

377 The Effect of Smoking on the Distribution of CPITN Scores. B. WESTERMAN*, M.P. CULLINAN, M.A. ROBERTS, J.A. ECCLESTON and G.J. SEYMOUR. (Oral Care Research Programme, The University of Queensland, Brisbane, Australia).
The Community Periodontal Index of Treatment Needs (CPITN) has been widely used to determine periodontal treatment needs in different countries. The aim of this study was to investigate the differences in the percentage of subjects' CPITN worst score and percentage of CPITN sextants, in particular CPITN3 and CPITN4, in a population of smokers and non-smokers. Five hundred and thirty-one volunteers aged 18-64 were examined using CPITN. The subjects were staff at the University of Queensland and included academic, administrative and blue-collar workers. Examinations utilised dental surgery facilities and two trained and calibrated examiners. Participants were divided into 18-19, 20-24, 25-29, 30-34, 35-44, 45-54, 55-64 age groups. Smoking status was determined using an unsupervised questionnaire. The data were arranged into contingency tables with respect to sex, age, subject CPITN worst score, CPITN sextant scores and smoking. Associations were tested using Chi-squared tests. Smoking status and subject CPITN worst score were not significantly associated while there was significant association between the number of CPITN sextants scoring CPITN3 and CPITN4 and smoking status. The results show that the distribution of subjects with CPITN worst scores of 3 and 4 is not affected by smoking but that the proportion of sextants with a CPITN score of 3 or 4 is markedly increased in smokers, thus supporting the concept that smoking is a risk factor for periodontal disease. This study was supported by Colgate Oral Care Australia.

378 Natural Progression of Periodontal Disease Determined by a Computerized Analysis System. A. FURIE*[†], P.-O. SÖDER, L.-J. JIN & B. SÖDER. (Karolinska Institute, Stockholm, Sweden).
The aim was to study natural progression of periodontal disease in a group of young Lithuanians with use of a computerized analysis system. Twenty young adults 11 females and 9 males (mean age 36.3±4.4 SD) with advanced untreated periodontitis participated. They were clinically examined. Orthopantomograms were taken with CRANEX dc2 model SL4-PT-10 using Ektaspeed radiographs (Eastman-Kodak Co., Rochester, N.Y., USA). The roentgenograms were enlarged 2 times with an enlarger (E. Leitz GmbH Wetzlar Germany, Hektor f-8.5cm 1:2.5) on digitizing table (Bit Pad Plus, Summagraphics Corporation, Fairfield, CO) and analysed by use of a personal computer (Macintosh IIfx, Apple Computer, Inc., Cupertino Ca) with an image analysis program (Image version 1.31, NIH, Bethesda, MD, USA). The alveolar bone height was expressed in percentage of root length. An intraexaminer correlation coefficient of double examination was r=0.97 (p>0.01). The mean of alveolar bone height was 40.1±8.2, ranging from 20.5±20.0 to 53.7±14.0. There were significant differences between molars 34.4±8.6 and premolars 44.6±8.5 (p<0.01), molars and canines 53.7±10.5 (p<0.01), but not between molars and incisors 34.8±9.0 (p>0.05). The remaining bone of canines 53.3±11.4 and incisors 31.5±9.7 in mandibula was significantly higher than canines 38.1±10.8 and incisors in maxilla 24.2±7.4 (p<0.001). There were no significant differences between males and females, upper and lower jaws, right and left sides (p<0.001, t-test). Natural progression of periodontal disease is rapid and seems to follow a certain pattern with areas more or less resistant to the disease. The study was supported by the Swedish Institute and the Karolinska Institute, Stockholm, Sweden.

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This study was patients (58 mal had been treat cases), 15 (93 c well-maintainc extreme downh period. They s D of 19 % and after treatment (P<0.05) as t followed by lo incisors and lo 0.23) at 10 ye after treatmen periodontal re carefully fro

379 Efficiency of Antimony Micro-electrode in Measuring pH. K. YAMAKI*, C. MIURA, E. MAITA and H. HORIUCHI (Department of Endodontics and Periodontics, Tohoku University School of Dentistry, Sendai 980-77, JAPAN)
The pH of the periodontal pocket would be associated with the microflora and the inflammatory process of the periodontal tissues. Many investigators have studied the pH of gingival crevices and periodontal pockets by various methods. In order to measure the pH directly in a deep pocket, a probe-type antimony micro-electrode was designed. Antimony electrode is a firm and convenient sensor to record the pH, but it has been reported to be inaccurate in the presence of organic reducing agents. The purpose of this study was to evaluate this antimony micro-electrode in comparison with the conventional glass electrode *in vitro*. The pH changes in buffer solutions brought by adding reducing agents were measured with both glass and antimony electrodes. Either glucose or methionine was added to buffer solution standards of pH 4, 7, 9 to a final concentration of 278mM for glucose or 335mM for methionine. The same procedures were also carried out on buffer solutions containing 10% sheep blood. The addition of glucose or methionine to pH 9 standard solution brought a drop of pH for about 1.5 and 1.0 pH units respectively. They had little effect on pH 4 and 7 solutions. When prepared to include blood for 10%, the pH 4 standard showed a pH rise as much as 0.5, but the pH 7 and 9 standards were not seriously affected. The effects of glucose and methionine on the pH of blood-containing solutions remained the same. The newly developed antimony micro-electrode gave almost the same pH readings as the glass electrode throughout the course, encouraging its clinical use as a pH measuring device. (This investigation was supported by the Japanese Ministry of Education under a Grant-in-Aid for Scientific Research No.06304041.)

380 Pain Response after Periodontal Surgery. K. KIYONOBU*, Y. NUMABE, H. ITO and K. KAMOI. (Department of Periodontology, Nippon Dental University, Tokyo, Japan).
Patients can not avoid pain occurring after periodontal surgery. As clues to understanding the items necessary for determining these present situations and providing patients with a more comfortable outcome, we carried out a questionnaire survey as a clinical investigation which focused on pain occurring after periodontal surgery in 21 surgeons and in 107 patients. The surgeons were questioned about the type of periodontal surgery performed, its extent, the severity of the periodontal disease, method of drug administration, and points to which special attention was paid to relieve postoperative discomfort. The patients were asked about the severity and duration of postoperative pain, the environment, and medication. The degree of the severest pain the patients felt was evaluated using the visual analogue scale (VAS), and expressed as the pain score. The multiple comparisons nature of the data was taken into account through use of the Multiple Range Test. The following results were obtained: 1. The mean VAS was 35.4. The VAS levels were lower than 65 in most cases. 2. VAS levels exceeded 50 in most cases of periodontal surgery involving osseotomy, root separation, hemisection, bone graft, or GTR technique. 3. There were no correlation between duration of surgery, extent of the surgical field or stage of the periodontal lesion in the surgical field, and VAS. 4. Postoperative VAS levels tended to increase when complications, e.g., surgical wound dehiscence, dislodging of periodontal packs, ulceration, etc., occurred after the operation. 5. The pain tended to be relieved post-operatively in patients who rested after their surgery according to the instructions of their physicians and took anti-inflammatory analgesics immediately. These results of this study indicate that factors involving not only the surgeons but patients are important in achieving successful pain control after periodontal surgery.

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381 Effect of projection geometry on radiographic dimensions of a stepwedge. Y.C. LIM* and G.S. GRIFFITHS (Eastman Dental Institute, London, U.K.)
The detection of periodontal lesions using digital radiography or computer assisted densitometric analysis are dependent upon reproducible radiographs. This study aimed to measure changes in the dimensions of the radiographic image of a stepwedge as an assessment of variation in the angulation of the X-ray beam. Bitewing radiographs of a human skull were obtained using a modified holder with a slot to retain the stepwedge (Griffiths *et al.* Br Dent J 164: 365-367, 1988). The holder was located using an occlusal registration of self-cured acrylic. A jig was developed allowing variations of angulations of the X-ray beam to film. Horizontal angulations of 0,3,6,9,12 and vertical angulations of +6,+3,0,-3,-6 degrees were used. Combinations of these provided 25 variations and 4 repeat radiographs were taken in each position. Radiographs were magnified x8.52 and digital calipers used to measure the length and width of the stepwedge. The results showed that a 3° vertical misangulation changed the length by 2% and the width by 6.8%. With a concomitant vertical and horizontal misangulation of 3° the length may increase by 1.9% or decrease by 6.8%, whereas the width may increase by 10.9%. For a threshold of 0.1mm error of measured length or width, angulation of X-ray beam must be in the range of -1.3° to +1.4° when the horizontal angulation is 0°. If the threshold is increased to 0.2mm, the vertical angulation needs to be within -3.2° to +3.3°. The dimensions of a stepwedge acts as a good indicator of beam alignment. Width of the stepwedge was most influenced by vertical angulation whereas length was affected most by horizontal angulation.

382 Comparison of Mechanical Properties of Incisor Periodontal Ligament. K. KOMATSU*, Y. YAMAZAKI, S. YAMAGUCHI and M. CHIBA (Tsurumi University School of Dental Medicine, Yokohama, Japan).
The aim of this study was to compare the shear stress-strain relationships in the incisor periodontal ligament (PDL) between different regions of the tooth and between teeth from different species. Ten animals of four species (mice, hamsters, rats and rabbits) were used. The animals were 10 to 17 weeks old. From the dissected mandible, transverse sections (ca. 0.65 mm in thickness) were cut at the incisal, middle and basal regions of the incisor. The tooth was pushed out of the alveolar bone in an eruptive direction at 5 mm/min using a tensiometer. The maximum shear stress, maximum shear strain, tangent modulus and failure strain energy density were estimated from the resulting stress-strain curves. All species showed stress-strain relationships that varied between tooth regions. The largest maximum shear stresses occurred at the incisal regions (p<0.001). Differences between species were also found, particularly in the incisal region where the greatest maximum stress and failure strain energy density were in the hamster (p<0.001) and the greatest tangent modulus was in the mouse (p<0.001). Corresponding areas in the rat and rabbit showed results that were similar to each other. These results suggest that the mechanical properties of the PDL are dependent on the developmental stage of the PDL in a continuously growing tooth and that the structure and/or constitution of the PDL varies between different species.

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383 Prevalence of Dentine Hypersensitivity in Referred Periodontal Patients. D.G. GILLAM*, M.B. CHABANSKI, J.S. BULMAN & H.N. NEWMAN (Eastman Dental Institute, University of London, UK).
Detailed epidemiological data on the prevalence of dentine hypersensitivity in different populations, particularly in terms of causal factors in its aetiology, are sparse. Previously published data on the prevalence of this condition varies depending on the population studied and the methods used in data collection. Few studies, with the possible exception of Collaert & Speelman (*Rev Belge Med Dent* 46: 63-73, 1991), have looked specifically at this problem in periodontal patients. The aim of this investigation, therefore was to determine, by questionnaire the prevalence of dentine hypersensitivity in a selected population of patients referred to a specialist hospital for diagnosis and treatment. Completed questionnaires from 507 patients (181 M; 326 F, Mean Age 44.2 years [SD 10.31]) were collected. Analysis of the results was by frequency distribution and cross tabulation. The prevalence of patients' self-reported discomfort from dentine hypersensitivity was higher (86%) than previously reported by Collaert & Speelman (46%). 71.5% of patients perceived cold as the most common cause of discomfort which was in agreement with other studies. A higher prevalence of self-reported discomfort from dentine hypersensitivity was observed between 40 and 49 years, which may be a reflection of the population studied. Of the patients with a reported history of periodontal surgery (34.7%), those treated within six months prior to assessment appeared to be more at risk from dentine hypersensitivity than at any other time point. Of the patients who received hygienist therapy (88.2%), only 10.5% reported discomfort persisting ≥3 days after treatment. 84.5% of patients who complained of varying degrees of discomfort over time did not perceive the condition as severe and consequently did not seek treatment. The results of this investigation indicated that self-reporting of dentine hypersensitivity in patients referred to a periodontology department was higher than previously reported in other populations, suggesting that periodontal diseases and/or treatment may play a role in the aetiology of this condition.

384 Demand and Supply for Periodontal disease, in Japanese Dentistry N. MATSUZAKI* and M. KAMBARA (Dept. Preventive Dentistry, Osaka Dental Univ., Osaka, Japan)
The demand and supply in Japanese dentistry and the factors that influence these for periodontal disease were investigated to obtain the basic data about the optimal number of dentists needed in the future. The demand in periodontal disease was determined from the results of CPITN for the dental examinations in 25 companies. The supply was investigated by examining the dental clinical records in six private dental clinics in Osaka. Based on our findings we found that 15.53% of patients have received instructions in dental care. For scaling the figure is 40.03%, 108.16% for pocket curettage or flap operation and 41.37% for total periodontal treatments. To investigate the factors that influence the demand and supply for periodontal disease, the results of 77 companies located in western Japan were analyzed. The prevalence of periodontal disease was shown to have differences depending on geographic area by canonical correlation analysis. From logistic regression analysis, it was found that the rate of supply for demand had a significant correlation with the number of dentists. In order to meet the demand for the treatment and prevention of periodontal disease our results suggest that there is a need to increase the number of dentists able to meet those demands.

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