

**3409** Bacterial Colonisation / Survival Rate of / on Toothbrushes. M. QUIRYNEN\*, M. DE SOETE, M. PAUWELS, K. GOOSSENS, W. TEUGHEL, J. VAN ELDERE, D. van STEENBERGHE. (Cathol. Univ. of Leuven, Leuven, Belgium).

Previous studies indicated that oral hygiene aids could be responsible for intra-oral bacterial translocation. This study investigated the adherence and the survival rate of cariogenic and periodontopathogenic species on toothbrushes. Patients (n=6) with advanced periodontitis had 2 quadrants professionally brushed without toothpaste and the 2 remaining quadrants with (Sensodyne Previon F<sup>®</sup>). All 12 brushes were rinsed with tap water and then kept dry at room temperature. After 0, 4, 8, 16, 24 and 48 hours, 4 tufts were removed from each brush and suspended in RTF for vitality staining and culturing procedures (selective and non-selective media). A toothbrush without toothpaste harboured  $4.5 \times 10^7$ ,  $1.2 \times 10^8$  and  $7.5 \times 10^8$  colony forming units (C.F.U.) of respectively aerobic, anaerobic and black pigmented species immediately after rinsing. An insignificant decrease of 1 log (p>0.05) occurred the first 24 hours, leaving more than  $10^4$  C.F.U. of aerobic and anaerobic species on the toothbrush up to 48 hours. *Streptococcus mutans* decreased from  $1.7 \times 10^7$  to  $4.8 \times 10^3$  C.F.U. after 48 hours. From the  $10^4$  C.F.U. of periodontopathogens at 0 hours, none was detectable after 8 hours, except for *Fusobacterium nucleatum* with still  $2.1 \times 10^4$  C.F.U. after 48 hours. In the presence of a toothpaste, the number of adhering bacteria was already significantly lower immediately after rinsing ( $\pm 2$  log, p<0.05), followed by another 2 log decrease at 4 hours and 1 log at 8 hours of dry storing. None of the cariogenic or periodontopathogenic species could be cultured after 4 hours. The percentage of vital bacteria decreased in 48 hours from  $\pm 50\%$  to  $\pm 30\%$ , independent of the presence of a toothpaste. Comparable results were observed for interdental brushes. The use of a toothpaste significantly decreases the number / the survival rate of pathogenic species on a toothbrush and thereby the risk for bacterial translocation.

**3410** Transmission of Oral Microorganisms Adhering to Periodontal Probes - an In-Vitro Model. A. CALLAWAY\*, C. GLEISSNER, U. ZIMMERMANN, B. WILBERS-HAUSEN, E. STENDER. (Johannes Gutenberg-University, Mainz, Germany).

Transmission of oral microorganisms adhering to dental instruments like periodontal probes, has been previously shown. This way deep, but healing pockets could be reinfected after treatment by a periodontal probe contaminated with periodontopathogens from a different site in the patient's mouth. The aim of this in vitro study was to determine the frequency of transmission, the number of adhering bacteria, and the possible reduction of their numbers by disinfecting probes between pockets. Two periodontal probes (Plast-o-Probe, Maillefer, Ballaigues, Switzerland, and PCP12, Hu-Friedy, Leimen, Germany), 3 putative periodontopathogens (*A. actinomycetemcomitans* V4, *P. micros* 33270, *P. loeschii* PK1295), and *S. mutans* 10449 as strongly adherent control organism, were included in this study. The bacteria were plated on suitable nutrient agar and grown anaerobically. To measure frequency of transmission, the probe was inserted into a colony for 3s, removed and either inserted directly into field one of a fresh agar plate, divided into 47 fields, or, to measure the effect of Meridol, chlorhexidine, vegetable oil, and 70% ethanol, dipped into one of the fluids and blown dry before it was inserted. The probe was removed from field one, and repeatedly inserted till the last field was inoculated. To determine the number of bacteria capable of multiplying (CFUs) the probe was inserted into a colony, the adhering cells were removed and serial dilutions were plated on nutrient agar. All tested bacteria adhered to both probes;  $1.22-1.95 \times 10^6$  CFUs/ml, Plast-o-Probe, and  $0.86-11.2 \times 10^5$  CFUs/ml, PCP12, were found, and transmission frequency was high. Only 70% ethanol was effective in killing most bacteria, but 60-390 CFUs could be found for *P. loeschii*. This in vitro study suggests that if periodontal probes are not disinfected between measurements, periodontopathogens can be transmitted and healing sites might be reinfected.

**3411** Particulate Aerosolization During the Drilling of Amalgam Restorations and Teeth. E. C. KAO\*, P. C. YUE and B. T. CHEN (West Virginia University, Dept. of Energy, NIOSH, Morgantown, West Virginia, USA).

A potential hazard of particulate inhalation by patients and health workers is associated with removal of amalgam restorations and excavation of carious teeth. The objectives of this study was to determine the mass of aerodynamically respirable particles collected during high-speed drilling under two conditions: dry cut and wet cut (with water spray and suction), and the distances of aerosol dispersion from the source. The drilling was performed in an operatory measuring 3.9x3.3x2.4m with an airflow of 5810L/min. Extracted teeth and those with amalgam restorations were placed in a mannequin tyodont. Aerosol containing amalgam or teeth particles were created by drilling with cross-cut carbide burs for 30 minutes. Multiple survey (n=3) of particulate exposures were evaluated at simulated breathing zones of patient, dentist, dental assistant and at various locations in the operatory, using personal air samplers (IOM) and aerodynamic particle sizing Marple cascade impactors. The distances for sampler placement ranged from 0.24m-2.3m from the source of aerosol. For dry cut, total mass of amalgam particulate recovered from IOM's ranged from 2-30mg/m<sup>3</sup> and that of teeth particulate ranged from 3-8.7mg/m<sup>3</sup>. They were significantly higher than wet cut which ranged from 0.9-11mg/m<sup>3</sup> for amalgam and 0.8-7mg/m<sup>3</sup> for teeth (p<0.05). The particulate recovery generally decreased with increasing distance for both materials. The dentist and assistant were exposed to moderate amount of aerosols while the patient exposure was the highest. 36% of teeth particulates and 41% of amalgam particulates recovered from the cascade impactors were found to be in respirable range of 0.5-5um in size. The use of efficient water spray and suction and the use of protective barriers for all dental personnel and patient are important to reduce the exposure to amalgam and teeth aerosols during dental drilling. (This study was supported by ADAHF grant).

**3412** Postexposure Prophylaxis (PEP) Among Dental Workers after Occupational HIV Exposures. J. CLEVELAND\*, L. BARKER, S. CAMPBELL, D. CARDO and the National Surveillance System for Hospital Health Care Workers (NASH) Group. (Centers for Disease Control and Prevention, Atlanta GA).

In June 1996, the U.S. Public Health Service (USPHS) published recommendations for PEP after certain occupational exposures to human immunodeficiency virus (HIV). To evaluate the use of HIV PEP among hospital-based dental workers (DWs), data on exposures to blood reported at 23 hospitals participating in NaSH were analyzed. Factors associated with increased risk of transmission, such as depth of the injury and visible blood on the device, also were evaluated. During June 1995-July 1999, 68 exposures were reported among 400 DWs (67 percutaneous injuries (PIs); 1 mucous membrane). Of 62 known source patients, 11 (18%) were HIV+, 41 (66%) were HIV-, and 10 (16%) had unknown HIV status. PEP was offered to 27/59 (46%) DWs: 7/7 exposed to a source known to be HIV+ at the time of exposure; 1/2 exposed to a source known to be HIV- at the time of exposure; and 19/50 with unknown source or source whose HIV status was unknown at the time of exposure. Seventeen of 27 DWs (63%) initiated PEP. All DWs who initiated PEP and subsequently found the source patients to be HIV- (n=5) discontinued PEP. Twenty-six DWs with a PI were offered PEP: 13 (50%) were injured with visibly bloody devices and 19 (73%) had injuries of moderate depth. Thirty-two DWs with a PI were not offered PEP: 17 (53%) were injured with visibly bloody devices and 26 (82%) had injuries of moderate depth. Seventy-five percent (6/8) of DWs with PIs caused by surface needles were offered PEP compared to 42% (8/19) of DWs injured by hollow-bore syringe needles. Among these hospital DWs, the use of PEP based on the serostatus of the source patient appeared consistent with USPHS guidelines; however, the use of PEP based on other factors associated with increased risk of transmission was variable.

**3413** High Risk of Helicobacter Pylori (HP) Infection in the Dental Staffs K. HIROYASU\*, T. KUWAHARA, A. YAMAGUCHI, K. SHIBASAKI (The Nippon Dental University, School of Dentistry at Niigata, Japan)

Though 15 years passed from discovery of HP, infection time and route of HP is still unknown. The evidences on high infectiousness in medical staffs have been reported. In this study, by measuring serum anti-H.pylori-IgG antibody (HP-IgG), the prevalence of HP infection in the dental staffs was investigated. 183 dentists (males 144 and females 39; 24-70 year-old, and average 38.3), 38 dental hygienists (21-42 year-old, and average 28.3), and 82 dental hygienist apprentices (19-20 year-old, and average 19.1) who worked in our university hospital were enrolled in this study. On the dentists and dental hygienists, the blood was collected in one point, and the positive rate of HP-IgG was examined. In the meanwhile, on the dental hygienist apprentices, the blood was collected before and after practical training, and HP-IgG-IgA were measured. Each positive rate and rate of infection/year were examined. HP-IgG-IgA were measured by the enzyme immunoassay (EIA), respectively. The positive rate of serum HP-IgG in the dentists was 52.6% in 20-s, 61.5% in 30-s, 80.0% in 40-s, 100% in 50-s, and in the dental hygienists was 28.6% in 20-s, 57.1% in 30-s and 100% in 40-s. Before practical training of the dental hygienist apprentices, the positive rates of serum HP-IgG-IgA were respectively 25.6% (21 cases), 47.6% (39 cases), and after practical training, these were 36.6% (30 cases), 65.9% (54 cases), respectively. When rate of infection/year of HP in the dental hygienist apprentices was calculated from HP-IgG, it was 11.0 person-years %, and from HP-IgA, it was 18.3 person-years %. Conclusions: Though prevalence of HP infection in the dentists was obviously high in comparison with the general inhabitants of the same generation, in dental hygienists and apprentices, there were no significant differences. However, rates of infection/year of HP-IgG-IgA in the dental hygienist apprentices were higher than the results of reporting until now. These results showed the danger of HP infection in the dentistry, and sufficient countermeasure have to be taken in nearly future.

**3414** Systematic review of dental team's adherence to infection control guidelines. B. L. GORDON\*, F.J.T. BURKE, J. BAGG, H.S. MARLBOROUGH, E. S. McHUGH (University of Glasgow Dental Hospital and School, Scotland, UK).

This study integrated the extensive literature on dental infection control to determine the knowledge, attitudes and practising behaviour of the dental team, thereby assessing their adherence to infection control guidelines. Electronic databases were searched from 1980 to present, experts were contacted, reference lists scanned and key journals handsearched. The quality of studies was assessed in line with pre-specified criteria. Potential studies were limited to randomised controlled trials, controlled clinical trials, controlled before-and-after studies, interrupted time series studies, observational studies, surveys and reports of infection control procedure uptake, focusing on members of the dental team. Relevant outcome measures included use of protective wear, sterilisation procedures, hepatitis B vaccination, disinfection, and proxy measures of knowledge, attitudes and behaviour with regard to infection control. Studies were required to state the guideline being assessed or the standard practice identifiable as consistent with universal guidelines. Database searches uncovered 2,420 studies of which 1,985 were excluded on screening. Hard copies of 435 potentially valid studies were retrieved and 65 were identified as meeting the necessary criteria, but the heterogeneity of study design, targeted participants, sample size and outcome measures rendered quantitative analysis impossible. Qualitative synthesis revealed that much more rigorous methodology needs to be applied. The present dominance of self-report surveys introduces numerous biases and compromises any findings. Despite the weaknesses of these studies, the level of compliance with infection control recommendations appears less than ideal and the available data highlight key problem areas which need to be targeted. Supported by NHS R & D Grant RDO/90/91.

**3415** Doxycycline Hyclate Microspheres: Antibacterial/Antienzymatic Effect on *Prevotella Intermedia*. G.M. JORGE\*, N.J. GRIMAUDO (University of Florida, Department of Dental Biomaterials, Gainesville, Florida, USA).

Systemic administration of antibiotics for the treatment of periodontal disease can produce unwanted side effects, consequently a need exists to establish a drug delivery system for local therapeutic purposes. The objectives of this *in vitro* investigation were to prepare T35 microspheres with doxycycline hyclate (DH), test their antibacterial activity on *Prevotella intermedia* 17 (PI), and analyze their antienzymatic effect on collagenase. The preliminary step was loading 0.25g of microspheres using 0.8g of DH and 7.2g of methanol. To test the inhibition of bacterial growth, 120 petri dishes and 30 test tubes with various masses of DH microspheres (DHM) were prepared with a combination of 200µL of PI and 500µL of nutrient broth. Unloaded microspheres were used as a control group. Visual assessment, zone of inhibition (ZI), spectrophotometric analysis, and photographs were taken at different time intervals. Life span of 0.02g and 0.04g of DHM was studied using 6 custom made denture relines discs as a vehicle that were transferred daily to a petri dish containing 200µL of fresh PI. Collagenase inhibition assay was performed using a commercial fluorescence microplate kit to analyze the effects of 0.01g and 0.02g DHM. Successful loading of the microspheres with DH was evident by change in color and microscopic swelling. The ZI diameters ranged from 1.6cm to 5cm. Spectrophotometric results of 0.01 and 0.02g DHM at 72h was 0.1768 and -0.0868, respectively. Collagenase inhibition was equal to or higher than the positive control. Life span of the microspheres was observed to be 34d at 0.02g and 39d at 0.04g. The data from this study presents promising results for clinical applications. Supported by UFCD Student Summer Research Program, FSPF, Dental AG and NIH/NIDCR Grant DE09307.

**3416** Comparative study of clinical efficacy of clarithromycin versus a metronidazole-spiramycin association in buccal infections. A. DANIEL\*, J.P. CHAUVIN\*\* & G. POTELE\*\*\* (\*Dental Faculty, Nantes; \*\* Lab. Abbott France; \*\*\* Medicine Faculty, Nantes)

The aim of this study was to compare the clinical efficacy of clarithromycin (CL) versus a metronidazole spiramycin association (MS).

The study including 352 patients was multicentric (45 centers), randomised, with double-placebo and parallel groups. An equivalence test was evaluated for the main efficacy parameters.

The infections treated were acute cellulitis, periapical abscess, pericoronitis, suppurative alveolitis and endodontic infections. The posology was 2 x 250 mg per day during 5 days for the CL group and 2 x 2 tablets per day (750/500 IU spiramycin and 125 mg metronidazole for a tablet) during 5 days for the MS group.

The clinical efficacy is reported in the next Table (percentage of patients presenting an amelioration or a complete healing):

	CL	MS
Treatment intention	159/173 (91.9 %)	159/168 (94.6 %)
per-protocol	148/161 (91.9 %)	152/160 (95 %)

No difference concerning the tolerance has been noted.

In conclusion, the CL treatment and the MS treatment show the same clinical efficacy concerning the buccal infections needing an antibiotherapy.