Poster Session Abstracts: General Session

The Oral Mucosa as an Immunologic Organ

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The oral mucosa is colonized by commensal and pathogenic flora whose mass and diversity rival the lower bowel, yet surprisingly little is known of how immune homeostasis is regulated (or dysregulated) within, despite mounting evidence for systemic effects of oral mucosal diseases such as periodontitis (PD). Dendritic cells (DCs) are unique for their innate ability to initiate and regulate the adaptive immune response. The role of DCs in immune regulation within the oral mucosa, however, has received scant attention. The objectives of the present study were to: 1) establish *in situ* the involvement of Langerhans' cells (LCs) and mature DCs (DCmat), relative to other myeloid/lymphoid subsets within distinct tissue compartments of the human gingival mucosa in health, gingivitis and PD; 2) to determine the cytokine changes in the mucosal milieu (GCF) in vivo that might influence DC maturation and immune regulation *in situ*; 3) to determine in vitro if *P. gingivalis* (*Pg*) and its LPS induce human DCs to undergo maturation, release Th-biasing cytokines, and stimulate T cell expansion. Our results indicate that DCmat specifically infiltrate the CD4+ activated T cell-rich lamina propria, forming oral lymphoid follicles (OLF). Moreover, the cytokines released in active PD are consistent with *in situ* maturation of DCs within OLF, and T cell activation/proliferation. In vitro, *Pg*-pulsed DCs (*Pg*-pDCs) undergo maturation and release IL-10 and IL-12; moreover, *Pg*-pDCs induce CD4+ autologous T cells to proliferate and secrete IFN-γ, but at a significantly (*P* <0.05) lower level than *E. coli*-pulsed DCs. In conclusion, these studies support the development of organized lymphoid follicles in PD, composed predominantly of mature DCs engaged with activated T cells within the gingival mucosa. The systemic influence of this oral immunologic organ is presently under investigation. **Acknowledgment:** Supported by NIDCR grants DE14160 and DE13154.

Periodontal Radiography and Tooth Loss in Systemic Compromised Thai Elderly

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Periodontal diseases have been reported in association with systemic diseases. The aim of this study was to examine a group of Thai elderly to determine the association of radiographic periodontal findings and tooth loss with diabetes and high cholesterol. One-hundred and ninety-eight dentate subjects (ages 51 to 84 years) participated in the study. Periodontal examinations, panoramic radiography, questionnaires, and peripheral blood drawn for fasting blood sugar (FBS) and cholesterol tests were conducted. The subjects were divided into subgroups according to the result of blood laboratory tests. There were: diabetes (DM), non-diabetes (non-DM), high cholesterol (h-Chol), normal cholesterol (n-Chol), diabetes and high cholesterol (DM+h-Chol), and non-diabetes and normal cholesterol (non-DM+n-Chol) subgroups. Horizontal and vertical alveolar bone loss in the posterior teeth were found 99.3% and 0.7% of the sites respectively. It was slight in 63.2%, moderate in 29.9%, and advanced in 7.3% of these sites. Mean tooth loss was 10 teeth per person. There was no difference in extent or severity of the alveolar bone loss in the posterior teeth and the number of teeth lost between DM and non-DM, h-Chol and n-Chol, or DM+h-Chol, and non-DM+n-Chol subgroups. The number of teeth lost was moderately correlated with severity and extent of alveolar bone loss in the posterior teeth in DM subgroup (r = 0.4, *P* <0.05) and weakly correlated in n-Chol subgroups (r = 0.02, *P* <0.05). It may be concluded that there is a possibility that diabetes might have an influence on the number of teeth lost in relation to severity and extent of periodontal disease in this group of elderly. Even though an increased bone loss in advancing age is the cumulative effect of lifetime periodontal disease experience, radiography and the number of teeth lost as a part of the oral examination may have some value in dental professional awareness of some systemic disease in the elderly. **Acknowledgment:** Supported by Mahidol University, Bangkok, Thailand.

Systemic Health Status of Ambulatory Patients in an Urban Private Periodontal Practice

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More and more patients presenting to periodontal practices are believed to be in poorer systemic health. However, the health status of such patients has not been carefully studied. This pilot study has surveyed 565 consecutive patients evaluated by 3 periodontists in an urban private periodontal practice from October 1999 to December 2000. The objective of the project was to elicit prevalence of various health conditions on the population being studied. Data were gathered retrospectively from review of dental charts. Patients filled out a health history questionnaires upon registration to the practice, which were reviewed by 3 periodontists through personal interviews during the consultation visit. Resting blood pressure was taken with an electronic blood pressure monitor during the visit and noted for each patient. Ninety-four percent (531 subjects) were referred to the prac-

tice by other dental professionals for periodontal assessment and treatment. The other 6% (34 subjects) were referred in by other patients or were self-referred. Two-hundred sixty-eight (47.4%) females and 297 males (52.6%) were included in the study. Mean age of subjects was 45.7 years (s.d. 13.4) and ranged from 8 to 89. Sixty-two percent (62.3%, 352 subjects) were Caucasians, 24.4% (139) were of Hispanic origin, and 11.9% (67 subjects) were of Asian ethnicity. There were 6 (1.1%) African, and 1 Indian American (0.2%). Sixteen of the subjects (2.8%) were considered free of periodontitis, but presented with mucogingival defects, gingivitis, and/or for pre-orthodontic evaluation. Thirty-seven (6.5%) were classified as early chronic periodontitis, 275 subjects (48.7%) were "moderate." and 237 subjects (41.9%) were classified as "advanced." One-third of the subjects (188) were taking one or more medications (a total of 323 medications) on a routine basis. The most common medication being taken was for hormone replacement therapy (n = 27; 9.1% of females). Twenty subjects were taking antihypertensive drugs. One-hundred-five subjects (18.6%) reported allergic reaction to at least one known medication (total of 142 medications). Forty-nine subjects (8.7%) reported having positive allergic reactions to penicillin. Of the health conditions listed, sinus trouble was the most common (17.0%), followed by allergies other than to medications (16.6%) such as pollens, dust, certain metals, or latex. Latex sensitivity was reported by one subject. Hypertension was self-reported in 89 subjects (15.8%). However, 38 subjects had measured 90 mm/Hg or higher in resting diastolic blood pressure (DBP). A further 69 subjects had systolic pressure of at least 140 mm/Hg. Combining the two, 107 subjects (18.9%) were hypertensive according to definitions set forth by Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (1988). These data are favorable when compared to national data of 23.1% in 20 to 74 year olds (Health, United States, CDC 2000). Diabetes mellitus (DM) was reported by 40 subjects (7.1%). A cross-tabulation analysis revealed that 100% of the DM subjects fell into "moderate" and "advanced" periodontitis categories. Arthritis and rheumatism was also a frequent finding (9.9%), as were gastric ulcers (4.8%), and chest pain (4.6%). Heart murmur was reported by 26 subjects (4.6%). Hepatitis and yellow jaundice was reported by 15 (2.7%), and 10 (1.8%) subjects, respectively. Chemotherapy and radiation therapy were reported each by 5 subjects (0.9%) each. A positive history of HIV was reported by just one subject. This pilot survey presents interesting cross-sectional data from periodontal patients in an urban area. The relationship between systemic health conditions and periodontal disease status may be further studied from a large sample size, of which this on-going project is aiming to gather.

Inadequate Adjustment for Smoking in Periodontitis-Systemic Disease Associations

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Objective: Cigarette smoking is a potent risk factor that periodontitis shares with many systemic diseases. Inaccurate or incomplete adjustment for cigarette use can lead to spurious associations between periodontitis and smoking-related systemic diseases. The goal of this study was to evaluate the potential biases caused by inaccuracies in self-reported smoking on the periodontal-systemic disease association. **Methods:** Computer simulations were used to generate 1,000 datasets containing observations on self-reported cigarettes smoked per day, attachment loss, and serum cotinine (a biomarker indicting extent of current tobacco exposure). The distribution of these interrelated variables was specified to mimic that of a cohort of 29 currently-smoking subjects presented in an earlier study. A variable indicating times until incident systemic-disease was also generated. These times were specified to be dependent solely upon level of serum cotinine and independent of attachment loss. Cox proportional-hazard models were computed to relate the risk of incident disease to attachment loss and the 2 different smoking measures. **Results:** As expected, in the simulated data, the Cox models found no periodontitis-systemic disease relationship when the analyses were adjusted for serum-cotinine levels (false-positive rate, <0.05). When analyses were instead adjusted for self-reported cigarettes per day, a proxy measure of serum-cotinine levels, statistically significant ($P<0.05$) false-positive associations were presents 75% of the time. These false-positive results occurred because self-reported cigarette use did not capture the effect of smoking on attachment loss as precisely as did serum-cotinine levels. **Conclusions:** These findings illustrate that adjustment for self-reported smoking may not be adequate to remove the confounding effects of actual cigarette usage and may lead to false-positive results associating periodontitis with smoking-related systemic diseases. **Acknowledgment:** This study is supported by NIH/NIDCR grants P30 DE09743, and R03-DE13861.

Concurrence of Periodontitis and Cancer

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Objectives: Periodontitis, an infectious disease, has been associated with overall mortality, cardiovascular disease, low birth weight, and pulmonary diseases. The goal of this study was to further investigate the possible non-specificity of the periodontitis-systemic disease relationships by assessing the association of periodontitis and cancer. **Methods:** Data were obtained from the First National Health and Nutrition Examination Survey (1971-1975) Epidemiologic Follow-Up Study conducted in 1982-1984, 1986, 1987, and 1992. In this

prospective cohort study of 11,328 adults, age 25 to 74 years who had a dental exam at the beginning of follow-up. The main outcome measure was fatal cancer, as ascertained from death certificates. Using the detailed smoking questionnaire from 1982, the average number of cigarettes smoked each day and the number of years smoked were estimated. An individual who reported ever smoking a pipe or cigar was classified as such and persons reporting marriage to a smoker were identified as passive smokers. **Results:** The occurrence of fatal cancer was positively associated with periodontitis at baseline (age and gender adjusted odds ratio = 1.55, 95% confidence interval: 1.25 to 1.92). The corresponding odds ratio for lung cancer was 1.94 (1.16 to 3.26). After adjustment for socio-economic factors, duration of cigarette smoking, average number of cigarettes smoked per day, cigar and pipe smoking, passive smoking, and consumption of vitamin A and C and alcohol, the presence of periodontitis was associated with a 1.73-fold increased rate of lung cancer (95% confidence interval: 1.01 to 2.97). **Conclusions:** Periodontitis is associated with lung cancer mortality above and beyond adjustment for known risk factors for lung cancer. The multiplicity of the associations between periodontitis and various diseases argues that some or all of the periodontitis-cancer concurrence is due to confounding.