Academy of Minimally Invasive Dentistry and European Society of Preventive Dentistry

Abstracts from 1st European Conference on Preventive & Minimally Invasive Dentistry. Copenhagen 16–17 April 2004



Listed in order of date of submission * Presenting author

001 Minimally Invasive Dentistry: Sonic and Ultrasonic Devices in Ultraconservative Class 2 Restorations

- H. Tassery* a/F. Bukieta/S. Koubia
- ^a Marseille Dental School, University of Mediterranean, Marseille, France.

Key words: sonic insert, ultrasonic insert, class 2 restoration, minimally preventive restorative dentistry

Introduction: Ultraconservative restorative techniques in class 2 restorations require the use of sonic and some ultrasonic preparation devices. These systems facilitate a new field of ultraconservative restorations for sites in 2 sizes (1 or 2), with or without the preservation of the marginal ridge. This poster reviews and evaluates the clinical advantages and difficulties when using sonic and the different ultrasonic insert devices.

Materials: Sonic systems

Advantages:

- 1. Preservation of adjacent proximal surface
- 2. Preservation of marginal ridge
- 3. Low risk of enamel cracks
- 4. 90° angle tips available: PrepAngle[®] inserts.
- Disadvantages:
- 1. Constant pressure necessary for maximal effect
- 2. Needs specific water coolant handpiece
- 3. Needs air pressure of approx. 3 bars.

Materials: Ultrasonic systems

Advantages:

- 1. Preservation of adjacent proximal surface
- 2. Preservation or not of marginal ridge depending on shape of inserts
- 3. Specific ultrasonic handpiece not required
- 4. Drilling first with diamond burr required less often to start preparation
- 5. Low cost.
- Disadvantages:
- 1. No references about potential enamel cracks created by ultrasonic vibrations and their clinical outcomes
- 2. Preservation of adjacent proximal surface regarding effectiveness of ultrasonic vibrations is more difficult compared to sonic devices
- 3. Rubber dam required with Vector system.

Materials: Negative points in common

- 1. Both procedures' effectiveness depends on hardness of dental tissue
- 2. Perfect filling of cavity remains difficult to control
- 3. Outer carious dentin removed with round steel burr mounted on low-speed motor or with manual excavators
- 4. Thickness limit of marginal ridge is unknown
- 5. Surface of dentine treated covered by smear layer
- 6. Lack of visibility during excavation and filling procedures.

Materials: Clinical aspects

The shape of the slot cavities is similar for both techniques, and resembles a funnel. A butt-joint is the usual marginal shape of the cavity, but on the enamel cervical margins a slight bevel can be achieved depending on the accessibility of the caries lesion. In these kinds of clinical situations the use of chemical excavation could be helpful for reducing the risk of leaving infected tissue and then having to reverse the caries processes in association with a sealed restoration. The current excavation procedures will be reviewed and discussed.

Materials: Restorative procedures of a slot cavity

Because the marginal ridge is preserved and the restorative biomaterial is free from occlusal wear, the clinical rule is to promote biomaterials with cariostastic effects like modified glass ionomer resin. Different clinical hypothesis and their timeliness will be discussed:

- 1. Use of 2% chlorehexidine solution before or after acid etching
- 2. Use of self-etching adhesive system to overcome the uncontrolled moisture in the deep part of the cavity lesion.
- Conclusion: These new restorative procedures appear to be useful in routine preventive dentistry.

002 A Socio-dental Approach to Assessing Dental Needs in Children

S. Gherunpong* ^a/G. Tsakos^a/A. Sheiham^a

^a Department of Epidemiology and Public Health, University College London, London, UK.

Key words: socio-dental, impact, quality of life, need, children

Purpose: To develop and test a socio-dental approach to assessing dental needs in children. Socio-dental needs assessed by the new approach will be compared with normative needs assessed by the conventional approach.

Developing the Theoretical Framework: The study developed a theoretical framework and models of socio-dental needs assessment. The framework is an integrating process whereby various factors are incorporated into the system. The conventional normative method is integrated with the concept of oral health-related quality of life resulting in 'Impact-related Needs' indicating those who had a need for 'Dental Care'. Evidence-based and propensity concepts are integrated into the system resulting in 'Propensity-related Needs' where dental needs are categorized by propensity levels. A need for 'Normative Treatment' is considered for children at a high level of propensity, while alternative treatment and dental health education/oral health promotion could be offered to those at other levels.

Materials and Methods: To test the new socio-dental approach, a cross-sectional survey was carried out, including all grade 6 (11–12 years old) children in an area of Suphan-buri province, Thailand. The sample (N = 1034) was clinically examined for Normative Treatment Needs for: a) dental caries; b) traumatic dental injuries; c) enamel defects and dental anomalies; d) periodontal diseases; e) malocclusions; and f) prosthodotic conditions. They were also interviewed to assess oral health-related quality of life using the CHILD-OIDP index and answered a questionnaire to assess oral behaviors and demographic status. Impact-Related Needs were assessed for five non-progressive dental conditions, from b–f. Propensity-related Needs were assessed for complex treatment such as orthodontic treatment as well as dental crowns.

Results: Considering all five types of treatment for non-progressive dental conditions together, 98.8% of the sample had a Normative Treatment Need. Per 100 children with Normative Treatment Needs for any of the five treatment types, 40 children had Impact-related Needs. The amount of needs decreased significantly using the socio-dental approach (p < 0.001). As Impact-related Needs can be further prioritized by the level of impacts, the amount of needs decreased more if children with low levels of impacts were excluded. For example, Impact-related Needs referred to 29.6 children by excluding those with 'very little' impacts, and to 17.7 children by the further exclusion of those with 'little' impacts. The assessment of Propensity-related Needs showed that a relatively low proportion of children had high or medium-high levels of propensity. For example, per 100 children with Normative Needs for orthodontic treatment, 30.2 children had Impact-related Needs; furthermore, only 2.7 children had high and medium-high Propensity-related Needs. Per 100 children with Normative Needs for treating dental caries, 12.8 dental crowns were needed normatively. The assessment of Propensity-related Needs showed that none of the normatively recommended dental crowns were in children with a high propensity. Only 5.0 dental crowns were in children with a medium-high level of propensity.

Conclusions: There was a big gap between dental needs assessed normatively and socio-dentally. The amount of need for dental care decreased significantly from Normative to Impact-related Needs. Moreover, the number of normative treatments required decreased even more when Propensity-related Needs were assessed. The socio-dental approach highlights not only the concept of oral health-related quality of life, but also a need for a broader type of dental care for those in need.

003 Normative Dental Treatment Need and Oral Quality of Life Studied among Adolescents in Urban and Rural Uganda

A. Nordrehaug Åstrøm* a/I. Okulloa

^a Centre for International Health, University of Bergen, Norway.

Key words: self-reported oral health, DMFT, OIDP, adolescents, Uganda

Purpose: This study applies a validated version of the Oral Impacts on Daily Performance (OIDP) to adolescents' oral quality of life and addresses the following question: Do the OIDP scores contribute to the explainable variance of self-perceived oral condition beyond measures of normative dental treatment need and satisfaction with the dental care received?

Materials and Methods: A cross-sectional random sample survey was conducted in Kampala (urban) and Lira (rural) in 2001 and 1146 secondary school students (mean age 15.8 yr, response rate 87%) completed questionnaires in school. Dental caries was recorded following the World Health Organization criteria (1997) on a random sub-sample of 372 students (mean age 16.3 yr).

Results: 62% of the students experienced at least one oral impact during the 6 months preceding the survey; 29% were dissatisfied with their dental condition, whereas 30% evaluated dental care unfavorably. A total of 19.9%, 55.9% and 24.3% had respectively, DMFT > 0, DMFT1-4 and DMFT 5-14. Multiple logistic regression analyses revealed that students of higher educated parents were less likely to be dissatisfied with their dental condition (adjusted OR 0.3, 95% Cl 0.1–0.6). Students having DMFT score > 5 (adjusted OR 2.6, 95% Cl 1.2–6.1), being dissatisfied with care (adjusted OR 4.3, 95% Cl 2.3–8.0) and reporting at least one oral impact (adjusted OR 3.8, 95% Cl 1.9–7.5) were more likely to be dissatisfied with own oral health status. Socio-demographics, DMFT status and satisfaction with oral care contributed 24%, whereas OIDP scores raised the explainable variance of self perceived oral health to a final 30% (p < 0.001).

Conclusion: This study indicates that normatively defined need for caries treatment, aspects of oral quality of life and expression of unmet need are all important in shaping adolescents' perceptions about their mouth and teeth.

Support or Funding

This study was financially supported by the University of Bergen.

004 Minimal Invasive Augmentation Treatment in the Maxillary Sinus: Data and Experience after 500 Internal Sinus Lifts with Different Grafting Materials and the Use of Activated Platelet Rich Plasma

H. Eymer* a

^a Praxis für Zahnheilkunde Hamburg, Hamburg, Germany.

 $\ensuremath{\textit{Key words:}}\xspace$ sinus lift, internal sinus lift, bone augmentation

Purpose: The aim of this study was to analyze internal sinus lift procedures with different grafting materials (GM). Activated Platelet Rich Plasma (PRP) was used and implants could always be placed simultaneously in all 500 internal lifts from 1999 to 2003.

Materials and Methods: The internal sinus lift procedure using the osteotome technique is the only method to minimize the local and total operative stress of the patient. In this study the procedure was done with mixtures of 20–40% autologous bone and different grafting materials with PRP, because PRP can only work on human cells. The GMs were: Biogran, Bio Oss, Cerasorb and DFDBA.

The PRP was produced by a local certified blood bank, and in the office laboratory centrifuge (PCCS System) and by the Smart PReP System. Different concentrations of the systems from 450–1200% with different vitalities of the thrombocytes could be found. The grafting materials absorbed various volumes of PRP from 0.5 ml (Biogran) to 1.23 ml (DFDBA) per 1 ccm GM. The mixtures of the grafting materials with the autologous bone from a bone collector or local harvested bone chips were made extraorally and combined with PRP which had to be activated with Calcium Chloride and thrombin. Then the jelly mixtures were filled and carefully condensed with osteotomes in the prepared locations of the sinus floor. Simultaneous implantations could be done in every case.

Results: The residual bone heights in this study from 1-2.5 mm (Group1) to 11-12.5 mm (Group 6) were always measured before treatment with Denta CTs. In the different groups we achieved additional bone heights from Group 1 (1-2.5 mm): 11.8 mm, to Group 6 (11-12.5 mm): 3.7 mm. The results of the loading times of the different grafting materials (pre-evaluated by the bone density with X-rays) were 11 weeks for DFDBA, 19 weeks for Bio Oss, 26 weeks for Cerasorb and 28 weeks for Biogran after lifting and implantation. There were no statistically significant differences in implants loss. A number of the 46 implants were lost in the first four weeks after loading – out of a total number of 55. The 46 implants could not be treated with the full torque during abutment fixation which might be an indicator for early loss.

Conclusions: After more than five years and 500 internal sinus lift procedures the use of these grafting materials mixed with autologous bone and activated PRP is a demonstrably successful method to reduce the local and total operative stress of augmentations and implantations in the sinus lift. Residual sinus bone heights down to 1-2.5 mm can be treated and simultaneous implantations can be done thereby reducing the total treatment time for the patient. The author achieved a survival rate of 89% for implants that continued to function after five years.

005 Dental Decay in Austria and Treatment Needs in Different Age Groups

P. Städtler* a/A. Bodenwinklera/G. Saxa

^a Institute of Health, Vienna, Austria.

Key words: caries prevalence, treatment needs, DMFS, DMFT, polarization

Purpose: In order to determine the need for prophylactic measures and dental treatment in Austria, dental surveys were performed on persons aged 5, 12, 18, 35 to 44, and over 65 years.

Materials and Methods: Since 1997 we examined one age level group each year and established the D3MFT and D3MFS values for a representative number of 500 persons for each age group. Sampling was based on the two-layer Pathfinder method: the first step involved choosing a representative sample of Austrian survey localities with reference to urban/rural distribution; the second step involved the random selection of participants in the localities chosen.

Results: There was a very high normative treatment need in pre-school children with 67% requiring treatment. Conversely, in the other age levels 15%, 8%, 1.5% and 4.1% respectively had treatment needs. Dental decay was skewly distributed among the younger age groups: 50% of dental caries in the 5, 12 and 18-year-old participants was concentrated on 9%, 15% and 17% of the children and youngsters. A caries decline from 2.7 to 1.5 D3MFS was found in 12-year-old children between 1997 and 2002. The adult age group, however, showed high tooth loss, increasing from 2.2 MT in the 34 to 44-year-old group to 18.1 MT in persons aged 65 years and over.

Conclusions: Dental restorative care of adults appears to be adequate in Austria but the care does not prevent high rates of tooth loss in adults. There is a great need for restorative dental care in pre-school children and in age groups with a high risk of caries. Prophylactic measures in young persons and adults could contribute to a reduction of tooth loss at older ages if evidence based methods were used.

Support or Funding

The investigation was carried out for the Austrian Federal Ministry of Health and Women.

006 Evaluation of Novel Instruments for the Preparation of Porcelain Veneers

M.O. Ahlers^a/G. Cachovan* ^a/H.A. Jakstat^b/U. Platzer^a

^a Restorative and Preventive Dentistry, School of Dental and Oral Medicine, Universitätsklinikum Hamburg-Eppendorf, Germany.

^b Prosthetic Dentistry and Material Sciences, Dental School, Universität Leipzig, Germany.

Key words: porcelain veneers, preparation, orientation grooves, depth markers, Keramik-Veneers.de, randomized controlled study

Introduction: Porcelain veneers are accepted scientifically as restorative treatment means. Guidelines for the preparation of porcelain veneers suggest a labial reduction of 0.5 mm without an incisal chamfer, distinguishable cervical and interproximal extensions and intact interproximal contacts; dentine exposure is to be avoided. An earlier controlled study determined a high probability of cervical dentine exposure and insufficient labial reduction. This result was obtained by two experienced clinicians preparing natural teeth *in vitro* without the use of orientation grooves.

Preparation instruments including depth markers were introduced by Goldstein. These cylindrical instruments carry the risk of extensive angulation leading to extensive preparation depths. Therefore, a new set of instruments was developed, characterized by novel depth markers with ellipsoid cone tips designed to ensure orientation grooves of definite depths. Matching preparatory and finishing diamonds are congruent with the depth markers in shape, as required by the new German standards for preparatory instruments.

Purpose: The aim of this study was to determine how the use of the 3 different systems for the preparation of veneers in a simulated patient situation is perceived by inexperienced practitioners.

Materials and Methods: The study was performed as a controlled prospective randomized trial in a simulated patient situation. Eighteen undergraduate students without experience in the preparation of ceramic veneers served as test persons and were randomly assigned to three groups. All groups performed all tasks in a randomly assigned sequence. Before that, all students received a simultaneous uniform instruction on the preparatory guidelines, the instrument sets and their handling: 1. 'Laminate Veneer System' (LVS); 2. 'Keramik-Veneers.de' (KVde); 3. round tapered diamonds serving as a reference (REF).

Every student prepared three central upper and three central lower incisors (18 teeth by student, maximum time 8 h) with each set of instruments. Finally, all students answered a detailed anonymous questionnaire, covering perceived safety, ease in complying with preparation guidelines, efficacy/required time and overall suitability for the task. Answers were stratified (ranks – 5 to + 5 per item) and statistically evaluated (Mann-Whitney U-Test and confidence intervals).

Results: Perceived safety was judged better in KVde (+ 4) than in LVS (+ 1.5) and in REF (- 3.5). Efficacy was judged better in KVde (+ 3.5) than in LVS (+ 1) and in REF (- 2). Efficacy was judged better in KVde (+ 3.5) than in LVS (+ 1) and in REF (- 2). Overall suitability was evaluated best in KVde (+ 5) than in LVS (+ 2) and in REF (- 3). Differences between all groups were highly significant ($p \le 0.01$).

Conclusions: The results confirm and explain the earlier studies' findings. Obviously, the preparation of veneers without orientation aides can lead to problems not only for experienced clinicians in a laboratory setup, but also for inexperienced practitioners. In this study, the systems featuring initial preparation of orientation grooves lead to perceived improvement of safety and time required. When comparing the two dedicated sets, the novel instruments were judged to increase the safety and overall suitability while perceived time was reduced.

007 Comparing Oral-health Quality of Life in Three Cohorts of Spanish Teenagers

J.M. Martin* a/M.B. Pérezb

^a School of Dentistry, University of Granada, Spain.

^b Faculty of Preventive Dentistry and Community Oral-Health, University of Granada, Spain.

Key words: quality of life, fissure sealant, fluoride varnish, teenagers

Purpose: The aim was to assess Oral Health Quality of Life (OHQoL) scores in fifteen to seventeen-year-old student cohorts, 5 years after they had completed a 4-year sealant and fluoride varnish program.

Materials and Methods: In 1990, 362 six to eight-year- old students were included in a experimental study to assess the effectiveness of a fluoride varnish versus fissure sealants programs initiated in Granada (Spain). The fluoride and the sealant programs lasted 4-years (Bravo et al. Community Dent Oral Epidemiol 1997;25:247–50.). After a discontinuation period of five years, 145 students from the study (Sealant = 48; Varnish = 40; and Control = 57) aged from fifteen to seventeen years, were recalled and included in this study. OHQoL scores were assessed using an adapted version of the DIDL questionnaire (Leao A, Sheiham A. Dent Health 1996;118:22–26.), which had a -2 (bad) to +2 (good) scale, based on negative/positive impacts.

Results: The scores in the three groups (mean \pm sd) were: Sealant: 0.47 \pm 0.23; Fluoride Varnish: 0.34 \pm 0.25; and Control: 0.35 \pm 0.22. OHQL was statistically better (p < 0.05) in those students that had fissure sealants applied compared to the control and fluoride varnish cohorts. **Support or Funding**

This study was partially supported by FIS project #PI021129 (Spanish Ministry of Health).

008 French Dental Teachers' Restorative Treatment Decisions on Approximal and Occlusal Caries

- S. Domejean-Orliaguet* a/S. Tubert-Jeanninb/Anne B. Tveitc/I. Espelidd/Paul J. Riordanb
- ^a Faculty of Dentistry, Department of Operative Dentistry, Clermont-Ferrand, France.
- ^b Faculty of Dentistry, Department of Public Health, Clermont-Ferrand, France.
- ^c Faculty of Dentistry, Department of Cariology, Oslo, Norway.
- ^d Faculty of Dentistry, Department of Pediatric Dentistry and Behavioral Science, Oslo, Norway.

Key words: dental education, dental caries, caries diagnosis, decision making, operative dentistry

Purpose: Caries diagnostic thresholds and restorative treatment strategies are known to vary among dentists. The aim of this study was to measure diagnostic and treatment-decision variability for occlusal and approximal caries among teachers in the 16 French dental schools.

Materials and Methods: The questionnaire produced by Espelid et al, previously used in Scandinavia and now translated into French, was sent with a reply-paid envelope to 180 teachers in operative dentistry. It assessed their treatment strategies, knowledge and beliefs about selected aspects of caries diagnosis and operative dentistry. After one reminder, the response rate was 49.1%.

Results: Restorative treatment threshold for approximal surfaces, opinions about the rate of caries progression and strategies to monitor lesions near the DEJ varied among French university teachers. The findings suggest that these teachers would intervene later than would French private practitioners, who had previously responded to the same questionnaire, but earlier than would Scandinavian dentists, for the same carious conditions.

Conclusion: This study provides a baseline for caries diagnosis and operative care, and may provide an incentive for dental teachers to converge their ideas on the diagnosis and treatment of dental caries.

009 Molecular Genetic Identity of Blood and Oral Isolates of Viridans Streptococci

Z. Broukal^a/J. Dusková* ^a/T. Janatová^a

^a Institute of Dental Research, 1st Faculty of Medicine, Charles University, Prague, Czech Republic.

Key words: viridans streptococci, oral and blood isolates, molecular genetic identification

Purpose: Prevention of haematogenic dissemination of oral bacteria belongs to the category of significant issues currently associated with emergency care of health-compromised individuals. The aim of this study was to ascertain the molecular genetic relationships of oral and blood culture isolates of viridans streptococci (S. salivarius, S. mitis, S. mutans and S. sanguis groups).

Materials and Methods: An attempt was made to test the similarities of the relationships in a group of 30 patients with positive haemocultures harboring these organisms. Isolates were preliminarily identified by means of colonial morphology and biochemical properties and then genotyped by means of the PCR (spacer 16S and 23S rDNA) and AP-PCR.

Results: Strain identity of blood and oral isolates has been proved in S. salivarius in 2 of 4 cases, in S. mitis in 8 of 10 cases, in S. mutans in 2 of 2 cases and in S. sanguis in 15 of 16 cases. Clonal identity of blood and oral isolates has been proved in 50% of isolates. Oral microbial flora is thus the significant source of viridans streptococci in positive haemocultures.

Discussion: Based on these findings when managing the oral health care of a patient at risk the recommendation should be to eradicate not only the oral infectious foci but also to introduce an oral home-care regime that substantially reduces plaque and mucosal oral flora.

Support or Funding Grant supported by Ministry of Health, Czech Republic, No. 0002377901.

010 Trends in Oral Health Status in Schoolchildren from Iasi, Romania

I. Danila* a/C. Hanganua/T. Timisa

^a Oral Health Department, University of Medicine and Pharmacy 'Gr. T. Popa', Faculty of Dentistry, lasi, Romania.

Key words: dental caries, preventive program, mouth rinsing

Purpose: The aim of the study was to analyze trends in dental caries over a ten-year period (1992–2003) among children of 6 and 12 years of age and to assess the changes in oral health status after four years of implementation of the National Caries Preventive Program (NCPP).

Materials and Methods: In 1999 the NCPP comprising supervised weekly mouth rinsing with 0.2% NaF was introduced in all primary schools in a non-fluoridated area, lasi, Romania. Children in grades I to IV participated. All children were examined clinically by trained and calibrated dentists using WHO criteria. No radiographs were taken.

Results: In grade I children (6-year-olds) the defs was constant over the ten-year period: 8.8 defs in 1992 and 2003; but the defs decreased from 5.1 in 1992 to 4.5 in 2003. The DMFT decreased significantly in the 6-year-olds: from 1.2 in 1992 to 0.11 in 2003. The DMFS also decreased markedly from 1.71 in 1992 to 0.11 in 2003. At grade VI (12-year-olds) the mean caries experience was 2.37 (3.9 DMFS (2003) compared with 6.0 DMFS (1992). The DMFT index decreased from 3.0 (1992) to 2.37 (2003).

Discussion: The decline is unlikely to be due solely to the preventive program. Thus, even if the water in lasi is fluoride-deficient, the children may be exposed to fluorides unassociated with the mouth rinsing programs. The possibility exists that some factors that influence dental caries other than the intervention being studied must have contributed to the observed changes in caries prevalence.

Conclusions: Caries declined markedly in the permanent teeth over 10 years. Factors other than the mouth rinsing must have contributed to the decline as the marked decline in the DMFS of 6-year-olds could not be due to one year's mouth rinsing.

Support or Funding

This study is supported by the Ministry of Health, Romania.

011 Evaluation of Microdentistry Technologies in Therapy of Early Caries Lesion

M. Mikšovský^a/Z. Broukal^a

^a Institute of Dental Research, Prague, Czech Republic.

Key words: Microdentistry, caries occurrence, initial caries treatment

Purpose: There is a wide range of Microdentistry devices available within the Czech dental trade. However, use of this equipment in dental offices is very low for two reasons: Firstly, patients must pay for the treatment despite the fact that the majority of the population in the Czech Republic believes that medical and dental care should be free of charge. Secondly, there is a perception that Microdentistry treatment takes much longer in comparison to classic treatment with drill, amalgam and sometimes with the application of local anesthetics. The benefits of a less invasive approach to soft dental tissue and the potential danger of local anesthetics are still not well-understood. The main goal of this study was to compare single Microdentistry technologies from the point of view of time spent on treatment, level of pain, and SEM pictures of hard dental tissues after preparation.

Materials and Methods: In this study we used the RONDOflex (KaVo) air abrasion device (pressure 3.2 bar, 27 micronAl2O3 particles), the SON-ICflex (KaVo) airscaler, and the Fissurotomy (SSWhite) special Microdentistry burs. We treated 276 human molars (142 patients, 1 to 3 molars each) *in vivo* with fissure caries at a DEJ depth of roughly similar size determined by radiographs and clinical examination. The treatment was performed by two dentists. Teeth were divided into four groups: group 1 was treated in the classic way according to Black by conventional rotary hand piece with green marked diamond; group 2 with air abrasion; group 3 with oscillating device; and group 4 with Fissurotomy burs. The restoration material used in group 1 was amalgam. Cavities in groups 2, 3 and 4 were filled with flow composite Flow line (Kultzer). At each appointment, for restorative treatment, patients were instructed to rate their pain on the special 5 degree scale (1 = completely painless, 5 = require anesthetic). The time taken was measured during each treatment form the start of preparation to completion of filling. All data was registered and statistically evaluated (Student t-test).

Results: Average time required for classic preparation with amalgam filling was 6 min 35 s. Micro-preparation provided by Fissurotomy burs with flow composite filling required 7 min 15 s, by SONICflex 8 min 55 s and by RONDOflex 10 min 5 s. Level of pain was registered in inverse order. Preparation by RONDOflex was completely painless. SONICflex and Fissurotomy preparation were described as having approximately the same levels of painfulness. The highest degree of painfulness was registered by patients that were treated with classic rotary preparation. SEM pictures show that air abrasion and oscillating systems resulted in less trauma to adjacent tooth surfaces than rotary preparation.

Conclusions: This study clearly shows that the Microdentistry approach did not take much more time compared to classic preparation. The benefits resulting from a less invasive approach to soft dental tissue and the lower level of pain were accepted by patients in a positive way. Patients in our offices were prepared to pay for these benefits.

Support or Funding

Institution grant VÚS-VFN No. 0002377901.

012 Oral Health Status of Adults in Denmark

U. Krustrup* a/P. E. Petersena

^a Faculty of Health Sciences, Department for Community Dentistry and Graduate Studies, University of Copenhagen, Denmark.

Key words: oral health care services, dental status, dental caries, periodontal disease, treatment need, preventive services

Purpose: Data on oral health and treatment needs of the adult Danish population are limited. The aim of the present study was to provide an analysis of the oral health profile of the adult population in Denmark and to assess the need for adjustments to the adult oral health care services. **Materials and Methods:** Stratified cluster sampling was used for selection of participants nationwide. A total of 1115 individuals in the age groups 35–44 and 65–74 years were clinically examined. The response rate was 89.8%. Clinical examinations of dental status, dental caries and periodontal conditions were carried out using WHO criteria (1997). Frequency distributions and means were computed for the bivariate analyses.

Results: The 35-44-year-olds had a mean of 28.1 teeth present: 98.8% had 20+ teeth and no edentulous persons were found; the 65-74-year-olds had a mean of 16.4 teeth: 54.7% had 20+ teeth and 17.8% were edentulous. Among the 35-44-year-olds 1.2% were denture wearers against 49.3% of the 65-74-year-olds. The mean DMFT of the 35-44-year-olds was 16.7 (DT = 0.5, MT = 3.9, FT = 12.3); the dentate 65-74-year-olds had a mean DMFT of 24.8 (DT = 0.8, MT = 12.0, FT = 12.0); and the total sample of 65-74-year-olds had a mean DMFT of 26.2 (DT = 0.7, MT = 15.6, FT = 9.9). The D-component was higher for men (p < 0.05), while the M-component was higher for women (p < 0.05). Multivariate analyses revealed substantial differences by social group in relation to caries experience for both age groups. High D-T and low F-T were associated with low income and low education while high DMF-T was strongly associated with low education (p < 0.05). For irregular dental attenders the DT component (D = 1.2) was more than twice the figure of regular dental attenders (D = 0.5). However, the total DMFT for the two groups was similar. Regarding periodontal conditions, 29.4% of 35-44-year-olds had shallow pockets and 6.3% had deep pockets whereas in the older age group 45.5% had shallow pockets and 20.0% had deep pockets. Women generally had more healthy periodontal conditions than men. Periodontal conditions were also affected by socio-economic status; in particular, education was shown to have a strong effect on periodontal health, being poor in persons with low level of education. The number of teeth with healthy periodontal conditions was relatively high among regular dental visitors at a younger age, whereas among the elderly more teeth with healthy periodontal conditions were found in the group of irregular attenders. **Conclusion:** The study indicates a need for reorientation of the oral health care system towards preventive services and health promotion.

The study was supported by The Danish National Health Insurance.

013 Early Childhood Caries in Inner City Children

- J. Vanobbergen* ^a/L. Martens^b
- ^a Department of Community Dentistry and Dental Public Health, Ghent University, Belgium.
- ^b Department of Pediatric Dentistry, Ghent University, Belgium.
- Key words: early childhood caries

Purpose: The aim of this study was to determine the prevalence and determinants of ECC in inner city children within the city of Ghent (Belgium) in order to start an oral health promotion project directed at the intermediary care givers in the 'Child and Family' sector.

Materials and Methods: Caries prevalence expressed by dmfs was determined using WHO and BASCD criteria implemented by two calibrated examiners in a sample of 385 children (24–35-months-old). Oral hygiene was assessed using the Silness and Löe index. Data on oral health habits and social variables were obtained by a face to face interview. Bivariate and Multivariate analyses were performed with ECC as a response variable. **Results:** ECC was diagnosed in 18.5% of the children. The mean dmfs was 0,83 (SEM = 0.14). The median was 0 and the inter-quartile range equaled 0 (Q3–Q1).The mean number of decayed surfaces was 0.83, expressing that the treatment need was 100%. Daily use of a bottle with sweetened drinks (p = 0.02) and going to sleep with a bottle (p = 0.03) were directly associated with ECC. Drinking from a cup (p = 0.01), low plaque index scores (p < 0.0001) and brushing at least once a day (p < 0.0001) were inversely associated with ECC. In the multiple logistic regression analysis, adjusted for social variables and age, frequency of brushing, drinking from a cup and plaque index scores remained significantly associated with ECC.

Conclusion: Living in a deprived neighborhood (p < 0.0001) and the country of origin (p < 0.01) were the most significant social variables associated with ECC.

Support or Funding

Johnson & Johnson fund for Health and Wellbeing.

014 Determination of Mediators PGE2 and TXB2 in Saliva of Adult Patients with Periodontitis

I.B. Prso* a/F. Culob/S. Pezelj-Ribarica/J. Aleksicb/M. Abramc

- ^a Department of Stomatology, Medical Faculty, University of Rijeka, Croatia.
- ^b Department of Physiology and Immunology, Medical Faculty, University of Zagreb, Croatia.
- ^c Department of Microbiology, Medical Faculty, University of Rijeka, Croatia.
- Key words: periodontal disease, saliva, pro-inflammatory prostanoids

Purpose: Etiologic agents (anaerobic bacteria) and host defense mechanisms are involved in the pathogenesis of periodontal diseases. The aim of this study was to examine possible relationships between the levels of pro-inflammatory agents **PGE2** and **TXB2** in human saliva and the presence of the periodontal disease.

Materials and Methods: The study was conducted on 30 adult patients with periodontitis and 20 healthy subjects in a control group. Their saliva samples were collected and stored at – 70°C pending analysis. Levels of prostanoids **PGE2** and **TXB2** in the saliva were measured using enzyme immunoassay (EIA).

Results: PGE2 and TXB2 levels in saliva were significantly higher in adult patients with periodontitis as compared to healthy individuals. **Discussion:** The result of this study indicates that prostanoids PGE2 and TXB2 are implicated in the pathogenesis of periodontal disease. The circumstances surrounding the production of PGE2 and TXB2 in the inflammatory processes in humans are still under debate, but it is well known that these pro-inflammatory mediators play an essential part in the pathogenesis of periodontal disease.

Support or Funding

This research was supported by the Ministry of Science of the Republic Croatia.

015 The Quality of Life Reflected in Oral Health

A. Podariu* a/A. Galuscana/R. Vacarua/D. Jumancaa/R. Munteana

^a Department of Preventive and Community Dentistry and Oral Health, University of Medicine and Pharmacy Timisoara, Romania.

Key words: oral health, children, quality of life, odontal status

Conclusion: Quality of life influenced oral health.

Purpose: The aim of this study was to compare the oral health status correlated with the quality of life for 2 groups of children with different socio-economic backgrounds. In the first group, 280 children were from a normal school; in the second group, 230 came from an orphanage.

Material and Methods: The following evaluation criteria were used for all 510 children (286 boys, 224 girls, age 6–10 years): psycho-somatic status (height, weight, and communication abilities); odontal status (DMFT); the level of dental health education (toothbrushing techniques and frequency of toothbrushing); and the presence of dental-maxillary abnormalities caused by abnormal oral and postural habits.

Results: 63% of the children from families exhibited higher mean weight with 2–3 kilograms above normal weight for age (7% from first group had a tendency for obesity). The same evaluation indicated that 15% of the children from the second group were 2–4 kilograms below normal weight. Only 1% in first group (compared with 28% in the second group) had emotional and communication problems (shyness). The results indicated a DMFT score of 3.8 for the first group and a DMFT score of 4.1 for the second group – a difference of 8%. Concerning dental health education and the frequency of toothbrushing the orphans had a regular daily program and the children from families had an intermittent program of toothbrushing. The first group had 5% dental-maxillary abnormalities (14 children) and the second group had 17% dental-maxillary abnormalities (40 children) – a 12% difference in prevalence for orphans compared to children from families.

016 An Assessment of the Influence of Socio-economic Conditions on the State of the Dentition, Dental Awareness and Cariogenic Products R. Chalas* a/T. Bachaneka/M. Cieszko-Buka/I. Wojcik-Checinskaa

^a Department of Conservative Dentistry, Medical University of Lublin, Poland.

Key words: socio-economic conditions, decay, dental awareness, cariogenic products

Purpose: Like other chronic diseases, caries has a behavioral dimension that may be affected by socio-economic factors. The aim of this study was an assessment of the state of the dentition and the frequency of consumption of cariogenic products by children and mothers living in the Alone Mothers' Home in Lublin district.

Materials and Methods: The effects of socio-economic conditions (homeless, unemployed, split family) on oral health were assessed. Thirty mothers and 63 children living in the Alone Mothers' Home were examined. The state of the dentition was evaluated using the DMFT index. A behavioral enquiry was also carried out.

Results: The results were compared with a control group of mothers and children living in normal socio-economic conditions (own home, employed, complete family) that adequately mirrored the examined group. In the examined group of mothers, the mean DMFT index was 23.9; DMFT was 3.3 in a group of children with deciduous teeth; DMFT of the first permanent molars (DMFT6) was 1.3 in a group of children with mixed teeth; the DMFT score for permanent teeth was 7.5. The frequency of visits to a dentist by mothers was: once a year, 40%; and sporadically, 60%. In the group of examined mothers 66.6% consumed cariogenic products (sweetened drinks) twice a day or more. Similar patterns occurred in their children. Sweets, orange juices and chips were rarely eaten.

Conclusions: The dental state of mothers and children was unsatisfactory and was influenced by their socio-economic conditions.

017 Children's Oral Health in Italy. The First National Pathfinder. Clinical Calibration of the Examiners

G. Campus* a/P. Castigliab/A. Sennac/L. Strohmengerc

^a Dental Institute, University of Sassari, Italy.

^b Institute of Hygiene and Preventive Medicine, Laboratory of Epidemiology and Biostatistics, University of Sassari, Italy.

School of Dentristry, WHO Collaborating Center for Epidemiology and Community Dentistry, University of Milan, Italy.

Key words: caries, examiner calibration

Purpose: To improve examiner comparability in dental epidemiology.

Background: A large number of reports have indicated a decline in dental caries in permanent dentition in many European countries. The average DMFT ranges from 0.9 in the Netherlands and Sweden to 7.8 in Serbia. Data for Italy, where no comprehensive prevention system is present, are only available for a few areas: Milan (2.6), Venice (2.2), Rome (1.8), Naples (2.5) and Sassari (2.4). Almost all these studies were performed independently without calibrated examiners. A national pathfinder epidemiological study was then designed with the goal of analyzing and comparing oral and dental health, in two WHO age-groups, in 14 different Italian areas.

Materials and Methods: To ensure comparability of the clinical examinations, a calibration course for examiners was held before data collection. A six-day workshop was organized at the University of Milan with calibration exercises of 7 raters on 30 subjects. Agreement was evaluated on DMFS/dmfs index both as interexaminer reliability and sensitivity study in relation to a reference examiner.

Results: Sensitivity ranged from 34.3-85.7% with significant differences among raters (p < 0.05). A detailed discussion followed these results with slides and clinical clarifications. The criteria were re-explained and clinical exercises were repeated if necessary. A second reliability study was performed without significant differences among examiners, the agreement ranged from 85.2-92.3% of sensitivity.

Conclusion: The sensitivity-specificity calculation at surface level is a good expression of inter-examiner reliability.

018 Self-Reported Oral Hygiene Practices among Young Adults in Sardinia (Italy)

- G. Campus* a/G. Solinasb/F. Staraa/P. Luglia/P. Castigliab
- ^a Dental Institute, University of Sassari, Italy.
- ^b Institute of Hygiene and Preventive Medicine, Laboratory of Epidemiology and Biostatistics, University of Sassari, Italy.
- Keywords: oral hygiene practices, young adults

Purpose: To assess the level of oral hygiene practices in young adults in Sassari (Italy) aged 18 and over. The goals were to analyze how self-care practices (oral hygiene habits) are affected by dietary habits, actual dental visiting habits, and behavioral habits.

Materials and Methods: A cross-sectional study of all students attending one of the University canteens was performed. Data were collected on 312 persons (124, 39.7% males; 188, 60.3% females) by self-administered questionnaires. Independence among qualitative variables was tested using chi-square test. Logistic regression analysis was applied to assess the relative effect of several variables on two dependent dichotomous oral hygiene habits' variables.

Results: Toothbrushing Habits (TH) after each meal were reported by 80.1%. Gender, frequency of weekend meals outside home, time dedicated to oral hygiene practices, oral hygiene practices after meals outside home, frequency of replacement of toothbrush were significantly associated with TH. Regular use of Other Oral Hygiene Instruments (OOHI), like dental floss, toothpicks were reported by 70.4%. Gender, time dedicated to oral hygiene practices, type of preferred toothpaste, frequency of dental check-ups were significantly associated with OOHI. These significant variables were imputed as covariates in two logistic regression models: the first with TH as dependent, and the second with OOHI. Both models were highly significant. Being female and time dedicated to oral hygiene practices had a positive effect on TH, while frequency of weekend meals outside home and frequency of replacement of toothbrush had a negative effect. For OOHI, being male and time dedicated to oral hygiene practices played a negative role.

Conclusions: Oral hygiene habits were more frequent among females, while males seem to use other oral hygiene instruments more frequently.

019 Inter- and Intra-examiners Reproducibility of the Clinpro Cario L-Pop Caries Risk Test

P. Hahn* ^a/K. Keppler^a

^a Department of Operative Dentistry, Albert-Ludwigs-University, Freiburg, Germany.

Key words: diagnosis, caries risk test

Purpose: Efficiency of prophylactic measures can be improved based on the quantification of individual caries activity. However, more diagnostic tools are needed for determining the risk of caries. The new Clinpro Cario L-Pop diagnostic test (3M Espe, Seefeld, Germany) claims to provide information about caries risk by measuring the amount of lactic acid in dental plaque on the tongue. The aim of the present study was to evaluate reproducibility of the test results and the inter- and intra-examiners agreement concerning analysis of the test results.

Materials and Methods: Forty adult volunteers participated in an *in vivo* study. Oral hygiene and DMFS indices were determined and the Clinpro Cario L-Pop test (CCLP) was performed twice under standardized conditions. A photograph of each indicator swab was taken. Subsequently, three investigators assessed the color change to blue of the indicator swab based on the acid concentration in the plaque. Two tables (nine-color, and three-color with different intensities of blue) were used for the semi quantitative evaluation. After four weeks each investigator repeated the analysis of the photographs. The correlation between clinical parameters and caries risk test results was analyzed using the Spearman correlation test. Kappa and Kendall's Tau statistics were applied to verify the reproducibility of the test results (same test performed and evaluated twice) and the inter- and intra-examiner agreement.

Results: No correlation was found between oral hygiene indices, DMFS and CCLP results, except for one investigator for the plaque index. The two evaluations of the same swab showed a good reproducibility. Kendall's Tau values were between 0.52 and 0.81 for the nine-color table, and between 0.66 and 0.78 for the three-color table. Reproducibility was fair to good between the two tests, with comparable results for the nine-color table and the three-color groups (0.4-0.64/0.31-0.56). Reproducibility of the test results between the investigators was: investigator 1 and 2 (0.28-0.63); investigator 1 and 3 (0.28-0.57); and investigator 2 and 3 (0.49-0.80).

Conclusions: The intra-examiner reproducibility of the test results was good. The inter-examiner variability was greater in interpretation of the CCLP test results, and the variability of the results between two different tests.

Support or Funding

The authors would like to thank 3M Espe, Germany for providing the test material.

020 Caries Prevalence in School Children from the Centre of Italy

P. Esposito* a/A. Ferrittoa/C. Cordellaa/G. Murmuraa/G. Varvaraa/S. Caputia

^a Department of Oral Sciences, University of Chieti, Italy.

Keywords: caries, children

Purpose: Evaluating the caries prevalence in children of primary school of centre of Italy.

Background: There is no national planning of preventive dentistry in Italy, probably because of a lack of data regarding caries prevalence. **Materials and Methods:** A total of 24,567 boys and girls aged 5–9 years-old (mean 7.34 years) were surveyed. Each subject answered a questionnaire on gender, age, frequency of tooth brushing, regular use of F tablets. A dental exam was also performed on each participant and the number of decayed (D), missing (M) and filled (F), deciduous (t) and permanent (T) teeth were recorded. From the initial sample, 22,319 subjects

had full data. A series of univariate analyses was carried out in order to assess differences in DMFT/t by each predictor. Finally a dichotomous DMFT/t was used in a multiple forward logistic regression.

Results: The DMFT/t was 2.1; 49.6% of subjects were caries free (DMFT/t = 0). Significant odds ratios (ORs) for the tested outcomes were: the age (OR, 1.15; p < 0.01); male gender (OR, 1.06; p < 0.05); increasing tooth brushing/day (ORs, 0.93 and 0.88, for 1 and 2/times day, respectively; p < 0.05); regular use of F tablets (OR, 0.76; p < 0.01); urban area of residence (OR, 0.66, p < 0.01).

Conclusion: The results can be useful in planning preventive interventions.

021 Caries Risk Assessment of Xerostomia Patients

M. Otsuki* ^a/J. Tagami^a/Y. Takahashi^b/K. Meguro^b/K. Omura^b

^a Department of Cariology and Operative Dentistry, Tokyo Medical and Dental University, Japan.

^b Department of Oral Surgery, Tokyo Medical and Dental University, Japan.

Key words: xerostomia, caries risk, Sjögren syndrome

Purpose: Secretion of saliva is one of the biggest risk factors of dental caries. The purpose of this study was to evaluate the caries risk factors of xerostomia patients.

Materials and Methods: Based on laboratory test results of oral examination, ophthalmologic examination and examination of the level of anti-SS-A and SS-B autoantibodies, 67 patients who complained about dry mouth were assigned into one of three groups for: Sjögren syndrome, xerostomia and non-xerostomia donor. The patient group comprised 2 males and 65 females (average age 54 years). Patients' DMF-T levels were scored and their secretion of saliva was measured. Buffering of saliva, amounts of mutans streptococci, lactobacillus and candida albicans were also evaluated using Dentobuff Strip (Orion Diagnostica, Finland) and Dent Cult SM, LB and CA (Orion Diagnostica, Finland) or CRT strip and bacteria (Vivadent, Liechtenstein). Results were statistically analyzed.

Results: 47 patients were classified with Sjögren syndrome; 14 with xerostomia; 6 were non-xerostomia donors. Average secretion of saliva of Sjögren syndrome patients was 0.40 ml/min and secretion of xerostomia patients was 0.54 ml/min. Sjögren syndrome patients and patients with only xerostomia exhibited higher DMF-T with considerable amounts of mutans streptococci and lactobacillus. One third of these patients displayed low saliva buffering capacity. Candida albicans was often detected in patients using removable partial dentures. **Conclusion:** Sjögren syndrome and xerostomia patients had a high caries risk due to the low secretion of saliva.

Support or Funding

This study was supported by the COE Program, FRMDRTB at Tokyo Medical and Dental University.

022 Achieving Good Quality Water Standards with a Modified Dental Unit Waterline Disinfecting Protocol

D. Marques* a/J. Silveiraa/C. Gonçalvesa/H. Franciscoa/C. Santosa/A. Mataa

a Instituto Superior de Ciencias da Saude-Sul, Oral Biology Research Team, Monte Caparica, Portugal.

Key words: duwl, waterlines, health promotion

Introduction: In 1999, the ADA recommended to their members that from the year 2000 dental unit water (DUW) should comply with drinking water standards (DWS). To meet this target several authors have suggested the use of a weekly loading of the dental unit waterline with a 5.25 g l-1 solution of sodium hypochlorite (SH) for ten minutes plus the use of an IWS with continuous use of 3 ppm SH as being effective in maintaining reduced bacterial load to DWS (1). Nevertheless such procedures have raised some controversial argumentation stating that continuous use of 3 ppm of SH could lead to elevated levels of trihalomethane compounds and bacterial endotoxins which could be harmful to patients. Moreover, the direct use contact of SH with etched dentin has been proven to interfere with adhesion properties of dental materials (2).

Purpose: In this study we have tested the efficacy of a modified disinfecting protocol from which the continuous use of 3 ppm SH was removed. The rationale was to ascertain if weekly disinfecting of dental unit waterline (DUW) alone is sufficient to maintain drinking water standards.

Materials and Methods: 9 dental units at a university clinic were used in this study. At the start of the day a 5.25 g l-1 SH was loaded into the tubing system via an IWS and allowed to rest for 10 min. Then flushing was performed for 2 min with pure water. This procedure was repeated until all collection points showed DWS levels of contamination. Thereafter the disinfecting protocol described above was performed weekly. Pure water was used as solvent to guarantee total exclusion of water chloride levels. The samples were taken weekly from the oral rising cup, incoming water, air-water syringe and turbine in a total of 189 samples and analyzed to determine level of heterotrophic bacterial contamination according to standard methods for the analysis of water. Results are expressed as mean +/- SEM bacterial colony forming units ml-1. ANOVA plus Post HOC tests were used for testing Mean differences, P < 0.05 values were taken as significant.

Results: At the beginning of the study all points of collection were significantly contaminated (P < 0.05) above DWS (the turbine and air water spray being significantly (P < 0.05) elevated compared to other points of collection). The use of the daily disinfecting protocol achieved progressive and significant (P < 0.05) decontamination of the DUW. At the end of the fourth week all points of collection submitted to the disinfection protocol significantly (P < 0.05) achieved DWS. However after two weeks of weekly disinfection all points of collection were significantly (P < 0.05) achieved DWS. However after two weeks of weekly disinfection all points of collection were significantly (P < 0.05) recontaminated above DWS.

Conclusions: In this study weekly disinfecting failed to maintain DWS. Nevertheless, daily loading of the DUW with SH using an IWS proved to be effective in reducing contamination levels and could be indicated as an alternative disinfection protocol.

1. J Am Dent Assoc 1999 Jul;130(7):957-65.

2. J Appl Oral Sci 2003;11(3):223-8.

Support or Funding

This work was funded by Egas Moniz, CRL.

023 Effects of Ageing on Salivary Gland Secretion

A. Mata* a/D. Marquesa/H. Franciscoa/C. Santosa/S. Rochaa/J. Marquesa

^a Instituto Superior de Ciencias da Saude-Sul, Oral Biology Research Team, Monte Caparica, Portugal.

Key words: ageing, salivary secretion

Introduction: The effects of ageing on salivary gland function have been the subject of recent discussions with contradictory data published in the literature. Defining normal salivation standards has become one of major features in oral health research, but has been complicated by the enormous naturally-occurring variability of this fluid. Therefore, knowledge improvement in the analytical sialometric field could certainly be extremely useful for the dental clinician in order to define which salivation patterns and concentration ranges of each salivary component are to be considered normal, thereby allowing the clinician to diagnose altered salivary phenotypes possibly linked to pathological systemic or oral conditions. This would certainly be of major importance in health prevention.

Purpose: This study was designed to evaluate the age and gender effects in the quantity of salivary fluid, protein output and salivary ionic composition in healthy human subjects.

Material and Methods: Saliva collections were undertaken by established methods from 164 healthy individuals of both genders aged between 20 and 75 years. Resting and stimulated salivary (citric acid 0, 1 M) flows were determined by established methods. Resting, stimulated and secretory salivary outputs for proteins Ca2+ and Zn2+ were determined by established spectrophotometric and atomic absorbance spectroscopic methods, respectively. Multi-ANOVA testing was performed for comparison purposes between factors for age, gender and for their interactions. P < 0.05 values were taken as significant.

Results: The results suggest a negative association between age and secretory salivary output. There were no significant differences between male and female subjects for the parameter fluid production. However, male and female were significantly (P < 0.05) affected by age in different ways. In the elderly, resting and stimulated salivary proteins were found to be significantly (P < 0.05) more concentrated despite the fact that secretory capacity of the gland was found to be significantly (P < 0.05) decreased in an age dependent way. There were no gender related significant differences for salivary protein measures. Resting, stimulated and secretory capacities for salivary Ca2+ were significantly (P < 0.05) increased in advanced age groups for both male and female subjects. Conversely, resting, stimulated and secretory capacities for salivary Zn2+ were significantly (P < 0.05) decreased in advanced age groups for both male and female subjects.

Conclusions: Profound age associated changes in salivary secretion and composition were found. Older male and female subjects have less salivary flow and Zn2+ concentrations but proteins and Ca2+ concentrations tended to increase with age.

Support or Funding

Research work undertaken with grants by PRODEP and Egas Moniz, CRL. This work received ethical clearance and approval by the ethical committee at ISCSS and was conducted under informed and signed consent for each patient selected.

024 Amount of Dental Plaque in Relation to Early Carotid Lesions

B. Söder* a/P-Ö. Söderb/J. Nowakb/T. Jogestrandb

^a Institute of Odontology, Karolinska Institutet, Huddinge, Sweden.

^b Department of Clinical Physiology, Karolinska University Hospital, Huddinge, Sweden.

Key words: dental plaque, carotid lesions

Purpose: To study the level of dental plaque on tooth surfaces and early carotid lesions. Several reports have indicated a relationship between chronic inflammation/infection and the development of atherosclerosis. The hypothesis of our study was that amount of dental plaque accelerates the development of carotid atherosclerosis.

Material and Methods: The study group consisted of 98 patients (52 men and 46 women) with a mean age of 54 (\pm 3 SD) years with periodontal diseases for at least 15 years; and 41 periodontally healthy controls (20 men and 21 women) with a mean age of 53 (\pm 3 SD) years. The participants were clinically examined to determine the amount of dental plaque, level of gingival inflammation, calculus, bleeding on probing and pocket depth. Their carotid arteries were examined using the ultrasonographic B-mode technique. The far wall intima-media thickness (IMT) and the lumen diameter in the common carotid artery were estimated on both sides and the cross-sectional intima-media area (cIMa) was calculated using the formula 3.14 [(lumen diameter/2 + IMT)2 – (lumen diameter/2)2]. The statistical methods used were analysis of variance (ANOVA) and unpaired Student t-test.

Results: Subjects with a high amount of dental plaque had IMT of mean $0.69 (\pm 0.18 \text{ SD})$ mm in left carotid arteries. For subjects with a low amount of dental plaque the mean value was $0.62 (\pm 0.11 \text{ SD})$ mm. The difference was statistically significant (p < 0.001). A similar difference was seen when the cross-sectional intima-media area was calculated on the left side. For subjects with high amount of dental plaque the calculated intima-media area was mean 14.6 (± 4.1 SD) mm² and for subjects with low amount of dental plaque the mean value was 12.3 (± 2.5 SD) mm². The difference was statistically significant (p < 0.001).

Conclusion: High amount of dental plaque seems to enhance the risk for early carotid lesions.

Support or Funding

The study was supported by the Karolinska Institutet, Stockholm, Sweden and The Swedish Hart and Lung foundation.