

Abstracts from the European Association for Dental Public Health 2009 Conference

ASSOCIATIONS BETWEEN ORAL HEALTH AND ORAL HEALTH-RELATED QUALITY OF LIFE

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Objective: The aim of this study was to investigate associations between oral health and oral health related-quality of life, using the Oral Impact on Daily Performances (OIDP) instrument.

Materials and Methods: The study was performed in three clinics in Sweden and included 204 patients, 43.8% men and 56.2% women (20-86 years), consecutively recruited in connection with their routine dental examination. The patients were interviewed using the OIDP followed by a clinical examination. Four bite-wings radiographs were taken in two of the clinics (n=154). The study was approved by the Research Ethics Committee of Karlstad University, Sweden.

Results: Subjects =60 years had significantly more missing teeth, lesser maximal jaw opening, more periodontal pockets =6 mm, a higher number of sites with alveolar bone loss and proportionally more filled teeth compared to younger individuals. Impacts related to oral health that affected daily life were reported in 39.7%. Subjects missing =10 teeth significantly more often experienced oral impacts than those with more teeth. Multivariate logistic regression analysis including clinical and radiographic variables showed that 10 or more missing teeth and a maximal jaw opening of less than 40 mm were significantly associated with having one or more impacts as measured with the OIDP (OR 5.32; 95% CI 1.32-21.43 and OR 2.74; 95% CI 1.02-7.31, respectively).

Conclusions: In the patients studied diminished functional oral health status increased the impact on daily life and oral health-related quality of life. The OIDP instrument may be of value to use in routine dental check ups in patients with related problems to determine possible oral impacts on their daily life.

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PILOTING S MUTANS PLAQUE TESTING IN 2-YEAR-OLDS IN VANTAA, FINLAND

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Introduction: In the health promotion project of Vantaa public health care a test for measuring plaque levels of mutans streptococci was launched in 2-year-old children. Calibration of the procedure and interpretation of bacterial growth was arranged for participants involved in the dental examinations of small children.

Aim: The aim of the study was to obtain consistency in plaque testing and interpretation of bacterial growth among participants of different age, education and practical experience.

Methods: The training was organised in eleven day-care centres (between November 2007 and February 2008). The ethical committee of Helsinki gave approval for plaque testing. The parents of the children were asked for written permission. A total of 35 dental hygienists or dental nurses participated, in groups of 2-4. The trainees practiced the sampling and inoculation of plaque, as well as the interpretation of bacterial growth. A test on how to interpret the results and a structured questionnaire regarding the training were implemented.

Results: All trainees agreed or almost agreed to have gained practical benefit from the training and 92 % of them considered the written instructions clear. However, less than 50% of trainees considered the interpretation of growth as easy. Agreement in the interpretation was highest in cases with no mutans streptococcal growth as well as in cases with abundant growth of bacteria.

Conclusions: Piloting plaque testing was aided by precise written instructions and practical education and training, which were carried out in collaboration with public day care centres. The training improved the quality and the consistency of the performance and gave each participant more cer-

tainty and confidence to use and interpret the bacterial tests.

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NATION WIDE SURVEY OF ORAL HEALTH AMONG CHILDREN IN THE CZECH REPUBLIC

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Aim: The aim of this study was to evaluate the oral health status of 5 and 12 year-old children in the Czech Republic in 2008.

Methods: Ethical approval was obtained. WHO oral health monitoring criteria were used (with scoring at cavitation level). Informed consent from parents was obtained. In total 944 children (mean age 5,13) and 575 children (mean age 12,16) were examined in 39 randomly selected localities in the 9 regions of the Czech Republic. Examinations were performed by 4 calibrated dental professionals. Oral health status data were collected and basic oral health indicators were calculated: % of caries free children; caries experience: dmft/DMFT, ri/RI, sic/SIC.

Results: In 5 year-olds, 49.36% children were caries free with mean dmft of 2.69, sic of 7.19 and ri (restoration index) of 21.23%. In 12 year-olds 34.26% was caries free with a mean DMFT of 2.14, SIC of 5.0 and RI (restoration index) of 30.66 %.

Conclusions: This epidemiological study among children in the Czech Republic supports the trend of increasing % of caries free children and decreasing mean dmft/DMFT values. However, sic/SIC and ri/RI values remain alarming. The situation demonstrates the need for intensive oral health promotion activities in schools and kindergartens in the Czech Republic.

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EXPLORING POSITIVE PERCEPTIONS OF DENTAL WORK IN SWEDEN AND DENMARK

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Introduction: Dentistry is an example of human service work involving cognitively, emotionally and technically demanding tasks. These tasks are potentially implicative of negative as well as positive personal effects.

Aim: The aim was to study work enjoyment, satisfaction with work and good working life, comparing Danish and Swedish general dental practitioners.

Methods: In 2008, a questionnaire was sent to a randomly selected sample of practising dentists in Sweden (n=900) and Denmark (n=937). The study was approved by the Swedish regional ethical board. Distribution analysis and Mann-Whitney U tests were used for comparison between the Swedish/Danish groups, private/public practitioners and dentists with/without management responsibility.

Results: The response rate was 68%, with 51% Swedes and 49% Danes. Sixty percent had management responsibility and 40% not. Further, 58% were private and 37% were public practitioners. Frequency analysis showed that almost three fourths of the dentists experienced a *high* or a *very high degree of* (1) work enjoyment (73%), (2) satisfaction with their work as a whole (72%) and (3) of a good working life (74%). The items (1) and (2) showed differences among groups: Danes, private practitioners and dentists with management responsibility scored higher than their counterparts ($p=0.05$). Item (3) showed similar results ($p=0.05$), except for the comparison between Danes and Swedes, which was non-significant.

Conclusions: The initial results corroborate that Danish and Swedish dentists have positive perceptions of their work. The differences between the three groups are to be further studied to track potential correlations promoting positive perceptions of work.

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DECISION AUTHORITY AMONG DENTISTS FROM DENMARK AND SWEDEN

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Aim: Karasek and Theorell define job control as the worker's control over work tasks and performance during the working day. This study aimed to analyze differences in job control as decision

authority over aspects of the work, among general dental practitioners from Denmark and Sweden.

Methods: In 2008, a questionnaire was sent to 1835 general dental practitioners, randomly selected from the dental associations in Sweden and Denmark (17% of the eligible population). The response rate was 68% after two reminders. Principal Components Analysis was applied to eight items about influence. Based on the resulting two factors, additive indices were established to measure decision authority: "influence on scheduling appointments" (2 items) and "general influence" (6 items). ANOVA with Tukey's HSD test was used for comparison between groups based on nationality and sector for dentists with/without managerial responsibility. For analyses without equal variances, Kruskal-Wallis tests were applied. **Results:** In both Denmark and Sweden, dentists from the public sector reported lower influence on scheduling appointments than private practitioners ($p=0.01$). Comparing dentists from the same sector showed no significant differences between countries, neither after controlling for managerial responsibility. Dentists with managerial responsibility had higher influence than employed dentists ($p=0.001$). For dentists without leadership tasks, similar patterns were seen. In contrast, Swedish dentists with managerial responsibility reported higher general influence than their Danish colleagues ($p=0.01$). Independently of gender and nationality, private managers had higher general influence than their public counterparts ($p=0.01$). Dentists with managerial responsibility had higher influence than employed dentists ($p=0.001$).

Conclusions: Differences in decision authority were found between general dental practitioners working in the public and the private sector in both countries. The results may reflect different management cultures as well as different structural organization of the work.

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ORAL HEALTH LIFE-STYLE AND CARIES EXPERIENCE IN 14 YEAR-OLD ITALIAN ADOLESCENTS

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Aim: To evaluate the relationship between caries experience, socioeconomic status (SES) and life-style factors in a random sample of 14 year old students.

Methods: A random cluster observational study, approved by the local Research Ethics Committee, was conducted in a sample of 560 (out of 2296) subjects born in 1994 in North-East Italy. Caries status was determined by two calibrated dentists using a portable light and mouth mirror. Dental decay was diagnosed visually at D₃ level. Caries experience was calculated using the D₃MFT index. Each subject was then classified as showing no obvious caries (DMFT=0), low caries experience (DMFT 1-3) or high caries experience (DMFT 4). Information on SES of the family was obtained from the parents through a series of 20 written closed questions on occupational status, immigrant status and their sons' oral health related life-style (dietary habits, daily oral hygiene, dental visits). A multivariable regression analysis was run using DMFT classification as dependent variable.

Results: Prevalence of high caries experience was 33.6%. Children received fluoride (tablets, drops) in the past (70.7%, mostly tablets). One third of the sample brushed their teeth no more than once a day: tooth brushing after eating was not a common practice (23%). High caries experience was positively associated with immigration status (Relative Risk Ratio 6.2, 95%CI 2.1-18.2) and negatively with frequency of tooth brushing (RRR 0.6, 95%CI 0.4-0.8), but not with SES or systemic fluoride supplementation.

Conclusions: Adolescents share high caries experience independently of social class or systemic fluoride supplementation. The most relevant factors associated with high caries prevalence were the frequency of tooth-brushing and immigrant status.

PARAMETERS INFLUENCING ORAL HEALTH IN ADULTS WITH INTELLECTUAL DISABILITIES

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Aim: To investigate the influence of socio-economic status and some preventive measures on the oral health of adults with intellectual disabilities.

Methods: After obtaining consent of the ethics comity, a cross-sectional study was conducted in 2007 and 2008 in south-west and south-east Germany. Five institutions comprising care facilities for individuals with intellectual disabilities were selected. After their approval for participation, the legal custodians were asked to fill out a questionnaire. An oral examination of the persons cared for in these institutions was also performed. Caries diagnosis was based on visual examination. A plane mirror, a blunt dental probe and an artificial light were used. WHO methods and criteria were followed. The examinations were performed in the selected institutions by a dentist (F.K.) who had been calibrated by a dentist with experience in epidemiology (A.B.).

Results: 427 individuals, representing 21% of the target group, participated in the study. Their age ranged between 18 and 64 years with an average of 35.5 years. Participants belonging to families with high socio-economical status had a significantly lower mean D₃MFT (8.42, SD = 6.10) than those from families with low socio-economical status (12.3, SD = 6.72). The mean D₃MFT of those who used fluoridated salt at home was 10.96 (SD= 6.29) and significantly lower than the D₃MFT of those who did not use F-salt (12.82, SD = 6.53). Users of fluoride gel had a significantly lower mean D₃MFT than non-users: 8.11 (SD = 5.32) and 12.27 (SD = 6.62) respectively. Smokers had a significantly higher mean D₃MFT (15.74, SD = 7.59) than non-smokers (11.59, SD = 6.46).

Conclusions: Also in adults with intellectual disabilities, socio-economical status plays an important role with regard to oral health. Nevertheless, the use of fluoride contributes significantly in reducing caries experience in this patient group.

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IMPROVING DENTAL CHECK-UP RATES AMONG CZECH PRE-SCHOOL AND SCHOOL CHILDREN (2000-2008)

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Objectives: Regular dental check-ups in children are a significant tool to deliver regular preventive interventions and necessary dental care. The aim of this retrospective analysis was to assess the propor-

tion of pre-school and school children annually examined by general dental practitioners (GDPs) over the years 2000-2008. Data were provided by the General Health Insurance Company (GHIC) that covers medical insurance of about 90 % (~750 thou) of Czech children and adolescents aged 2-14 years.

Materials and Methods: Data sets of dental care service accounts of children aged 2-14 years reimbursed by the GHIC over the years 2000-2008, were analyzed and the percentages of children annually seen for examination or treatment by GDPs were calculated. Parameters of dental check-up rate: percentage of children examined once a year and children examined twice a year. A linear regression analysis (SPSS 17.0, advanced statistics) was used to figure out trends in dental check-up rates. A significance of trends was expressed in R² (reliability) and P (level of significance).

Results: Mean percentages of children examined by GDPs at least once a year and twice a year over the years 2000-2008: 2-3-yr olds 58.9/24.4, 3-6-yr olds 67.7/32.2, 6-10-yr olds 83.4/51.5, 10-14-yr olds 86.6/64.9. Trends (R², P) in dental check-up rates (examined once a year/ twice a year): 2-3-yr olds – 0.87, 0.000/0.78, 0.001 [signif. increase in both groups]; 3-6-yr olds – 0.04, 0.60/0.25, 0.17 [non-signif.]; 6-10-yr olds – 0.02, 0.70/0.69, 0.05 [signif. increase in group examined twice a year]; 10-14-yr olds - 0.23, 0.19/0.53, 0.03 [signif. increase in group examined twice a year].

Conclusions: Data confirmed a positive change observed over the years 2000-2008 in dental check-up rates in younger pre-school children and in both age groups of school children. However, dental check-up rates in older pre-school children did not change.

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ORAL PROPHYLAXIS KNOWLEDGE OF 14-35 YEARS-OLDS IN CLUJ-NAPOCA IN 2008

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Aims: To investigate the level of oral prophylaxis knowledge and self assessment of oral health level of young adults aged between 14 - 35 years, in Cluj-Napoca, Romania 2008, in order to redesign and improve the existing oral prophylaxis program managed by the Preventive Dentistry Department of the University "Iuliu Hatieganu" since 2000.

Methods: 987 subjects (491 males and 496 females) were randomly selected from students at 8 high-schools and 5 colleges and answered a questionnaire on their tobacco and alcohol consumption, oral hygiene, dietary habits (ten cariogenic items and five non-cariogenic), self-assessed gingival health, dental periodic check-ups, professional hygiene treatments. The questionnaire also included demographic items (age, gender, monthly income per family member). Descriptive summary statistics, bivariate and regression analyses were employed to analyse the resulting data. For subjects under 18 years old, parent's informed consent was obtained in order to include them in the study.

Results: The mean age of the study population was 17.2 years. As far as tobacco consumption was concerned, 121 (12.2%) of the study group consumed more than 10 cigarettes per day whereas 235 (23.8%) consumed more than 20 cigarette per day. 171 (17.32%) smokers belonged to the under-mean age group. The self-assessed level of gingival health was poor for 431 (43.66%). 935 (94.7%) had correct knowledge of tooth brushing but almost nobody reported using auxiliary oral hygiene techniques. Statistical analysis revealed that monthly income had a statistically significant influence on oral hygiene behavior and dietary habits ($p < 0.05$).

Conclusions: In the population studied, there was insufficient knowledge of good dietary habits, auxiliary oral hygiene techniques and dental check-ups. In the light of these results, a new oral prophylaxis program has been designed which includes an assessment of the behavioral changes necessary to overcome these deficiencies

ORAL HEALTH-RELATED QUALITY OF LIFE AMONG FRAIL ELDERLY PERSONS

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Aims: To describe and analyse determinants for oral health-related quality of life (OHRQoL) among frail elderly persons. Data were collected as a baseline for the evaluation of a public oral health care programme for disabled elderly in the City of Copenhagen.

Methods: The study population comprised consecutive patients (n=120) on admission to the programme. Structured interviews (if possible with respect to the participants' mental condition) and

clinical oral examinations were conducted. The interview included questions on social factors, lifestyle, dental visiting habits, oral hygiene, dependency of assistance regarding oral hygiene, and oral health. OHRQoL was measured by means of a modified index (Slade and Spencer 1994) on perceived dysfunction, discomfort and disability due to oral disorders. Non-parametric methods (Chi-square, correlation and Mann-Whitney tests) were used for control of differences between groups. The study was approved by the Danish Data Protection Agency and written consent was obtained from all participants as required by law.

Results: One fourth of the study population was edentulous, half had removable dentures, and mean DMFT was 25 (median=26 DMFT). Presence of one or more OHRQoL -specific indicators was reported by 57 % of the respondents. The most frequent OHRQoL-indicator was "difficulties in chewing". Smoking habits and number of teeth were correlated to OHRQoL ($p < 0.01$). In general, edentulousness and wearing removable dentures did not have any influence on OHRQoL, whilst oral health was associated with the specific indicators of OHRQoL. "Difficulties in chewing" was associated with tooth mobility ($p < 0.05$), and oral-related embarrassment was associated with wearing removable dentures. Among persons having natural teeth correlation was found between OHRQoL, DMF-T and age ($p < 0.05$).

Conclusions: OHRQoL did not seem to be influenced by edentulousness. Associations between OHRQoL and oral health were found where oral health was poor in terms of tooth mobility, high DMFT and limited number of teeth.

The study was supported by the Danish Dental Association and local health authorities in the City of Copenhagen

EFFECT EVALUATION OF THE IMPLEMENTATION OF AN 'ORAL HYGIENE PROTOCOL' IN NURSING HOMES: A 5-YEAR LONGITUDINAL STUDY

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Aim: The aim of this study was to explore the effect of the implementation of an oral hygiene protocol in nursing homes.

Methods: Out of 14 randomly selected nursing homes, seven were randomly allocated to an intervention group and confirmed in writing the implementation of an 'oral hygiene protocol'. Residents of the remaining nursing homes (control group) continued to perform oral hygiene as usual. The protocol was administered gradually for newly admitted residents in the intervention group. To compare the effect of the intervention, three groups of residents were considered: residents in control homes (n=671), residents in intervention homes not involved in the implementation (n=511), residents in intervention homes involved in the implementation (n=211). Each year, residents were randomly selected and stratified by scale of dependency (Katz-scale). Oral hygiene levels were scored by trained and calibrated examiners using the Plaque Index (Silness & Löe 1964) and the Denture Plaque Index (Augsburger). Factors thought to be associated with oral hygiene levels were also collected. Mixed model analysis was used to explore differences of oral hygiene levels due to the intervention, and predictive value of explanatory variables. This study was approved by the Ethics Committee of the Gent University Hospital (OG017).

Results: An unadjusted analysis showed significant differences in oral hygiene levels between residents with different scale of dependency and between the three study groups. Differences in denture plaque ($p=0.05$) were observed with the highest level (2.08 (SD 0.91) in residents in the control homes and in dental plaque ($p=0.008$) with the highest level (2.18 (SD 0.79) in residents in intervention homes not involved in the implementation.

Mixed model regression revealed residents' scale of dependency as an important predictive variable for both dental ($p=0.001$) and denture ($p=0.029$) plaque. Highly dependent elderly peoples' oral hygiene seemed to be less favorable.

Conclusions: Obtaining adequate oral hygiene levels in nursing homes is quite a challenge. To maintain the benefits of the implementation of an oral hygiene protocol, continuous efforts should be made by all care staff. Residents' scale of dependency seemed to be a major factor indicating the need to individualize oral hygiene protocols.

Data collection was supported by Gaba International

STABILITY OF TOOTH SATISFACTION IN A SWEDISH COHORT BETWEEN AGE 50 AND 65 YEARS

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Aim: The relative contribution of factors operating at various stages of the adult life has rarely been considered in the context of oral health related quality of life, OHRQoL.

This study aimed to assess the stability and change in satisfaction with teeth in Swedish adults aged from 50 to 65 years and the impact of socio-demographic – clinical- and subjective oral health factors operating at the ages of 50 and 60 years on tooth satisfaction as reported at age 65 years.

Materials and Methods: Self-administered standardized questionnaires were used as part of a longitudinal study. The original studies in 1992 and 1997 were approved by the Ethics Committee in Sweden. New regulations introduced in 2007 did not require further ethical approval to be sought. In 1992, all residents, who were born in 1942 (n=8888), in two conveniently selected Swedish counties were invited to participate in the study. A total of 6346 (71.4%) responded, of whom 5364, 4736 and 4143 remained in the study at age 55 (1997), 60 (2002) and 65 (2007), respectively. All analyses were performed with the remaining 1992/1997/2002/2007 cohort.

Results: There were no changes between the ages of 50 and 65 years with respect to satisfaction with teeth for 62% of females and 65% of males. Corresponding figures with respect to dissatisfaction were 7% and 5%. A total of 7% females and 6% males changed from dissatisfied to satisfied, whereas 11% females and males changed from satisfied to dissatisfied. Logistic regression analyses revealed that subjects who smoked daily, perceived that they had bad health, had many missing teeth and who had experienced symptoms and functional problems at the ages of 50 and 60 years were less likely to be satisfied with their teeth at age 65 years.

Exploratory variables assessed at the ages of 50 and 60 years explained 2.5% and 8.6% of the variance in tooth satisfaction at age 65 years. Total explained variance was 27%.

Conclusions: The results of this study suggest that the consolidation of good OHRQoL starts before the age of 50 years making intervention in the middle aged defensible. Promotion of a healthy lifestyle, increased number of remaining teeth. Absence of symptoms and functional problems in middle age are likely to improve tooth satisfaction at age 65 years.

AIR ABRASIVE TECHNOLOGY FOR CARIOSIS DIAGNOSIS AND FISSURE SEALING

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Aim: To evaluate the suitability of air abrasive technology for fissure caries diagnosis and for conditioning occlusal tooth surface for fissure sealing.

Methods: In a clinical study, approved by the ethics committee of the university of Jena, 66 permanent molars with darkened fissures selected from 18 patients (6-15 years) were examined for caries by visual inspection (VI), laser fluorescence (LF) (DIAGNOdent, KaVo, Germany) and inspection after air abrasion (AA) (Air Flow prep K1 Max, EMS, Switzerland). AA was used as a gold standard. If there were no clinical signs of dentinal lesions after AA occlusal surfaces were sealed (Fissurit Fx, VOCO, Germany) following German guidelines of fissure sealing (www.zsq-koeln.de). Children were asked about their level of acceptance in terms of the AA technique. Six months later sealed teeth were visually reexamined applying modified USPHS criteria for retention of the sealer.

Results: VI showed a sensitivity of 60%, LF of 90% and the AA technique of 100%. The specificity of VI and AA was 100%. LF had a specificity of 75%. Out of 66 permanent molars 56 did not show any dentinal caries and could be fissure sealed, the others were filled. 95% of children rated the air abrasion technique as good or very good. After 6 months the maintenance of the sealants could be confirmed in 83% of the sealed teeth. These results demonstrated that current caries diagnostic methods can be completed by using the AA technique. This methodology has the clinical ability to elimi-

nate both stains and organic debris rapidly in preparation for fissure sealing. Air abrasion leaves all but a few microns of healthy tooth structure intact, roughens the tooth surface and optimizes the retention of sealants.

Conclusions: It can be concluded that air abrasive technology can be used for caries diagnosis and for conditioning occlusal surfaces for fissure sealing in paediatric dentistry.

AUDIT OF DENTAL CARIOSIS DIAGNOSIS

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Objective: To characterize the population served by a University dental clinic, evaluating dental caries experience, dental caries risk and dentistry restoration treatment types.

Materials and Methods: This retrospective cross-sectional study was conducted at a University clinic which provides oral-care services. It was approved by the Ethical Commission of the University. A sample of 1005 dental records was randomly chosen within a 5-year-time period (2002 to 2006). Data on gender, age, reason of dental visit, diagnosis, oral hygiene status and restoration treatments were obtained from patient's files. SPSS© vs.16.0 was used for descriptive and inferential analyses using both parametric and non-parametric tests ($p<0.05$).

Results: 61.8% patients were female with an average age of 37.7 (± 15.8) years. The most frequent reason why patients requested dentistry services was for the treatment of dental caries (34.3% of all patients). The mean DMFT index was 16.9 (± 6.3) and no significant differences were found for gender, although DMFT was significantly higher for patients aged 30 years or more (two-way ANOVA; $p=0.102$; $p<0.001$). Most of the carious lesions were active with 59.0% having superficial, 88.7% medium and 95.2% deep lesions. Better oral hygiene was associated with female gender (χ^2 -test; $p=0.016$). Caries risk was gender independent (χ^2 -test; $p=0.771$), but associated with patient's age (>30 years) (χ^2 -test; $p=0.002$). Definitive restorations (86.0%) with resin-based composites (76.5%) were the most frequently performed treatment for dental caries.

Conclusions: Clinical records are a key element for care since they provide permanent documentation of the treatment and the treatment's effectiveness, the grounds for caries lesions diagnosis/treatment plan and quality control (Martin-Garcia *et al.* 2008). The results of the current study have established a representative baseline in terms of types of procedures, diagnosis, oral hygiene status and provided restoration treatments, important and not found elsewhere, which will enable professionals to provide better care and better meet the dental care needs of the population served.

MORE THAN 80% OF 12-YEAR-OLD CHILDREN ARE AFFECTED BY CARIES IN THE ARKHANGELSK REGION, NORTHWEST RUSSIA

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Aim: To describe the overall caries prevalence and caries experience among 12-year-old children in the Arkhangelsk region (population size – 1.3 million people), Northwest Russia.

Methods: One hundred 12-year-old children (of about 20 thousand residing in the region) were selected at random from schools in Novodvinsk in the North (n=50) and Velsk in the South (n=50) of the region. Boys comprised 52% of the sample. Caries experience was assessed at the D3 level by a single calibrated examiner. Means and standard errors of the DMFT indices were calculated. The prevalence of caries is presented with 95% confidence intervals (CI) using the Wilson method. Pearson's chi-squared tests and Mann-Whitney tests were used for dichotomous and numerical data, respectively.

The study was approved by the Ethical Committee of the Northern State Medical University, Arkhangelsk, Russia. Informed consent was obtained from all participants.

Results: Altogether, 86% (95%CI: 74-93) of children in Novodvinsk and 84% (95%CI: 72-92) of children in Velsk had caries ($\chi^2=0.078$, $p=0.779$). The corresponding mean DMFT values were 3.7 ± 0.4 and 2.9 ± 0.3 ($p=0.070$). While the mean values for decayed and missing teeth were similar (1.1 ± 0.2 vs. 1.3 ± 0.2 , $p=0.353$ and 0.02 ± 0.02 vs. 0.1 ± 0.1 , $p=0.300$, respectively), there were more

filled teeth in Novodvinsk than in Velsk (2.5 ± 0.3 vs. 1.4 ± 0.2 , $p=0.023$). No gender differences were observed.

Given that the study sites are relatively representative for the region, the findings should raise serious concerns. However, small sample size cannot provide more precise estimates. While the differences in the number of decayed and missing teeth between the study sites may be attributed to the differences in oral health habits, socio-economic or environmental factors, fewer filled teeth in Velsk may reflect poor organization of dental services.

Conclusions: The prevalence and experience of caries among 12-year-old children in the Arkhangelsk region is higher than in their European counterparts. Urgent public health measures on both population and individual levels are needed to improve the situation.

DELIVERING BETTER ORAL HEALTH: AN EVIDENCE-BASED TOOLKIT FOR PREVENTION

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Aims: To provide practical, evidence-based guidance to help dental teams to promote oral health and prevent dental disease in their patients. To list the advice and actions that should be provided for all patients to maintain oral health. To identify the intensity of generally applied actions for those patients about whom there is greater concern.

Methods: The British Association for the Study of Community Dentistry (BASCD) worked with Department of Health England to establish a multi-disciplinary working group which collated the evidence for effective prevention of dental disease and developed a toolkit on prevention for use by the dental team.

Results: The toolkit was published in September 2007 and disseminated to every dental practice in England. It is also available on the Department of Health website. The first section of the toolkit comprises quick reference cards of preventive advice and clinical intervention by patient age and covers dental caries, periodontal disease and oral cancer. Each piece of advice or suggested intervention is presented with an evidence grade. Subsequent sections of the toolkit provide more detailed information on tooth brushing and oral health, increasing fluoride availability, healthy eating advice, identi-

fying sugar free medicines, stop smoking guidance and alcohol misuse and support. The toolkit has been extremely well received, with many requests for additional copies. The first annual review has been completed and a second print run has been commissioned. Some Primary Care Trusts are building specific prevention elements into their contracts with dental practitioners. Toothpaste manufacturers have already been seen to amend the fluoride content of their children's toothpastes in line with the guidance.

Conclusions: The toolkit has enabled clinical teams to take a practice population approach to the delivery of evidence-based prevention. It has influenced delivery of care in the practice setting and the commercial sector's marketing of fluoride toothpastes.

Funding source: Department of Health (England)

RADIOLOGICAL SIGNS INDICATING INFECTION OF DENTAL ORIGIN IN ELDERLY FINNS

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Objectives: To assess the prevalence and background factors of odontogenous infection foci in elderly Finns.

Materials and methods: All persons belonging to every third birth cohort between 1919 and 1937 (n=1,733) living in two Finnish municipalities were invited. Of the subjects 1,069 filled in a questionnaire, gave written consent and attended both clinical and radiographic examinations. Of these 660 subjects was dentate forming the study sample. This study was approved by the ethical committees of the Surgical Hospital in Helsinki and Uusimaa Hospital District and the Northern Ostrobothnia Hospital District. Evaluation of radiological signs of infection was performed by a specialist in dental radiology. In the analysis an index including periapical lesions, furcal lesions, vertical bone pockets, horizontal bone loss and severe dental caries was used. The index is a sum of points (scale 0 to 3)

indicating the severity of infections. Severity was scored as no risk (less than 2 points)/ mild risk (3 points)/ moderate (4-9 points) /severe risk (10 points or more). In the analysis the data were dichotomized as non-severe (< 11 points) and severe infection risk (11 points or more).

Results: The index ranged from 0 to 91. Horizontal bone loss was found in 94%, vertical bone loss in 19%, apical periodontitis in 46%, furcal lesions in 19% and severe carious lesions in 39% of the subjects. 21 of the subjects (3%) were free of dental infections while 13 (2%) had mild, 109 (17%) moderate and 517 (78%) severe risk of odontogenous infection. Background factors associating significantly with the infection status were region, level of education, number of regular drugs, drugs inhibiting salivation, alcohol consumption, cardiovascular disease, asthma and rheumatoid arthritis.

Discussion and conclusions: Elderly Finns have high prevalence of infections of dental origin. The presence of odontogenous infections is associated with region, level of education, several general diseases, use of drugs and alcohol consumption. This indicates inequality in the use of dental services to be noted in health care.

A NEW DENTAL INSURANCE – EFFECTS ON TREATMENT PROVIDED

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Aim: The aim was to evaluate dental care in a capitation system compared to a fee for item of service system and to analyze differences in the number and type of treatments provided.

Methods: Two dental care clinics within the public dental service (PDS) in Gothenburg, Sweden introduced a new dental insurance system based on a capitation plan (CP). The new insurance system was offered to all adult patients aged 20-65 years. They were given the choice of paying either by capitation or the fee for item of service (FS) After a two-year period, an interim analysis of the results included comparisons between number and types of dental treatments provided. A PDS clinic with no capitation plan was matched for socio-demographic profile, at a patient level, for age and gender. Data were collected from patient files through the digital file system used within PDS. The capitation

plan included five different insurance premium classes with a patient cost per year of 620 to 4988 SEK. The type of dental treatment the patients received during the two-year period was analyzed by means of the spectrum of treatment options defined by the Swedish national dental insurance system. Ethical approval for the study was sought and granted.

Results: The numbers of patients included in the analyses were 1800 in the FS group and 3522 in the CP group. There was no statistically significant difference with regard to the mean number of treatments between patients in the CP (mean=3.6, SD=2.3) and FS (mean=3.7, SD=2.8) groups. Patients within the CP group had significantly fewer appointments with dentists, but more with dental hygienists as compared to those in the FS group. In addition, patients in the CP group received significantly more preventive measures, but fewer conservative treatments than those in the FS group.

Conclusions: In this study patients treated in a capitation system received more preventive dental treatment but no more other treatment measures than those treated under a fee for item system.

ORAL HEALTH STATUS IN SELECTED RISK GROUPS OF PATIENTS TREATED UNDER GENERAL ANAESTHESIA

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Aim: The study aimed to determine the level of oral health state in persons with handicap, and, in particular, those with the diagnosis of mental retardation and epilepsy.

Methods: A group of consecutive patients with handicap (N=225), who had been sent for dental care to the Clinic of Stomatology, Masaryk University in Brno, was examined by one experienced dentist. These patients were treated later under general anaesthesia. The subjects for this study were selected according to diagnosis of a specialist. DMFT (WHO 1997 criteria) and RI (%) indices were used to evaluate their oral health status. From the sample, 104 persons had the diagnosis of mental retardation and/or epilepsy and these were divided into four subgroups. The first two sub-groups included patients only with diagnosed mental retardation (N=35) or epilepsy

(N=6), the third patients with mental retardation and other diseases (N=33), epilepsy and other diseases (N=30), the fourth was formed from patients with combinations of other diagnoses (N=121). The age of patients at risk ranged between 18.6 -61.3 years. The study was approved by the ethical committee of Masaryk University.

Results: Patients with mental retardation had the following scores: mean DMFT was 16.66 and the value of RI was 34.37. Patients with mental retardation and combinations of other different diagnoses had a mean DMFT 17.48 and the value of RI=32.36. The mean DMFT score for patients with epilepsy was 21.33 and the RI value was 50.95. Patients with epilepsy and combinations with other diseases had a mean DMFT=19.03 and an RI=38.18, which was similar to those in the fourth group (mean DMFT=20.77 and RI=37.43).

Conclusion: This study demonstrated relatively high DMFT scores and RI values in patients with handicaps (mental retardation, epilepsy). The results suggest the necessity to improve dental care in these patients.

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THE ASSOCIATION BETWEEN OBESITY AND PERIODONTITIS

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Objectives: Obesity is a risk factor for metabolic and circulating diseases. Although obesity was once known as a health problem only in wealthy countries, the prevalence of obesity has increased dramatically over the past decades in both more-and less-developed countries. Several studies reported that obesity might be related to periodontitis, but it is still controversial. The aim of this study is to evaluate the association between various obesity indices and periodontitis among Korean adults.

Materials and methods: The subjects of this study were selected randomly and asked to participate. Finally, a total of 1,046 residents in South Korea were surveyed from 2005 to 2006. This study was approved by the Institutional Review Board for Human Subjects at the School of Dentistry (IRB), Seoul National University (approval number: S-020060000) and all of the subjects participated vol-

untarily with a written informed consent. The oral health as well as other target organ health was assessed by many health professionals joining the project. Periodontal health status was assessed using community periodontal index by two dentists. Physicians examined each participant, a phlebotomist sampled 5ml of venous blood and trained examiners measured body weight, height, and body composition. Trained interviewers obtained sociodemographic and behavioral information. Dependent variable was a periodontitis. Independent variables for obesity were visceral fat area, body mass index, waist circumference, and waist hip ratio. Multivariate logistic analyses were applied to evaluate the association between obesity indices and periodontitis controlling for age, gender, smoking, frequencies of daily tooth brushing, and diabetes. Subgroup analyses by gender and diabetes were also performed.

Results: After controlling for all of the confounders such as age, gender, smoking, frequencies of tooth brushing, and diabetes, obesity was significantly associated with periodontitis with odds ratio of 1.49 in visceral fat area and 1.61 in body mass index. According to the subgroup analyses by gender, the association was higher in obese male. The strength of association was the lowest for obesity without diabetes and increased by addition of diabetes, but not significant. Body mass index and visceral fat area without diabetes were the only two indices which were significantly associated with periodontitis.

Conclusions: Central obesity could be the substantial risk of periodontitis. Further prospective molecular approach will be needed to clarify the causality and the biological pathway.

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COMMUNITY PERIODONTAL INDEX AND TREATMENT NEED IN AN ADULT POPULATION FROM IASI, ROMANIA

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Aims: The aims of this study were to assess periodontal status and treatment need in the adult population from Iasi, Romania in correlation with periodontal risk factors like smoking and oral hygiene status.

Methods: A cross-sectional study of 928 patients 35-44 years old was conducted between 2005 and 2008 at "Gr. T. Popa" University of Medicine and Pharmacy, Iasi, Romania, Faculty of Dental Medicine. The patients were both from urban and rural areas and from different socio-economic status. The clinical examination was done in accordance with WHO 1997 criteria, using the Community Periodontal Index for Treatment Need (CPITN) in order to assess both periodontal status and treatment need. Oral hygiene was assessed using the Oral Hygiene Index, and smoking behaviour was assessed too. This study was approved by the ethics committee of the University. SPSS 13.0 was used for data analysis.

Results: Periodontal status was normal in 9.1% of patients. 21.7% had score 1, 54% of examined patients had CPITN score 2, 12.7% had score 3 and 2.5% had score 4. The results showed that 15.2% of patients had at least one pocket 4mm or deeper. People from urban areas needed more treatment (36.7%) than people from rural areas (32.6%). Multivariate logistic regression analyses were performed to study periodontal risk factors. The main predictors for periodontal treatment needs were the variables: "smoking habit" and "poor oral hygiene". The treatment need for a smoking patient was 3.065 higher than for a non-smoking patient ($p=0.001$) and a patient with poor oral hygiene needed periodontal treatment 1.622 more often than an individual with good oral hygiene.

Conclusions: Main periodontal treatment need was scaling and root planing. Smoking and poor oral hygiene are risk factors for periodontal disease that lead to increasing treatment need.

This study was supported by the Romanian National Centre for Management Research Programs.

COMPARISON OF ORTHODONTIC TREATMENT NEED AND EXPERIENCE AMONG 15-YEAR-OLDS IN NORWAY AND FINLAND

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Aim: The aim of this study was to compare two orthodontic treatment strategies, one privately based and implemented by specialists, the other provided as part of the public health care and implemented by general practitioners under spe-

cialist supervision, in terms of timing of treatment, treatment need and treatment outcome.

Methods: The sample consisted of one age cohort of 15-year-olds in Northern Norway (n=66), whose data were compared with previously published data from an age cohort of 15-year-olds in Finland (n=85). Treatment need was assessed on dental casts using The Dental Health Component (DHC) of The Index of Orthodontic Treatment Need (IOTN). Treatment outcome was assessed using the Peer Assessment Rating Index (PAR). Information concerning orthodontic treatment was obtained from dental records.

Results: The mean age at starting treatment was 12.7 years (SD 1.5) in Norway and 9.9 years (SD 2.9) in Finland. Treatment rates in Norway and Finland were 47% and 52% respectively (n.s.). At age 15, half of the subjects in Norway were still in active treatment compared to 7% in Finland. Need for treatment (DHC score) at age 15 showed no significant difference between Norway and Finland. Fixed appliances were used in 100% of the treatments in Norway, compared to 12% in Finland. Mean PAR improvements in Norway and in Finland were 80% and 63% respectively (n.s.).

Conclusions: Our results indicate that in spite of different treatment strategies, treatment need of 15-year-olds showed no difference. The late timing of treatment in Norway compared to Finland reflects the predominant use of fixed appliances in Norway. Funding sources: "Sparebanken Nord-Norge" research fund, "Norske tannlegers fond til tannlegevitenskapens fremme".

ORAL HEALTH HABITS, DENTAL VISITS AND INSTRUCTIONS RECEIVED BY FINNISH ADOLESCENTS

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Aim: This study aimed to find out possible associations between oral health habits and dental visits and instructions received by the adolescents from their dentists.

Methods: The data were collected as part of a nation-wide research program, the Adolescents Health and Lifestyle Survey, which already started in 1977. Since then a 12-page questionnaire has been sent every other year. The samples have represented 12-, 14-, 16-, and 18-year-old adolescents

in Finland. The Ethical Committee of the Ministry of Health and Social Affairs has approved the study. In 2007, 5,840 adolescents returned the questionnaire and the response rate was 61% (72% among girls and 50% among boys).

Results: Higher proportions of adolescents aged 12- and 14 years, who visited a dentist during the previous year, brushed their teeth as recommended, twice a day or more often. Among 16- and 18-year-olds this association was reversed. The daily use of sweets was more common among 12- and 14-year-old girls and 12- and 16-year-old boys, but less common among 16-year-old girls and 14- and 18-year-old boys who had visited a dentist during the previous year. This association with dental visits showed a similar pattern for the daily use of soft drinks. Twice a day or more frequent tooth brushing was consistently lower among those adolescents who had received instructions on tooth brushing than among those who did not. Similarly, the daily use of sweets and soft drinks was more common among adolescents who had received instructions on use of sugar products than among those who had not.

Conclusions: The association between reported oral health habits and dental visits was not consistent. However, oral hygiene and sugar consumption seems to have been targetted to high risk behaviour groups. Individually determined recall intervals might affect the association between dental visits and reported oral health habits.

THE ASSOCIATION OF FAMILY CULTURE WITH THE USE OF SWEETS AND SOFT DRINKS IN FINNISH ADOLESCENTS

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Aim: The aim was to find out if any association exists between the use of sugar products and parental monitoring and attachment of Finnish adolescents.

Methods: The survey was carried out in 2006 as part of the WHO Health Behaviour in School-Aged Children study. Structured questionnaires were distributed to a nationally representative sample of Finnish adolescents in school classrooms and collected in sealed envelopes. Altogether 3,405 ado-

lescents (13- and 15-year-olds) returned the questionnaire, the response rate being 87%. The daily use of soft drinks and sweets were dependent variables. Summaries of parental monitoring and attachment variables (i.e. family culture) were explaining variables. Parental monitoring (control) was measured by 5 and attachment (affection) by 8 questions, separately for mother and father. Ethical approval was obtained by the Ministry of Social Affairs and Health.

Results: Soft drinks were used daily by 13% and sweets by 16% of adolescents. Boys used soft drinks more often than girls ($p>0.001$). There was no statistically significant gender difference in the use of sweets. Both soft drinks and sweets were used more often by 15-year-olds than 13-year-olds, except younger girls, who used soft drinks more often than the older ones. Mother- and father monitoring were strongly associated with daily use of soft drinks and sweets in all groups. When mother- and father monitoring were low the proportions of daily users were highest (max 32%) and when they were high the daily use was lowest (min 5%). Similarly, when mother- and father attachment were low the proportions of daily use of soft drinks and sweets were highest (max 31%).

Conclusions: High parental monitoring and attachment seems to be associated with lower proportions of daily use of soft drinks and sweets by the adolescents. This suggests that parents have a key role in modifying children's consumption of sweets and soft drinks.

MOLAR-INCISOR-

HYPOMINERALISATION: A CASE SERIES

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Aim: The aim of this study was to evaluate associated factors, clinical appearance and treatment modalities in children with MIH.

Methods: Data were obtained from 30 MIH affected children (6-12 years, mean age 8.45) referred to the University Hospital Leuven (Belgium) in a period of 1 year (2007-2008). Potential aetiological factors were explored through an extensive questionnaire (e.g. pregnancy, overall health, illnesses, medication, vaccination, fluoride intake) completed by the parents. The distribution of affected first permanent molars (FPMs) and incisors (PIs) was examined. For each affected FPM, the severity of

hypomineralisation was assessed (extent, surfaces affected, colour, surface appearance) and sensitivity (air blast) was measured. Finally, treatment type and modality was recorded.

Results: The 30 dentitions contained 119 FPMs and 181 PIs, of which 107 FPMs and 88 PIs showed hypomineralisation. Eighty-one percent of the children had 4 affected molars (3 FPMs: 13%; 2 FPMs: 3%; 1 FPM: 3%). Affected FPMs were similarly distributed between gender, quadrants and arches. Moderate to severe hypomineralisation and increased sensitivity to a blast of air was recorded in 82% and 53% of the cases, respectively. All children presented with more than one medical event, especially during their first 4 years of life: antibiotic use (87%), respiratory conditions (80%), ear infection (68%), diarrhoea (66%) and chickenpox (60%) were the most commonly reported items. Regarding treatment, 90 affected FPMs were restored to prevent caries and reduce hypersensitivity (glass-ionomer: 2%; fissure sealing: 21%; composite: 77%), 12 affected incisors received a composite restoration and 10 molars were extracted due to extreme loss of tooth tissue. Treatment was carried out under general anaesthesia in 16 children (53%); 1 child was treated using sedation and the remaining children were treated using local anaesthesia. Follow-up of affected teeth is ongoing.

Conclusion: The aetiology of MIH remains unclear. Pain control (and young age) often necessitate treatment under general anaesthesia. The long term outcome of different treatment options needs further investigation.

TEAM DENTISTRY AND CUMULATIVE COSTS OF CARIES TREATMENT IN CHILDREN

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Aim: Two different operational concepts had been applied in public dental care for children in the years 1980-2004. The aim was to investigate the association between the operational concepts of caries treatment and the cumulative costs.

Methods: Data were collected from the files of the Public Health Centre of Kemi, Finland. The cohorts born in 1980, 1983 or 1986 (n = 600), represented the conventional concept, which was based on high dentist input. The cohorts 1989, 1992 and 1995 (n

= 600) represented the new concept, which was based on team dentistry and the early risk-based approach for control of caries. The number of caries treatment visits by provider was the basis for the modelling of operational concepts and input use. Cumulative costs were estimated by using the unit labour costs of dental professionals and input use.

Results: In the cohorts 1980 and 1992, the proportions of children with caries experience ($dmft/DMFT > 0$) were 44 and 20% at age 5, and 48 and 45% at age 12. By the age of 12 years, the number of caries treatment visits to dentists was 15.0 in the 1980 cohort and 7.6 in the 1992 cohort, and visits to dental hygienists 6.2 and 7.8, respectively. The costs related to caries treatment fell by 40% (176 €) between these cohorts.

The economic outcome was mainly based on the profession of the care provider and differences in their salaries. The decrease in costs was due to decrease in the number of more expensive dentist visits. The increase in the number of dental hygienist visits had a minimal effect on costs.

Conclusions: The choice of the operational concept has significant economic consequences. The early risk-based approach for control of caries seems ideal for team dentistry and may have economic benefits.

A PATH ANALYSIS OF CONTRACT AND FEE-FOR-SERVICE CARE

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Introduction: In Swedish dentistry, the traditional patient financial system is fee-for-service care (FFS). Since 1999, the public dental health service (PDHS) in the county of Värmland has offered an alternative system, contract care (CC), in which the patient pays a set fee for a fixed period of time, and receives oral health care without additional costs, as specified by a contract. Previously, an association between patient financial system and oral health-related quality of life (OHRQoL) was found.

Aim: The aim of the current study was to model direct and indirect effects with path analysis, to study if there were different underlying mechanisms in the patient financial systems.

Methods: In 2003, a questionnaire was sent to randomly selected patients enrolled in CC ($n=1,200$) and FFS ($n=1,200$) in the PDHS in Värmland. The study was approved by the ethical board in the

Southern region of Sweden. Response rate was 57%. Data without internal non-response ($n=1,044$; CC: 57%, FFS: 43%) were analysed with a multiple group path analysis. The interactions of four variables were of central interest: OHRQoL, the respondents' perceptions of the dental caregiver's humanistic (patient-, as opposed to disease-centred) qualities, what the respondents were prepared to pay, and what they had paid for dental care the previous year.

Results: The underlying mechanisms in the systems were similar. However, there were differences regarding the central variables: the perceived humanism of the caregiver affected OHRQoL only in FFS, while what the respondents were prepared to pay for dental care affected the perception of humanism only in CC.

Conclusions: The findings indicated that the perception of the caregiver's humanistic qualities were important for oral health in FFS, while financial considerations were important for how the caregiver's qualities were perceived by respondents in CC. The study was financed by the Swedish Research Council.

SALIVARY MUTANS STREPTOCOCCI AND LACTOBACILLI AND ORAL HEALTH BEHAVIOUR OF CHILDREN IN THURINGIA, GERMANY

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Aim: The aim of the study was to investigate mother's knowledge of the dental health of their children and salivary mutans streptococci (MS) and lactobacilli (LB) counts on the "Day of Dental Health" during the "Week of General Health" in Thuringia, Germany.

Methods: In 32 towns, a convenience sample was drawn. It consisted of mothers with children aged between 0 to 7 years who answered a validated questionnaire with 24 questions about their child's oral health behaviour, social aspects and diet. Salivary mutans streptococci (MS) and lactobacilli (LB) of mothers and their children were determined using the CRT® bacteria test (Ivoclar Vivadent). The data were statistically tested using the Pearson correlation or differences in variables at a level of

5%. The study was approved by the local ethics committee.

Results: 395 children (mean age 3 ½ years, 208 males, 187 females) and their mothers were recruited to the epidemiological and microbiological study. Sixty one percent of the mothers believed that caries is a transmissible disease. Sixteen percent of children and 57% of mothers had high scores for *S.Mutans* (SM 2 and 3). Twenty two percent of children and 38% of mothers had high scores for *Lactobacilli* (LB 3 and 4). A positive correlation could be found between high MS scores of mothers and children (Pearson *p*-value 0.040). With increasing age of children high scores of MS and LB increased. Seventeen percent children reported receiving cariogenic drinks and 20 % of children received snacks more than three times a day. Seventy five percent of parents supervised tooth brushing of their children. Forty seven, parents reported that they supervised their children's oral hygiene for between 5 (80%) and 15 (11%) minutes daily.

Conclusion: In summary, in the group studied, mothers need more extensive preventive education to avoid high counts of *S.Mutans* and *Lactobacilli* in their own mouths and in the saliva of their children. Advice on a dentally healthy diet is indispensable.

ORAL HEALTH AMONG ADOLESCENTS IN THE BARENTS REGION. A PILOT STUDY

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Aim: A pilot study was performed in the Arkhangelsk (Russia) and Tromsø (Norway) areas in the Barents region to assess oral health status and compare oral health care and oral health-related quality of life in 12-year-olds with the aim of creating hypotheses on oral health determinants among adolescents in the region.

Methods: Two schools representing each region were selected using a stratified cluster sampling procedure. All 12-year-old pupils where parents gave written consent, were included in the study, (Arkhangelsk n=48, Tromsø n=36). Parents who agreed to let their children participate returned a questionnaire comprising socio-economic status, own oral health and oral health habits, involvement in their child's oral health care and satisfaction with available dental heath services. The adolescents'

oral health conditions, i.e. caries (DMFT/S), oral hygiene (OHI-s) and satisfaction with dental appearance were recorded under field conditions. Analysis of variance and multiple regression analyses were used in order to test possible associations between parents' oral health and oral health attitudes and the adolescents' dental conditions.

Results: The mean DMFS-scores among adolescents were: Arkhangelsk = 5.9 (s.d. 5.1) and Tromsø = 0.6 (s.d. 1.1). OHI-s values were: Arkhangelsk 0.8 (s.d. 0.5) and Tromsø 0.3 (s.d. 0.4). Parental factors showing the strongest association with variation in dental caries were education, awareness of the child's oral health, satisfaction with dental health services and last visit to the dentist ($R^2 = 0.56$) while parents' own oral health and concern about their child's oral hygiene habits were associated with oral hygiene level (OHI-s) ($R^2 = 0.17$).

Conclusions: Our pilot investigation demonstrates associations between parents' perception of oral health and oral health conditions and children's oral health status. The results will be used as a basis for creating hypotheses to be tested on a more extensive sample of adolescents from the Barents region. Acknowledgement: Support obtained from the "Sparebanken Nord-Norge" research fund

ORAL HEALTH AMONG CHILDREN AND ADOLESCENTS IN SERBIA (2000-2006)

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Aim: To evaluate utilization of oral health services and oral health behavior of children and adolescents in Serbia in 2006 and compare them to the findings of the 2000 Health Survey.

Methods: The study was a part of the 2006 National Health Survey for the population of Serbia. A stratified two-stage sample of the population of the Republic of Serbia was used. The following information was collected: demographic and socio-economic characteristics, behavior habits and use of oral health services. The population distribution was made from the lowest to the highest household value of the wealth index divided into five quintiles, where the first comprised the poorest. The information was collected from interviews of the population between 7 and 19 years of age (2.721 respondents). Ethics approval was not sought.

Results: In 2006, 53.5% of respondents had a regular dentist, which was significantly more than in

2000 (42.6%). The number of respondents who visited their dentist in the year preceding 2006, also increased (58.9% vs. 63.7%), while there was a decrease in the percentage of respondents who had never visited a dentist (8.5% vs. 3.2%). The poorest children and adolescents used dental health care to the lowest extent. Only 34.3% had a regular dentist, and 46.8% had visited him/her in the year preceding 2006. In relation to oral hygiene habits, 56.7% of all the respondents brushed their teeth more than once a day, most regularly girls (66.8%), adolescents age 15-19 years old (66.3%) and those coming from families with higher income. Only 32.3% of respondents in the first quintile (the poorest) brushed their teeth more than once a day.

Conclusions: In 2006, the utilization of dental health services was still inadequate but compared to year 2000, positive changes had taken place. Significant differences persist with regard to socio-economic and regional factors which should be addressed.

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ANALYSIS OF ORAL HEALTH DATA FROM 13-15-YEAR-OLDS FROM THE ELSPAC STUDY

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Aim This study's aim was to analyze the oral health state data obtained from 13-15 year old children from the ELSPAC group (European Longitudinal Study of Pregnancy and Childhood) monitored in Brno city.

Methods: Randomly selected children from the ELSPAC group (n=780) were examined clinically for dental and periodontal status, dental plaque, dental calculus and orthodontic anomalies. The following clinical parameters were assessed: DMFT score and its components, gingival index (GI), plaque index (PI) and calculus index (CSI). Gingivitis was measured using the modified Löe-

Silness 1963 GI index. The presence of plaque and calculus was recorded according Silness-Löe 1964 (PI) and calculus surface index (CSI), respectively, without any disclosing agents. GI, PI and CSI were recorded on selected teeth. Presence/absence of orthodontic anomalies and their severity were recorded. To evaluate the significance of differences between groups, the F test for quantitative and the χ^2 test for qualitative parameters were used. The study was approved by the ethical committee of Masaryk University.

Results: Mean DMFT of the group was 2.82 (SE 0.36). The percentage of caries-free children was 25.4%. Mean GI index was 0.204 (SE 0.011), grade 0 was found in 36.9% children, grade 1 in 43.0%, and grade 2 in 19.5%. Statistical differences ($p > 0.05$), were seen in GI vs DMFT, in GI of caries-free and treated children vs treatment need, in GI vs D value, in GI vs severity of orthodontic anomaly and in PI value between children with gingivitis vs healthy ones.

Conclusions: In the group studied there was a relationship between GI and DMFT especially in D component, and between GI and orthodontic anomalies. The results showed the significance of early caries treatment and maintenance of oral hygiene for gingival health especially in children with orthodontic anomalies.

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CARIES EXPERIENCE OF PRIMARY TEETH AFTER PREVENTION OF MOTHER-CHILD TRANSMISSION OF MUTANS STREPTOCOCCI

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Introduction: The original Ylivieska mother-child study was carried out in Finland, in the beginning of 1990s (Söderling et al. 2000, Isokangas et al. 2000). In that study, maternal use of xylitol was found to reduce MS transmission from mother to child until the age of 2 years and caries experience until the age of 5 years, when compared with children in maternal fluoride and chlorhexidine varnish treatments.

Aim: The present study aimed to examine the long-term effects of the inhibition of early mutans streptococci (MS) colonization on the health of children's primary teeth.

Methods: The annual data of caries experience of the subjects for the present study were gathered from the files of Ylivieska Public Health Care Centre. Caries-free time was measured using the age of the child when dentinal decay was first recorded and analysed with survival analysis. The effect of MS on caries-free time was estimated with the Cox regression model. Caries experience was measured by the dmf index, differences of values at 6, 8 and 10 years of age were tested with Mann-Whitney U-test. At the age of 10 years, the data of altogether 148 from the original 195 children in the Ylivieska mother-child study were available.

Results: The children who had not been colonized by MS at 2 years of age maintained their primary teeth as caries-free longer ($p<0.001$) and had significantly lower caries experience in their primary teeth from 6 until 10 years of age than MS-colonized children. The early colonization of MS was strongly related to caries experience in primary teeth..

Conclusions: The results suggest that the inhibition of early MS colonization may lead to long-term effects on caries experience in primary teeth. The inhibition of early MS transmission may offer a new strategy for caries control in public dental care

Funding source(s) Academy of Finland, Association of Finnish Dentists in Public Health Care (TKHLY ry)

THE MEANS OF IMPROVING COST-EFFECTIVENESS IN PUBLIC DENTAL SERVICE WHEN THE DEMAND FOR TREATMENT INCREASES.

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Aim: This study aimed to evaluate retrospectively the effect of work division and individual recall intervals on the coverage of the population treated in the Public Dental Service (PDS) and by private dentists of Lohja, Finland after the subvention reform (2002) when subsidized dental care was offered to all inhabitants in the community regardless of their age.

Methods: Lohja is a town with 37,352 inhabitants in the Southern Finland. There are 18 PDS dentists (no change after 2002) and 7 private dentists (-1 after 2002). The number of patients and visits were collected and summarized by provider's profession, year and patients' age. The mean values for DMFT

at the age of 12 were counted by the year. The number of patients attending private dentists was taken from the annual reports of the Social Insurance Institution of Finland.

Results: The number of patients under 18 years decreased from 6,481 to 5777. Visits to dental hygienists increased slightly but visits to dentists decreased from 13,512 to 7,489. The number of adult patients increased from 5,219 to 9,422 and during three years (2005-2007) there were 14,459 patients. The number of adult patients visiting private dentists decreased from 6996 to 6560. Annually 55% residents visited public or private dental health care. The cross-sectional mean DMF of 12-year-olds dropped from 2.45 (2002) to 1.0 (2007).

Conclusions: Prevention-oriented work division and individualizing recall intervals saved clinical time previously given to children and diverted to new patient groups without endangering the children's dental health and helped to deliver the oral health services to all inhabitants.

The study was supported by Lohja town.

CARIES EXPERIENCE AND *S. MUTANS* COUNTS OF THE SOUTH-EAST ESTONIAN PRIMARY SCHOOL CHILDREN

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Aim: This study aimed to investigate association between caries experience and whole saliva and quadrant-based *S. mutans* (SM) counts among first^t and second grade children in the primary schools in South-East Estonia.

Methods: A random sample was drawn from ten primary schools with 16 classes of first and 16 classes of second grade children (n=485) representing South-East Estonia. The Ethical Committee of the University of Tartu approved the study. The clinical examinations with ICDAS criteria were completed in January 2008 by four calibrated examiners. The inter- and intra-examiner consistency of the examiners was high (surface- and tooth-based kappas >0.9). The plaque (interdental from each quadrant) and salivary SM counts were determined by the Orion Diagnostica Dentocult® SM method (scores 0-3). The tests were interpreted by

three independent assessors and a mode count was used.

Results: The mean number of enamel and dentinal caries surfaces and teeth in each quadrant were consistently and statistically significantly higher according to the higher quadrant-based plaque SM counts (ANOVA), except for the number of enamel caries teeth ($DT_{(1-3)}$) in the lower right quadrant ($p=0.65$). The mean number of enamel and dentinal caries surfaces and teeth also increased consistently and highly significantly according to the increasing saliva SM counts, from 4.1 to 7.6 ($DS_{(1-3)}$) and from 6.2 to 13.9 ($DS_{(4-6)}$). Both DMFT and DMFS increased highly significantly according to increasing saliva SM counts, from 4.1 to 7.6 (DMFT) and from 6.2 to 13.9 (DMFS). Prevalence of enamel caries increased consistently according to increasing saliva SM counts from 71.2% to 89.2%, dentinal caries from 39.7% to 78.5% and caries experience from 82.2% to 99.2%.

Conclusions: Both enamel and dentinal caries and caries experience seemed to correlate highly significantly with SM counts determined according to quadrants for interdental plaque and saliva.

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THE QUALITY OF DATA COLLECTION AND DATA ANALYSIS OF QUALITATIVE DENTAL RESEARCH PUBLISHED IN NON-DENTAL JOURNALS

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Aim: The aim of the present study was to determine the quality of published qualitative dental research in non-dental journals that used qualitative methodology.

Methods: A systematic literature search was carried using the Ovid version of Medline to produce a list of 1379 papers. The search terms were; qualitative, interviews, focus groups, observations and diaries. The inclusion and exclusion criteria were: (1) Studies related to dentistry, (2) published in non-dental journals, (3) in English language, (4) from 2002 to 2006 and (5) incorporating a significant qualitative component. All these papers were independently reviewed by two different researchers with 98.1% of agreement and a 0.85 kappa value. A

total of 18 research papers out of the 1379 fulfilled the inclusion and exclusion criteria and were appraised using the Critical Appraisal Skills Programme (CASP), developed by the National CASP Collaboration of the Public Health Resources Unit, United Kingdom.

Results: In the 18 papers, the authors only justified their settings for data collection in 22% of the papers and methods of choice for data collection in 33%. However, 94% and 72% of the papers clearly described the methods and the form of data collection, respectively. Only 12% mentioned saturation of the data. No paper mentioned any modification in the methodology used during the data collection and data analysis. Only 33% of the papers discussed the data in depth. Moreover, 72% of the papers clearly presented that the themes were derived from the data but only 22% presented data to support the findings. No paper took contradictory data into account. Whereas, 17% of the papers presented data to support the findings and 22% explained how the data presented were selected from the original sample. During the data analysis only 28% of the authors critically examined their own role and potential bias.

Conclusions: In general the quality of the reporting of qualitative research in dentistry published in non dental journals was found to be poor as judged by CASP guidelines. In particular, data collection and analysis had a high need for improvement.

DENTAL BRIDGE FAILURE AND CORRELATION WITH ORAL HYGIENE IN RANDOMLY SELECTED PATIENTS IN CLUJ-NAPOCA, ROMANIA IN 2008

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Aim: To investigate causes of failure of fixed prosthetic restorations (FPR) at the time of their removal in 2008 and to compare the findings with those of a previous meta-analysis.

Methods: A previous meta-analysis study of seven articles with similar evaluation criteria, was made of the causes of failure of 4789 FPR. It identified nine possible causes of failure. In the present study, in 2008, the dentists in ten randomly selected dental offices in Cluj-Napoca, Romania performed a

retrospective survey of 97 patients who asked for dental treatment and who had had a FPR fail in the previous eight years. Ethics approval and an informed consent from each patient were obtained. The Plaque Index of the patients concerned was recorded on a survey form together with six items completed by the patient regarding socio-demographic data, oral hygiene information received after the initial treatment, individual hygiene habits and recall visits attended. Descriptive and multivariate regression analysis was performed.

Results: The main causes of failure identified in the present study were 4-6 mm pockets and root caries at abutments in 26 subjects (26%), abutment tooth decay in 12 patients (12%) and esthetic failure in 28 (29%). The Wilcoxon signed rank test showed no significant difference between the percentages of failure causes identified within this study and those obtained from the previous meta-analysis ($p>0.05$). Ninety patients (95%) reported not having received any individual dental hygiene information after their initial treatment. Less than 10% (9 patients) had a check-up once a year and 42 (43%) asked for an appointment only because of pain or esthetic problems from their FPR. Only 11 patients (11%) used auxiliary dental hygiene devices.

Conclusions: More dental hygiene information should be given after prosthetic treatment and patients should be motivated to attend for recall on a regular basis.

PREVALENCE OF MISSING TEETH AND TREATMENT NEEDS IN THE ADULT POPULATION OF IASI, ROMANIA

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Aim: The aim of this study was to evaluate the dental prosthetic status in Iasi county and to correlate the prevalence of missing teeth and treatment needs with socio-demographic variables.

Methods: A cross-sectional study was conducted in dental clinics in rural and urban areas of Iasi in 2006-2008 and a representative sample of 928 people (age 35-44 years old) was examined by three calibrated dentists according to the World Health Organization's 1997 index criteria. This index can determine both oral status and treatment needs. The study sample was assessed through a question-

nnaire for income level, graded as high, medium or low, oral hygiene (using the OHI index) and tobacco usage. The data were analyzed using the SPSS statistical package. The following statistical tests were used: Chi-square and Logistic regression. The study was approved by the Department of the Iasi Trust who gave ethical approval.

Results: The prevalence of partial edentulous of adults in the study group was 66.5%. The rate of tooth loss was higher in rural (71.3%), than in urban areas (61.5%) ($p=0.001$, $\chi^2=38.1$). More missing teeth were found in male participants, prevalence: 68.1 % than in female: 64.9% ($p=0.02$, $\chi^2=29.3$), and adults with low income had more missing teeth than subjects with high income, prevalence: 76% versus 57% ($p=0.001$, $\chi^2=48.5$). Prosthetic crown restorations were deemed necessary for 363 subjects (39.1%) and the partial dentures for 39 adults (4.2%). To determine factors associated with partial denture needs, a logistic regression was used. It was found that people with low family income had more risk: OR=7.9, CI=[2.34-26.41] of needing partial dentures than people with high economic level. Smokers had also a higher risk: OR=3.2, CI=[1.55-6.73] than non-smokers.

Conclusions: The prevalence of missing teeth and treatment needs were highly related to: low income, rural area, male gender and smoking.

SPECIALIST DENTAL CARE IN NORWAY

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Introduction: In the Nordic countries the population should have access to primary and specialized dental services according to needs. Typically, oral health care provision systems in these countries are well-organized, partly tax-financed, within the Public Dental Service (PDS), and have broad responsibilities for care of the population. In Norway, the PDS cares for children, some elderly and special needs groups. In principle, it also has a responsibility, at a county level, for looking after necessary dental services for the whole population.

Aim: The aim was to investigate how specialized dental care in Norway was organized and how it functioned.

Materials and Methods: A postal questionnaire was sent to all (19) chief dental managers in the 19

counties; 17 answered. Data were analyzed qualitatively.

Results: There were specialists in orthodontics in all counties that responded (17) and oral surgeons and periodontists in most (15) of them. Endodontists were found in 12, pedodontists in seven and radiologists in three. Most specialists (84%) worked in private practice. The PDS employed few specialists (11%). According to the respondents, need and demand for specialist services has increased greatly and only four respondents said that they had enough specialists in their county. The respondents felt that there were insufficient numbers of specialists in Norway and that specialists did not want to work outside university cities. Chief dental managers reported that they had few tools to influence the numbers of specialists in their counties.

To improve the situation the respondents proposed decentralized specialist education at a number of training centres in the counties and to pay specialist trainees during their education.

Conclusions: Great inequities were found in access to specialized dental services in different parts of Norway.

COOPERATION BETWEEN THE PUBLIC DENTAL HEALTH SERVICE (PDHS) AND PRIVATE PRACTITIONERS (PP)

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Introduction: About half of Swedish dentists are publicly employed (PDHS) in 21 politically governed counties; the remainder are PPs. By law the PDHS should cooperate with PPs and with each other.

The PDHS can be organised in various ways, here we investigated the impact on cooperation from the following factors: 1/ a separate political board governing only the PDHS, 2/ a clear-cut purchase provider split organisation (P/P split), and 3/ the absolute size of the PDHS as measured by the size of county.

Aim: This study aimed to investigate cooperation between the PDHS and PP in Sweden.

Methods: A questionnaire was mailed to the Chief Dental Officer (CDO) in each PDHS.

Results: Answers were received from all 21 counties. Four counties reported cooperation on management and policy levels. Cooperation with other

PDHS was reported by 65%; usually in emergency care and in specialist dentistry. Cooperation with PPs was stated by 9 CDOs, most frequently out of hours emergency care and care for children.

1. Answers from PDHSs with a separate political board did not covary with any different patterns of cooperation.

2. Seven PDHS stated that they had a fully developed P/P split and four that there was no division of tasks. A clear P/Psplit showed no difference as regards cooperation with other PDHSs; however, these CDOs reported less cooperation with the PPs (rho- 0,45)

3. No correlations were found between the size of the county and the pattern of cooperation.

Conclusions: An organisation with a separate political board or with a clear P/Psplit revealed no difference in cooperation between PDHSs.

CDOs within a P/P organisation reported less cooperation with PPs. Perhaps the CDOs did not regard the present activities as cooperation or the cooperation might be on the purchaser's level not the provider's.

There appears to be potential for development of the cooperation between PDHSs and also for more cooperation with PPs.

ORAL IMPACT ON DAILY PERFORMANCES: ASSOCIATIONS WITH SELF-REPORTED GENERAL HEALTH AND MEDICATIONS

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Aim: The aim of the present study was to examine the impact of general diseases and medication on oral health-related quality of life in a Swedish adult population using the Swedish version of Oral Impacts on Daily Performances, OIDP.

Methods: A consecutively recruited sample of 200 adults (20-86 years; participation rate 70%) in three clinics (90, 65, 45 patients, respectively) in Southern Sweden was interviewed in a structured way by calibrated interviewers using the OIDP. Medical diagnoses and medication were documented. A self-reported questionnaire provided complementary socio-economic data. Statistical analyses included χ^2 -test, Mann-Whitney's U-test, Student's t-test, ANOVA and multivariate logistic regres-

sions. The Research Ethics Committee of Karlstad University, Sweden, approved the study.

Results: The burden of medical diagnoses and medications was greatest among the older participants in the study. The mean number of medicines in regular users was: ≥60 years, 3.6 (SD 2.6); 40-59 years, 1.9 (SD 1.5); and 20-40 years, 1.9 (SD 1.8) ($p=0.013$). There were no gender differences in general health or medication variables. Self-reported health, medical diagnoses and medication were significantly and consistently associated with the OIDP score: subjects with ≥1 diagnosis, OR 2.22 (95% CI 1.19-4.14) and subjects with ≥1 medicine, OR 1.85 (95% CI 1.01-3.40) versus those without diagnoses or medicines. However, there was a clear gradient: OIDP scores increased with increasing numbers of diagnoses and medicines.

Conclusions: The Swedish version of the OIDP was found useful for measuring impacts of general health and medication on oral health-related quality of life. Dental services should pay special attention to patients with medical conditions or who are on medication as they are more likely to experience oral impacts on daily performances.

The study was supported by The Swedish Dental Society, Göteborg; Dental Society and the Council for Medical Care Research in South Sweden.

CARIES EXPERIENCE AMONG PRE SCHOOL CHILDREN IN MIRNY, NORTH-WEST RUSSIA

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Introduction: There is lack of information about oral health conditions in the majority of Russian regions, which makes it impossible to plan strategies and action for improving oral health.

Aim: The aim was to assess the prevalence of dental caries among 4 to 6 year-old children in the town of Mirny, North-West Russia.

Methods: A cross-sectional survey was conducted in 4 (out of 8) randomly selected kindergartens with dental examinations in the frame of an obligatory (prophylactic) medical examination of the child population in the town of Mirny in February 2009. The total number of children studied was 220 (from which 47.3% boys) with mean age (SD) 66.13 (11.72) months. A calibrated dentist (PM) investigated the caries experience status of primary teeth and deft (decayed, extracted/missing due to caries,

filled teeth) values were calculated according to WHO criteria. Children were divided in 3 age-groups: 48-59 (n=102), 60-71 (n=20) and 72-83 (n=116) months respectively.

Results: The caries experience rate in the primary dentition was 75% for the total sample and 68.6%, 60% and 84.7% for each age group respectively. The mean (SD) deft was 4.54 (3.95), with dt component of 3.42 (3.54), et of 0.17 (0.53) and ft of 0.94 (1.69). There was no significant difference ($p=0.375$) in dt component (3.32(3.53) and 3.60 (3.39) respectively) in relation to age. There was a significant increase in deft (SD) from 3.89 (3.92) to 5.38 (3.76), ($p=0.007$), in et (SD) from 0.08 (0.34) to 0.30 (0.69) ($p=0.004$) and in ft (SD) from 0.47 (1.13) to 1.48 (2.05) ($p<0.001$) values over age-groups. There were 121 children (55%) with deft= 4 and this percentage increased significantly from 47% to 66% ($p=0.009$) with age.

Most children presented with caries experience in their primary dentition. The proportion of children with high caries activity was high (55%) and increased rapidly with age. The mean deft, et, and ft also increased with age, but dt stayed constant.

Conclusions: The study results showed a high caries experience in children with primary dentition, demonstrating the need for improvement of preventive actions among preschool children in the town of Mirny.

REDUCING INEQUALITIES IN ACCESS TO AND UPTAKE OF DENTAL SERVICES

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Aim: A retrospective referral audit aimed at evaluating the criteria used in increasing access to and uptake of dental care by children managed within the Community Dental Service.

Methods: This study used the following tools- (i) Triage form; (ii) Referral records between January and May 2007; (iii) Leeds Metropolitan District Postcodes and National Index of Multiple Deprivation 2004; and (iv) AA Route Planner, to measure four referral indices- (i) Reason; (ii) Referrer; (iii) Geographical origin; and (iv) Distance between domicile and clinic.

Results: Of the 150 referrals received, 95.3% required special care e.g. children with high dental needs, who were neither registered with a family dentist nor clinic (27.3%), uncooperative (18.2%),

showed dental phobia (13.3%), were medically compromised (11.9%) or had disabilities – {learning (11.9%), physical (1.4%)}). 99.3% of referrers were Health and Social Care Professionals (HSCPs). 96.5% of patients lived within Leeds, with 53.2% living in wards in the top 20% of the most deprived in the city and nationwide. 29.3% of these wards also had a high index of income deprivation affecting children. 72.8% were assessed within 3 miles from their homes.

Conclusions: Through referrals received and subsequent triaging, care was provided to children who due to their physical, medical or psychological conditions would normally experience difficulty in being successfully managed within a General Dental Practice setting; and those who might not attend because of socio-economic reasons. HSCPs played a significant role in referring these children to the service. Majority of patients accessed care close to their homes as there were thirteen clinics located citywide, with nine situated in the most deprived wards. Others however, had to travel further for a variety of reasons e.g. those requiring a dedicated facility for appropriate management such as treatment under General Anaesthesia.

The indicators measured highlighted the Service's contribution towards reducing inequalities in oral health affecting children with special needs.

ALCOHOL ATTRIBUTABLE FRACTION OF ORAL CANCER CASES: A META-ANALYSIS OF POOLED DATA

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Introduction: Alcohol is an oral cancer (OC) risk factor, with an estimated fraction of 19% of cases attributable to drinking, worldwide, while three fourth of cases would be attributable to drinking and smoking, simultaneously. Recently, studies disaggregating the exposures to drinking and smoking, reported that drinking without concomitant exposure to smoking or other risk factors, would not increase the OC risk.

Aim: Therefore, we sought to meta-analyse these data in order to assess the Population Attributable Fraction (PAF) of OC cases stratified for alcohol drinking.

Methods: Observational primary studies published within the last 5 years were located through MEDLINE. They were split into studies providing disag-

gregated information about drinking and smoking, that is, smoking only; drinking only; smoking and drinking; neither smoking nor drinking (INFO) and studies analysing drinking and smoking effects separately (NOINFO). Data were pooled, cumulative Odds Ratios (OR's) with 95% confidence intervals (95CI's) were calculated and were used to estimate PAF's with 95CI's.

Results: Cumulative alcohol PAF's resulting from the eight NOINFO and the three INFO studies were 32.6% (95CI, 32.2% ÷ 33.0%) and 28.3% (95CI, 23.6% ÷ 32.4%), respectively. The latter was estimated without accounting for the effect of smoking. The stratified PAF's relative to smoking only, drinking only and drinking and smoking resulting from the INFO studies were 3.1% (95CI, 1.9% ÷ 4.2%), -5.1% (95CI, -6.9% ÷ -3.5%), 46.9% (95CI, 42.5% ÷ 50.7%), respectively, with an aggregated PAF of 44.8% (95CI, 37.5% ÷ 51.4%).

Conclusions: Disaggregated data suggest that alcohol would not be carcinogenic *per se*, but would act as a potent co-carcinogen, dramatically strengthening, by 10 to 15 times, the effect of smoking. Such results have important implications in designing OC prevention policies.

COST-EFFECTIVENESS OF ORTHODONTIC SERVICES IN FINNISH HEALTH CENTRES WITH DIFFERING TREATMENT START TIMES

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Aim: The aim of this study was to analyse the cost-effectiveness of orthodontic treatment with early or late start times in eight municipal health centres.

Methods: The sample was drawn from all 16- and 18-year-olds (n=1109) who had attended eight municipal health centres for orthodontic treatment. The sample was divided into two groups, one of which had started treatment early (before 9 years of age); the other late (after 9 years of age). Two calibrated orthodontists assessed the subjects with the Occlusal Morphology and Function Index for the acceptability of their post treatment occlusion. The examiners achieved inter-examiner kappa scores of 0.70 for the assessment of morphology and 0.51 for the assessment of function. Data were collected from the patient records of all subjects who reported a history of orthodontic treatment (n=557). The costs that each health centre paid for one percent

unit of acceptability was calculated by dividing the mean cost per case by the percentage of subjects with acceptable morphology or function.

Results: No substantial differences were noticed in the acceptability of occlusion between the two groups. The proportion of subjects with acceptable occlusion was slightly higher in the earlier start group. The cost of one percent unit of acceptable morphology was equal in the two groups. The cost for one per cent unit of acceptable function was lower in the earlier start group. The low total costs as such did not explain the high cost-effectiveness of orthodontic care. The assessment of cost-effectiveness was complicated by the variation in several factors of treatment delivery both within and between the two timing groups.

Conclusions: There was a slight tendency for higher cost-effectiveness in the earlier start group, but the timing did not seem to be an unambiguous factor in explaining the cost-effectiveness of orthodontic care.

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ASSOCIATION OF SOME SPECIFIC NUTRIENTS DEFICIENCIES WITH PERIODONTAL DISEASE IN ELDERLY PEOPLE: A SYSTEMIC LITERATURE REVIEW

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Aim: Deficiencies of vitamin B-complex, vitamin C, vitamin D, calcium, and magnesium have been associated with periodontal disease. This study aimed at systematically reviewing the currently available literature on the possible association of vitamin B-complex, vitamin C, vitamin D, calcium, and magnesium deficiency with periodontal disease in elderly people.

Methods: A systematic review of relevant English and Dutch medical literature published between January 1990 and May 2007 was performed with critical appraisal of the studies that evaluated the association of vitamin B-complex, vitamin C, vita-

min D, calcium, and magnesium deficiency with periodontal disease in elderly people.

Results: None of the studies meeting the selection criteria included institutionalized elderly people. In the studies on non-institutionalized elderly people, no significant or consistent association was found of vitamin B-complex, vitamin C, vitamin D, calcium, and magnesium dietary intake and serum levels with periodontal disease. Although, reduced dietary vitamin C intake was found to be associated with increased risk of periodontal disease, no conclusive evidence could be demonstrated.

Conclusions: The literature reveals that at present, there is no evidence of an association of vitamin B-complex, vitamin C, vitamin D, calcium, and magnesium deficiency with periodontal disease in non-institutionalized elderly people. To produce conclusive evidence on the subject of this systematic literature review, longitudinal cohort studies and follow-up randomized controlled trials are needed. The literature search and the composition of this review were funded by The Open Ankh, Soesterberg, The Netherlands, Zorgaccent Amersfoort, Amersfoort, The Netherlands and Foundation De Opbouw, Utrecht The Netherlands.

PREVALENCE OF DYSPLASIA IN PATIENTS WITH CLINICALLY DIAGNOSED ORAL LICHEN PLANUS

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Introduction: The malignant potential of oral lichen planus (OLP) is controversial, primarily because of inconsistencies between clinical and histopathologic diagnoses. Generally, biopsy is recommended to exclude the presence of dysplasia or malignancy in atypical clinical forms.

Aim: In this study we aimed to investigate the agreement level between clinical and histopathologic diagnoses of OLP.

Methods: Patients with typical OLP forms were diagnosed clinically [van der Majj, van der Waal, 2003] by two calibrated examiners (Rabiei, Rabie), who achieved a Cohen's kappa score of 0.8). measured on five OLP and five non-OLP patients. Patients with OLP, referred to public and private dermatological and dental centres in the Guilani

province (Iran) were then recruited to the study. The patients provided their informed consent. Biopsies were collected and histopathologic diagnosis of OLP or oral dysplasia [IARC, 2005] was made by a trained histologist with 20 years of experience. Oral dysplasia prevalence in OLP patients was estimated with 95% confidence interval. This study was approved by the ethical committee of the Guilan University.

Results: Seventy biopsies were collected from OLP patients. Clinical forms were, reticular (n=2; 2.9%), plaque-like (n=11; 15.7%), atrophic (n=9; 12.9%), bullous (n=14; 20.0%) and erosive (n=34; 48.6%). Two patients with the erosive form had moderate dysplasia (increased number and morphologically abnormal mitoses, premature keratinization in up to two-thirds of the thickness of the epithelium). Dysplasia prevalence estimate was 2.86% (standard error, 0.0199; 95% confidence interval, -1.05%; +6.76%).

Conclusions: These results suggest that dysplasia is unlikely when OLP is clinically typical and, therefore, histopathologic confirmation is generally unnecessary, except for erosive forms which may have malignant potential or, alternatively, are misdiagnosed and, for this reason, must be periodically controlled.

CURRENT PATIENT EDUCATION: DOES IT SUPPORT PATIENT'S EMPOWERMENT?

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Introduction: Effective patient education is an important part of oral health care. Empowering patient education is based on a patient-centered approach and it can be seen as consisting of planning (assessing the patient's knowledge, expectations, preferences) and setting learning objectives.

Aim: The aim of the study was to describe the present state of patient education, carried out by dental hygienists, by determining the implementation of patient education in dental hygienists' work, as regards methods and content. The content of patient education was divided into the following six domains: bio-physiological, functional, cognitive, experiential, economic and ethical.

Materials and Methods: The participants in this

study were members of the Finnish Dental Hygiene Association (n=832). A systematic sample was taken in which every second dental hygienist was included (n=416). Data was collected by using a questionnaire (41 items). Those who returned their questionnaires were considered to have given voluntary consent.

Results: According to dental hygienists (n=222, response rate 53%) Patient education was usually given at the same time as treatment (93%). Patient's learning (9%) and learning needs (13%) were not assessed systematically. Little use was made of various educational methods. The education provided, and particularly the assessment of the need of education, often focused on the professional herself (87%). The contents of the education focused the most on the functional dimension (median 1, scale 1-4), like brushing, whereas least attention was paid to matters relating to economic dimensions, like costs (median 3).

Viewed from the perspective of empowerment, patients can be seen as collaborators in their care. However, in this study it seems that the viewpoint of patient is disregarded. Patients' expectations, knowledge, experiences, motivation, perceptions and participation should be taken into consideration more because these affect the patients' learning. Content of the education could be more holistic and individually tailored. The use of different educational methods should be fostered.

Conclusions: Further development of patient education should be performed in order to make it more empowering for patients.

CARIES EXPERIENCE IN THE PERMANENT DENTITION OF PRIMARY SCHOOL CHILDREN IN SOUTH-EAST ESTONIA

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Aim: This study aimed to investigate caries experience among the first and second grade children in the primary schools in South-East Estonia.

Methods: A random sample of ten primary schools with 16 first and 16 second graders (n=485) was drawn representing South-East Estonia. The main age of the children was 9.7 years (SD=0.7). The

clinical examinations using ICDAS criteria were completed in January 2008 by four calibrated examiners. The Ethical Committee of the University of Tartu approved the study. The inter- and intra-examiner consistency of the examiners was high (surface- and tooth-based kappas>0.9).

Results: The mean caries experience was 0.9 (DMFT) and 2.0 (DMFS) among the first graders, and 1.1 (DMFT) and 2.1 (DMFS) among the second graders. There were no statistically significant difference in caries experience between girls and boys. The DMFT varied between the schools from 0.6 to 1.6 and DMFS from 1.4 to 3.2. The mean number of enamel caries lesions (D₁₋₃), dentinal caries lesions (D₄₋₆) and restorations (FT, FS) did not differ between girls and boys. The mean D₁₋₃S, D₁₋₃T, FT and FS were significantly lower among the first graders than among the second graders, but there was no difference between the grades in D₄₋₆S and D₄₋₆T. The D₁₋₃T, D₄₋₆S and D₄₋₆T differed significantly between the schools, but D₁₋₃S, FS, FT, DMFS and DMFT did not.

Conclusions: Caries experience figures seemed to be very high in this area. There were no significant differences in the provision of restorative treatment. Preventive programmes are urgently needed. Cargill R&D Centre Europe grant for this study is appreciated.

BEHAVIOURAL AND DEMOGRAPHIC FACTORS ASSOCIATED WITH ORAL HEALTH AMONG LOW-INCOME KINDERGARTEN CHILDREN IN PERU

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Aim: To evaluate demographic and behavioral factors related to oral health among low-income kindergarten schoolchildren from low-income communities in Peru.

Methods: Children (276) and their parents in four low-income kindergartens in Chiclayo, Peru, were invited to partake in this study in 2007. Variables evaluated were divided into three sections: a) Demographics: children's age, children's gender, parents' age, parents' education, parents' marital status, and number of children per family; b) Children's history of pain: history of dental examination, previous pain experience, and frequency of

pain experience; c) Children's oral hygiene habits: toothbrushing frequency, person who performs toothbrushing, age when toothbrushing started, age when child started to perform toothbrushing by himself/herself, age when child started to use toothpaste. Caries prevalence, dmft mean, SiC mean, and standard deviation (SD) were calculated. Associations among predictors and oral health status (dmft & SiC) for each variable were assessed by Poisson analysis at a critical value of 5 % ($\alpha = 0.05$). One examiner conducted oral examinations throughout the study using the World Health Organization (WHO) diagnostic criteria (WHO, Oral Health Surveys, 4th Edition, 1997). Participation in this study was based on parents' informed consent.

Results: Among the whole sample, the percentage of children with dental caries was 53.99% and the children's mean age was 4.4 (0.8) years. The mean dmft was 2.4 (3.1); however, the mean SiC was 6.3 (2.2). Significant associations were found between dental caries (dmft) and children's age, parents' education, number of children per family, previous pain experience, toothbrushing frequency, person who performs toothbrushing, and age when child started to perform toothbrushing by himself/herself.

Conclusions: Our results demonstrated the need to improve the oral health status in these low-income communities, and especially to target the group with the poorest oral health. In a country where free access to dental care is provided to children from the government, education to parents about the importance of oral health and how it impacts general health should be implemented.

PARENTAL DENTAL ATTITUDES RELATED TO EDUCATIONAL BACKGROUND

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Aim: Parental dental attitudes to diet and parental indulgence are shown to be associated with caries increment in early childhood (Skeie MS et al., 2008). This study aimed to show how these attitudes varied with parents' educational backgrounds.

Methods: After achieving ethical approval, the sample was drawn from seven different Public Dental Health Service clinics in Oslo, Norway. The

inclusion of individuals at each clinic was randomized. Data were extracted from a questionnaire response from parents of the children, participating in a follow-up study (focus: caries development from 3-5 yrs, 2002-2004). Only children with mothers originating from Norway (n=251) were included. Composite attitudinal variables ("Attitude to Diet", "Parental Indulgence") were constructed based on items in the questionnaire, for use in the analyses both at baseline (2002) and follow-up. "Parental Indulgence", for example, included items which showed permissiveness. They represented a summation of weighted responses to some selected items and were dichotomized as positive or negative. Educational levels were categorized as low, medium and high. Chi-square analyses were used to measure statistical differences between groups.

Results: Dental attitudes of Norwegian parents were significantly more positive in 2004 than in 2002, when 69% showed a positive "Attitude to Diet" in 2002 increasing to 80% in 2004. According to "Parental Indulgence", the percentage not indulgent were respectively 87% and 94% in 2002 and 2004. The variable "Attitude to Diet", both in 2002 and 2004, was found to be significantly related to educational level of both the mother and the father (mother educational level; 2002: $p=0.007$, 2004: $p<0.0001$, father educational level; 2002: $p=0.010$, 2004: $p=0.002$). The higher educational level, the higher percentage of positive "Attitude to Diet".

Conclusions: The results showed that educational background of both mothers and fathers were related to "Attitude to Diet".

Funding source: EXTRA funds – the Norwegian Foundation for Health and Rehabilitation

HEROIN ADDICTION AND COMMON ORAL HEALTH PROBLEMS IN A BULGARIAN POPULATION: A PILOT SURVEY

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Introduction: Drug addiction is a serious medical and social problem. The number of heroin abusers in Bulgaria is between 20 000 and 30 000 according to general public health surveys. However, information is lacking about common oral health problems in this population group.

Aim: The aim of the present pilot survey was to investigate common oral problems of heroin addicts in the Plovdiv region of Bulgaria.

Materials and Methods: Fifty consecutive individuals aged 18 – 25 years attending a national methadone rehabilitation program at the university clinic in Plovdiv were examined after their consent and Ethical Committee approval. Caries, oral hygiene and periodontal health were assessed. Participants completed a questionnaire addressing oral hygiene and dietary habits. Saliva samples were collected for qualitative and quantitative assessment (Saliva Check Buffer, GC, was used as a chair-side kit).

Results: Acute and rapidly progressing caries lesions were a common finding. Caries index scores ranged between 15 and 24 which was about three fold higher than values in healthy population (DMFT = 6.68). OHI-S was 3 ± 0.5 in 85% of the individuals. Dry mouth was reported by 87% of the subjects with daily soft drink consumption of about 1.75 Litres. Unstimulated saliva collected according to the method described by Navazesh (1993) was 1.2 ± 0.3 .

Conclusions: This was the first survey addressing oral health of heroin addicts in Bulgaria. The results demonstrated that in the small sample studied, as in other countries, heroin addicts are a risk group for the development of oral health problems. It is suggested that specific prophylactic strategies, as well as an adequate treatment regime is needed to help address the problem.

ASSOCIATION BETWEEN FLUORIDE INTAKE AND CARIES EXPERIENCE IN MONTPELLIER (FRANCE) AND HEIDELBERG (GERMANY)

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Aim: The evaluation of systemic fluorides and caries experience in two samples of schoolchildren, one from Montpellier (France) and the other one from Heidelberg (Germany).

Methods: Taking into account the public/private ratio for the provision of oral health care, 12 schools from the town of Montpellier and seven schools from the town of Heidelberg were randomly selected. This cross-sectional survey concerned

1418 French and 848 German children, aged 4 to 13 years. The pupils were examined in the schools by two calibrated dentists and the dft+DMFT scores were recorded following WHO 1997 recommendations. Authorizations were obtained from the ethical and medical school department who officially informed the Head of the schools. Only children with informed consent from their parents were examined. Data relating to fluoride intake, in the past and present by every child, were collected from questionnaires sent to their parents. They were asked questions about tablets or drops supplements intake and fluoridated table salt consumption. Water fluoridation is authorized neither in France nor in Germany.

Results: The mean dft+DMFT was 1.26 (1.50 in Montpellier and 1.19 in Heidelberg). It was significantly different between the children who had taken fluoride supplementation (1.04) and those who had never taken it (1.38, $p=0.005$). This difference was still significant in public schools (1.05 vs 1.48, $p=0.002$), but not in private schools (0.98 vs 0.75, $p=0.34$). Multiple regression analysis adjusting for age and gender, with DMFT as dependent variable, showed a significant association with the type of school ($p=0.002$), but not with fluoride intake ($p=0.29$). Nearly all the parents declared that their child used fluoridated toothpaste (98.7%).

Conclusions: Although the association between caries experience and fluoride supplements appeared to be significant in bivariate analysis, it was no longer significant in multivariate analysis, where other associated factors, such as age, gender and the type of school were entered in the regression model.

RECALL INTERVALS AND DENTAL CARIES IN 5-YEAR-OLD CHILDREN

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Aim: The aim of the study was to explore associations between recall intervals and caries experience in 5-year-old children.

Methods: Data were collected from the dental records and by clinical and radiographic examination of 5623 5-year-old children in conjunction with the scheduled recall examination in the Public Dental Service. Intervals since previous dental examination and planned intervals to next examination were recorded. Caries experience was reported

as dmft, with lesions extending into dentin (d₃) defined as caries.

Results: Caries experience was low, mean dmft was 0.6 (SD = 1.8). Of the children 84% had no caries experience. Among children with caries experience (16%) mean dmft was 3.7 (SD = 3.1). Previous recall intervals varied from 3 to 48 months (mean 20 months), and planned recall intervals varied from 3 to 30 months (mean 18 months). Planned recall intervals less than 12 months, 12 to 17 months, 18 to 20 months and more than 20 months were set for respectively 4%, 21%, 54% and 21% of the children. The mean dmft of these groups were 3.1 (SD = 3.9), 1.8 (SD = 2.9), 0.2 (SD = 0.7) and 0.02 (SD = 0.2). Among children with dmft > 0, planned recall intervals was correlated with caries experience (Spearman's R = 0.4, $p < 0.01$).

Conclusions: Individualising recall intervals according to the children's need have been advocated. The results showed that the length of recall intervals were strongly associated with caries treatment need.

THE DEVELOPMENT OF A TOOLKIT FOR THE COMMISSIONING OF PRISON ORAL HEALTH SERVICES

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Aim: To support Primary Care Trusts (PCTs) in England with the commissioning of oral health services in prison and detention centres by establishing a relevant toolkit to ensure prison inmates receive sensitive and responsive oral care in par with the general population.

Methods: A national group was established under the auspices of the English Department of Health (DH). A number of meetings reviewing existing evidence, identifying gaps and incorporating national guidelines took place leading to the establishment of a commissioning toolkit.

Results: Two parts form the basis of the toolkit. The first part provides guidance for PCTs on the six main components of the commissioning process:

the concept and various elements of a needs assessment, strategies to be employed for oral health improvement, guidance for the development of an agreement between the commissioner and the provider on the terms and conditions of the service, advice on how to secure and then cooperate with the service providers and finally how to introduce an element of research in the commissioning cycle. The second part discusses the management of the provider's performance and mechanisms for monitoring outcomes.

The oral health of prison inmates varies from that of the general population in terms of levels, distribution and type of oral disease. A number of obstacles related to the provision of prison oral health services were identified and an attempt was made to produce a flexible, sensitive and easy to use toolkit. The required skills and training of the dental team are important and the participation of the entire prison service in the effort to improve oral health is encouraged. Finally it is paramount that a specific and clear agreement between the commissioner and the provider on the terms and conditions of the service is in place.

Conclusions: The establishment of a commissioning toolkit for oral health care in prison and detention centres is a new concept which aims at assisting PCTs in England with their newly acquired commissioning role.

Funding source: Department of Health, England

EVALUATION OF THE PREVENTIVE PROGRAM „HEALTHY SMILE“

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Aim: The aim of this study was the evaluation of the preventive program Healthy Smile after 5 years of implementation.

Methods: Dental status evaluation was performed in 150 schoolchildren, 10 - 11 years old, randomly selected in 3 elementary schools in Hradec Kralove (50 children from each school). *School A* – preventive program Healthy Smile (education, training, topical fluoridation), *School B* – preventive program Healthy Teeth (education), *School C* – no preventive program (control). Criteria for including the child in the study: informed consent, no systemic disease of the child. Children were examined

by one examiner using standard methodology recommended by WHO. The following parameters were calculated: % caries free, treated and carious dentition, DMFT and RI (restorative index). Statistical analysis of was performed using Student t-test ($p<0.05$) and Fisher exact test ($p<0.05$).

Results: DMFT-scores in both boys and girls were significantly lower in children from school A (Healthy Smile) compared to school B (Healthy Teeth). Children from school A had significantly lower numbers of filled permanent teeth. Children from school A had a significantly higher percentage of intact dentition (34.9%) when compared to control school C and a significantly lower percentage of filled teeth compared to school B (14.0% vs. 34.9%). The same indicators in boys have revealed significantly lower numbers of carious permanent teeth in school A compared to control school C. The DMFT index did not differ between groups, but boys from school A had the lowest DMFT. There were no differences in restorative index (RI=61.4%). The results in girls were more or less similar regarding DMFT. There were no differences between groups, but girls from school A had the lowest values of DMFT. No significant difference was found in restorative index in girls. Girls from school A had the highest percentage of intact mixed dentition (47.4%), but significantly lower numbers of filled teeth in the mixed dentition compared to school B (5.3% vs. 42.9%).

Conclusions: Children from the Healthy Smile project had significantly lower mean DMFT values and highest percentages of intact dentition. The better oral health in children from the project Healthy Smile confirmed the importance of not only theoretical education in oral hygiene, but also practical training of tooth brushing together with topical application of fluorides.

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ACUTE DENTAL CARE AMONG CHILDREN IN ILULISSAT, NORTH GREENLAND, COMPARED TO THE SITUATION IN ESPOO, FINLAND

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Introduction: The modern way of living in Greenland has caused a poor oral health situation and a caries boom among children. A caries strategy for children has therefore been introduced with emphasis on preventive dentistry and actions taken

by oral hygienists. There is both a shortage and a high turnover of dentists in many parts of Greenland.

Aim: The aim of this study was to illustrate the oral health situation among children in Ilulissat, Greenland with figures on the use of acute dental care and on tooth extractions for caries and to compare these to corresponding figures in Espoo, Finland. The Espoo figures most likely coincide with the mean levels in the Nordic countries.

Methods: Existing statistics from 2008 on the acute public dental care for children in Ilulissat (population 5,000) were processed, analyzed and compared with the corresponding data from the city of Espoo (population 240,000) located in the metropolitan area in southern Finland. To illustrate the trends in Ilulissat corresponding data from 2007 were also used.

Results: In 2008, children less than 7 years of age in Ilulissat paid 40 acute dental visits per 100 children, the corresponding figure in Espoo being <3. In Ilulissat, 22 teeth were extracted because of caries per 100 children, in Espoo the figure was 1. In Ilulissat, 7- to 16-year-old children paid 45 acute dental visits per 100 children; the corresponding figure in Espoo was 12. In Ilulissat, in the age group 7 to 16, 18 teeth were extracted because of caries; while in Espoo the corresponding figure was approximately 8. The parameters in Ilulissat show an increase between 33 and 300 % from 2007 to 2008.

Conclusions: The extensive use of acute dental services and the high number of tooth extractions because of caries among children in Ilulissat indicates a poor oral health situation. Therefore it is important to effectively implement the Greenlandic preventively orientated caries strategy.

RESTORATIVE TREATMENT DECISIONS ON APPROXIMAL CARIES IN NORWAY

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Aims: To describe variations in the threshold for operative treatment of approximal caries in permanent teeth and the use of dental materials, and to compare the results with similar studies conducted in Norway in 1983 and 1995 (*Espelid et al, 1985; Tveit et al 1999*).

Methods: An electronically, pre-coded questionnaire was sent in March 2009 to dentists with e-

mail address in the member register of the Norwegian Dental Association (NDA). The questions were related to caries treatment strategies and choice of dental materials.

Results: Of the 4317 members of the NDA, 3654 e-mail addresses were known and replies were obtained from 57.5% after one reminder. The distribution of the age of the respondents did not differ significantly ($p=0.75$) from all dentists in the NDA member register. 6.0% of the dentists would do restorative treatment of lesions confined to enamel based on radiographic appearance of approximal caries, compared to 65.6% in 1983 and 18.3% in 1995. While the tunnel preparation most often was the preparation of choice in 1995 (47.3%), the saucer shaped preparation was most favored in this study (68.8%) and tunnel preparation was only preferred by 3.8% of the dentists. After the amalgam ban in Norway in 2008, 95.3% preferred composite as the restorative material of choice, compared to 15.8% in 1995. The corresponding values for conventional glass ionomer cement (GIC) were 0.7% vs. 22.3%, resin modified GIC 0.5% vs. 7.2%, and a combination of GIC and composite: 1.7% vs. 22.4%. Compomer was preferred by 1.2% of the respondents and 0.6% did not specify which material they preferred.

Conclusions: Few dentists reported that they treat approximal caries operatively before the lesion reaches dentine (judged radiographically) indicating that most dentists realize that caries is slowly progressing and might be arrested.

THE NEED FOR DENTAL SPECIALTIES IN ROMANIA

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Aim: The aim of this poster is to present the current situation with regard to dental specialties in Romania.

Methods: Data and other information were gathered from published literature and the experience of authors as leaders in local or national dental organizations.

Results: Currently, in Romania there are only three specialties which require a degree in dentistry prior to entry to specialist training. They are: orthodontics, dento-alveolar (oral surgery) and oral-maxillo-facial surgery. Prior to 2001, there was also a spe-

cialty of General Dentistry with an annual entry of 240 residents paid for by the Ministry of Health. This specialty was abolished when Romania entered the European Union (EU). As a result of the 1500 dentists who graduate each year only 30 can enter now specialist training in one of the three remaining specialties. The literature reveals that several EU countries recognize at least six dental specialties and former Eastern Block countries such as Bulgaria, Lithuania, Poland and Slovenia did not choose to abolish existing dental specialties when they joined the EU. For a population of over 22 million, Romania has just 412 Orthodontists (1.19/100.000), while the rate in Slovenia is 5.23, Cyprus 5.03 and Denmark 4.71. The European average is 2.60. Romania has 1.9 OMF surgeon per 100000 inhabitants which is higher than the aver-

age of (0.57)), but Belgium has 2.72 and Hungary 2.07. Concerning dento-alveolar surgeons (OS), the European mean is 0.89/100.000 and Romania has 0.73 against Bulgaria which has 2.96 and Germany 2.49. There have been proposals to establish dental specialties in: Oral Rehabilitation, Dental Public Health, Endodontics, Periodontics, Prosthodontics, Paedodontics and Implantology.

Conclusions: More people retain teeth into old age, patient expectations have risen and a wider range of techniques are increasingly available to meet these demands and needs. It is therefore important that suitably trained specialists are available to meet these needs and demands. If it wishes to progress, Romania must address this problem by establishing a wide range of dental specialties.