal caries

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**Introduction:** The correct detection and diagnosis of non cavitated occlusal caries is essential for prevention programs. The aim of this study was to compare accuracy and reproducibility of visual inspection (VI), bitewing radiography (BW) and laser fluorescence (LF) methods in diagnosis of occlusal caries.
**Materials and methods:** The study was done on 80 extracted permanent pre-molars which seemed to be intact or with primary caries in fissures. Three trained dentists examined the teeth in four stages: Visual Inspection, Radiographic Examination, Laser Fluorescence and Histological Examination as gold standard. Sensitivity, specificity, positive and negative predictive values, and accuracy of all methods were calculated and compared. Additionally, ROC curves for LF were calculated.
**Results:** The accuracy was 58.9% for VI, 45.1% for BW and 94.8% for LF. Kappa coefficient for inter-examiner reproducibility was 0.57 and 0.341 in visual inspection and BW radiography, respectively. Inter- and intraexaminer reproducibility coefficients (Kappa coefficients) of LF method were 0.784 and 0.836, respectively. The mean intraexaminer reproducibility coefficient in VI method was 0.612 using Kappa coefficient.
**Conclusion:** Although accuracy and reproducibility of LF method was higher than VI and BW, it is better to use this method together with other methods to reduce diagnostic faults.

 