P-40 Anti-adherence Properties of Aqueous Extracts of *Piper* sp. and *Psidium* sp. on Whole Plaque Bacteria. *FATHILAH, AR., OTHMAN, Y., YUSOFF, M. and RAHIM, ZHA. (University of Malaya, 50603 Kuala Lumpur)

Plaque is a major contributing factor in the initiation of caries and periodontal diseases only when it is thick and left uncleaned over a period of time. If the oral cavity is regularly cleaned and plaque layer is kept at its minimal thickness, plaque would not be of any risk to the host. Instead, it will act as a protective barrier against the colonization of potential pathogens to the tooth surface. In the early stage of plaque formation, bacteria colonise the tooth surface by selectively adhering to the salivary components found covering the tooth surface. The presence of these early colonizers plays a very important role as it provides additional adhesion of other bacteria taking part in the development of dental plaque. Aqueous extracts of two local plants (*Piper* sp. and *Psidium* sp.) have been shown to have growth inhibiting effect on isolated plaque bacteria. In this study, the influence of the extracts on the adhesion of plaque microorganisms on a glass surface was determined. The internal surfaces of a glass tube were coated with saliva to simulate the pellicle-coated enamel surface in the oral cavity. The tubes were then treated with the plant extracts prior to the addition of the plaque culture. The suspension was incubated at 37°C for 18-24 hours, followed by the reading of the optical absorbance at 550nm. The anti-adherence effect was determined by the difference in the binding capacity of the bacterial cells the saliva-coated glass surfaces without and with treatment. Response of the whole plaque microorganisms to chlorhexidine treated saliva-coated tubes acted as a positive control while untreated saliva-coated tube as a negative control. In addition, the effect of the extracts on the whole plaque microorganisms were also observed under the scanning electron microscope (SEM) Results obtained showed the aqueous extracts of *Piper* sp. and *Psidium* sp. inhibit the adherence of plaque microorganisms to the glass surfaces by 78% and 43% respectively. Ultrastructurally, as seen under SEM, both extracts were shown to aggregate the bacterial cells.

P-41 The Efficacy of an alcohol-free 0.12 % w/v Chlorhexidine Gluconate mouthwash (Oradex®)
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Chlorhexidine gluconate, a dicationic bisbiguanide agent, contains anti-plaque properties and has undergone thorough research in the past few decades. Most chlorhexidine gluconate mouthwashes presently available contain alcohol in varying concentrations. The role of alcohol in these mouthwashes is to act as a preservative and solvent although it may have deleterious effects on the oral epithelium on long term usage. Alcohol is also religiously unacceptable to some segments of the population. Recently, a locally produced alcohol-free 0.12% w/v chlorhexidine gluconate mouthwash (Oradex) has become available in Malaysia . This double-blind, crossover clinical study was aimed at testing the efficacy of this alcohol-free product compared to a placebo without the active ingredient chlorhexidine gluconate. A group of 60 carefully screened subjects were assigned into two groups of 30 each. The first group started using the test product for 2 weeks followed by a washout period of 4 weeks. After this period, this group used the placebo for 2 weeks. The 2nd group underwent similar protocol as the 1st except that this group started with the placebo. Baseline measurements consisting of the following scores: Plaque (Quigley-Hein with Turesky modification Index), Gingival (Loe & Silness Index), Papillary bleeding (Saxer & Muhlemann Index), Stain (Shaw & Murray Index) and Calculus (Volpe-Manhold Index) were recorded at baseline and after 2 weeks for each group. Full mouth prophylaxis was carried out for all subjects after baseline measurements. Each subject was provided with a standard toothbrush and toothpaste and instructed to continue with their routine, unsupervised oral hygiene. They were told to rinse with 15ml of the products twice daily for 30 seconds each. The results of the study indicated that there was significant improvement in the plaque (p<0.05), gingival (p<0.05) and papilla bleeding (p<0.05) scores compared to the placebo. Stain and calculus scores were significantly increased (p<0.05) for the test product when compared to the placebo, which was anticipated with this dicationic anti-plaque agent. The results of this study was comparable to several other studies on chlorhexidine gluconate mouthwashes of similar concentrations and containing alcohol . In conclusion, this clinical study showed that this alcohol-free 0.12 % w/v chlorhexidine gluconate mouthwash is effective in reducing plaque and gingivitis but causes staining and calculus formation .

P-42 Full-mouth disinfection versus one-stage mechanical debridement in the management of Adult Periodontitis – Microbiological morphotype monitoring.
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Full-mouth disinfection is a treatment approach which aims to eliminate / reduce periodontopathogens colonising other intra-oral niches in addition to those colonising periodontal pockets. The aim of this study was to determine the effects of a full-mouth disinfection approach using topical and locally delivered Chlorhexidine along with mechanical periodontal therapy on the subgingival microflora and to compare these with the effects of a one-stage mechanical debridement. 32 otherwise healthy, non-smoking adult periodontitis patients, aged 35 to 60 years (mean 46.2 ± 7.54), having at least 2 sites with probing pocket depth (PPD) ≥ 5mm in each quadrant, participated in the study. The subjects were randomly divided into two groups: test group (n=16) and control group (n=16). The test group received full-mouth disinfection. The control group underwent debridement of all teeth in a single visit and received repeated personal oral hygiene instructions, but without use of Chlorhexidine at any stage. Plaque samples were collected from the deepest pockets in each quadrant using sterile paper points at baseline, 1 month, 3 months and 6 months. These samples were silver-stained for microbiological analysis according to the method suggested by Coffey *et al.* (1995). Different microbial morphotypes were identified by light microscope at X 1000. Statistical analysis was performed by t-tests and by analysis of variance for repeated measures. In response to the treatments there were significant shifts in the subgingival microbiota from pathogenic to beneficial morphotypes in both groups. At 1-month, significant reductions in the proportions of spirochetes, from 52.7% to 9% (p<0.0001) in the test group and 53.7% to 15.2% (p<0.0001) in the control group, were observed. The proportions of spirochetes and curved rods was reduced further at 3 months but relapsed slightly by 6 months, however these proportions were still within "healthy" limits and statistically significantly reduced from baseline levels. A concurrent rise in the proportions of coccoid cells was noted which was also significantly different to baseline (p<0.0001). There were no significant differences between the two groups regarding the proportions of spirochetes or cocci at any time point of the study. This morphological monitoring of subgingival plaque samples demonstrated no benefit from the application of a full-mouth disinfection approach compared to a one-stage mechanical debridement of the teeth.

P-43 Polyphasic Characterization of *Mogibacterium* Species Isolated from Human Oral Cavities
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The aim of the study was to describe the characteristics of the recently proposed genus *Mogibacterium* by a polyphasic approach. Members of the genus are asaccharolytic, anaerobic, Gram-positive rods (AAGPR) primarily isolated from periodontal pocket, necrotic pulp and tongue plaque. There are five recognized species, namely, *M. pumilum, M. vescum, M. timidum* (basonym *Eubacterium timidum*), *M. diversum* and *M. neglectum*, which produced phenylacetate as a sole metabolic end product from PYG. They were culture-difficult and inert in most conventional biochemical tests. The protein profiles on SDS-PAGE and RFLP analysis of PCR-amplified 16S rDNA distinguished these organisms from the type strains of other bacterial species. DNA-DNA hybridization values between *Mogibacterium* species ranges from 17-97%. The 16S rRNA gene sequence analysis demonstrated that these isolates are genealogically highly related (<90% sequence similarities) but each represent novel lineages. Comparative 16S rRNA gene sequence analysis with related bacteria showed that there are nine regions in the sequence analysis of *M. pumilum* (type species of the genus *Mogibacterium*), which are species-specific and can, therefore, be used as specific primers for the detection of these bacterial species by PCR analysis. Supported by Grants from the Japanese Ministry of Education, Science, Sport and Culture (092205, 1167179 and JSPS P99174).

P-44 Full-mouth disinfection versus one-stage full-mouth mechanical debridement in the management of Adult Periodontitis – Clinical results.
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The novel idea of full-mouth disinfection, a full-mouth oriented approach in the treatment of periodontal infections, was suggested by Quirynen *et al.* in 1995. This treatment approach aims to eliminate / reduce the periodontopathogens colonising other intraoral niches in addition to those colonising periodontal pockets. Full-mouth disinfection comprises full-mouth mechanical debridement within 24 hours along with subgingival irrigation of Chlorhexidine gel, disinfection of the dorsum of the tongue and rinsing with Chlorhexidine mouthwash during the healing period. This randomised, single-blinded, controlled, parallel study was to determine whether full-mouth disinfection confers any additional benefit over a one-stage full-mouth mechanical debridement in the treatment of adult periodontitis. 32 otherwise healthy, non-smoking patients, aged 35 to 60 years (mean 46.2 ± 7.54) having at least 2 sites with probing pocket depth (PPD) ≥ 5mm in each quadrant, participated in the study. The subjects were randomly divided into two groups: test group (n=16) and control group (n=16). The test group received full-mouth disinfection. The control group underwent debridement of all teeth in a single visit, but without use of Chlorhexidine at any stage, and received repeated personal oral hygiene instructions. Clinical measurements including: plaque percentage (PI%), bleeding on probing percentage (BOP%), PPD and probing attachment level (PAL), using a Florida Probe®, were recorded at baseline, 1 month, 3 months and 6 months. Statistical analysis was performed by both paired and unpaired t-tests and analysis of variance (ANOVA) for repeated measures. There were significant reductions in the PI% (p<0.0001), BOP% (p<0.0001), mean PPD (p<0.0001) and mean PAL (p<0.05) for both groups compared to baseline at all post-treatment evaluations. The test group in comparison to the control group showed greater reductions in PI% (55% vs 26.3%, p<0.0001), BOP% (58.6% vs 44.5%, p<0.05) and mean PPD (0.85mm vs 0.65mm, p<0.05), at 1 month. However no significant differences were noted between test and control groups at either 3 months or 6 months. ANOVA for repeated measures revealed that there were significant differences between groups for the PI% and BOP%. This study indicates that full-mouth disinfection may confer some additional short-term clinical benefits over a one-stage mechanical debridement in the management of adult periodontitis.

P-45 *In vivo* investigation of the resonance frequency of natural tooth
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Periodontal Probe and radiographic examination are commonly used in the diagnosis and detection of periodontal disease. Unfortunately, these methods can not provide precise quantity data, which can lead to misinterpretation. The purpose of this study is to evaluate the possibility of using a new method to examine the attachment loss of periodontal tissue in terms of natural frequency. Central incisor, canine, first premolar and first molar were chosen to test *in vivo*. Modal testing method was carried out to evaluate periodontal disease and verified with the conventional method of attachment loss measurements. The current experiment implies that there is no obvious difference of the natural frequency of upper, lower, left and right teeth, but instead, it shows a difference in natural frequency between the anatomical structure of teeth in periodontal disease. Our results demonstrated that the mean value of the frequency is 1.26±0.1 kHz while the periodontium was deseased. which was significantly lower (P<0.01) than the teeth with healthy periodontium (1.34±0.18 kHz). On the other hand. the mean for diseased posterior teeth is at 1.22± 0.13 as compared to healthy posterior teeth at 1.27±0.18 (P<0.05). The result of the experiment implies that the use of natural frequency analysis is an effective way of determining the periodontal condition of teeth. Moreover, it can offer a fixed quantity, non-invasive, non-destructive and minimum contact method for early testing and prevention of periodontal disease.

P-46 Vibration assessment of the periodontal conditions by finite element method
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The aim of this study was to develop a new non-destructive, less time-consuming and more reliable method for detecting the attachment level around teeth. Natural frequency analysis was evaluated to achieve these goals. A 3-D finite element model of upper central incisor was carried out to simulate the periodontal disease as well as the alveolar bone quality in clinical oral practice. A 3-dimensional finite element model was established. This model consisted of enamel, dentin, pulp, periodontal ligament and alveolar bone. To simulate periodontal attachment loss, alveolar bone was lowered apical from C.E.J. in 1 mm steps down up to 10mm. The bone quality was decreased from 100% to 10% .The natural frequencies of the model were calculated under the various boundary conditions. The natural frequency of upper central incisor with healthy attachment and bone level was 4700 Hz. Our results showed that natural frequency decreased significantly with lowering the attachment level. On the other hand, the bone density also affected the tooth's natural frequency. Similar results demonstrated that the frequencies also decreased linear with bone density. Our results suggested that natural frequency is an important parameter for assessing the periodontal conditions . The results obtained by this study may become a useful reference for future clinical investigations.

P-47 Efficacy of A Toothpaste Containing Sodium Chloride, Triclosan and Fluoride.
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Toothpaste is probably the best vehicle to carry anti-plaque, anti-caries and anti-calculus agents like triclosan, fluoride and sodium pyrophosphate respectively. Recently a toothpaste (*Hydent Salt*®) was produced locally incorporating a combination of sodium chloride, triclosan and fluoride. The effects of triclosan and fluoride are well documented, but literature on sodium chloride in toothpaste are few although it is known to promote healing and to exhibit some antibacterial properties. The aim of this double-blind parallel study was to evaluate the efficacy of this product on plaque, gingivitis, calculus and extrinsic dental stain. A group of 90 carefully screened subjects were randomly divided into 3 groups of 30 each. One group (group T) used test product, another group (placebo group P) used a placebo toothpaste (without sodium chloride, Triclosan and fluoride) and the third group (group C) used a negative control toothpaste (without sodium chloride but containing Triclosan and fluoride) for a period of 12 weeks. Baseline measurements consisting of plaque (Quigley-Hein with Turesky modification Index), gingival bleeding (Loe & Silness Index), papillary bleeding (Saxer & Muhlemann Index), stain (Shaw & Murray Index) and calculus (Volpe-Manhold Index) scores were taken. Full mouth scaling and polishing was done for all subjects after baseline measurements, followed by oral hygiene instruction. A standard toothbrush was provided for all groups in this study. All subjects were reviewed every 4 weeks and the scores were charted at every visit. The results of this study indicated that the test product produced significant reduction of plaque accumulation, gingival bleeding, papillary bleeding and calculus formation after 12 weeks relative to the placebo (p<0.05). The test product also showed some reduction in gingival bleeding relative to negative control (p>0.05). In conclusion, the study showed that the test product was effective in reducing plaque accumulation, gingival bleeding, papillary bleeding and calculus formation. The sodium chloride incorporated in the toothpaste may have contributed to the efficacy