

Abstracts from the

7th Student Scientific Conference 2009

22nd October 2009, Universiti Sains Malaysia, Health Campus, Kelantan, Malaysia.

The performance of light curing units at Klinik Pergigian Hospital Universiti Sains Malaysia (KPHUSM) and Pusat Pengajian Sains Pergigian (PPSG), Universiti Sains Malaysia

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Light intensity output is one of the determinants for adequate curing of visible light-cured materials. The aim of this survey was to evaluate the performance of light curing units (LCUs) in PPSG and KPHUSM. All functioning light curing units were numbered and tested by using light radiocurimeter to determine the respective light intensity output. For cordless light-emitting-diode (LED) LCUs, testing procedure was done in two stages; *in situ* and after the units were fully charged. Other units were tested once only. The intensity value for each unit was read 5 times and averaged. Data for statistical analysis was assessed by using SPSS version 12.0. Out of all the units tested, 42% (31/73), 92% (23/25) and 73% (8/11) of cable LED, cordless LED and quartz-tungsten-halogen (QTH) LCUs respectively recorded acceptable light intensity output as measured by radiocurimeter. Independent *t*-test showed that there was statistically significant different of mean intensity output of cordless LED LCUs between *in situ* and post charged readings. The results indicate that less than half of cable LED LCUs was within acceptable range of light intensity output. However, for cordless LED LCUs and QTH LCUs, over ninety percent and seventy percent of the units respectively performed satisfactorily with radiocurimeter. In general, cordless light curing units performed better in term of light intensity output than cabled units. The average readings of *in situ* and post charged cordless LED LCUs were not significantly different. Periodic testing of LCUs is essential in ensuring optimal performance.

A comparison between dry and wet processes of nanosilica using ball mill

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Fabrication of superior dental nanocomposite requires a good processing method of the filler-matrix. One of the important components of dental nanocomposite is nanosilica, which serves as the filler. Good processing of nanosilica undoubtedly plays imperative role in enhancing and improving the properties of dental nanocomposite. The aim of this study is to compare two different conditions in processing nanosilica by using ball mill. A quantity of 2 g fumed nanosilica powder was loaded into a grinding jar which was previously charged with alumina balls, was rotated on a mill roller, under wet and dry conditions for 1-7 hours at 35 rpm, respectively. Each processed fumed nanosilica powder was characterized by measuring tapping density and SEM analysis. The results showed that wet process gained greater tapping densities compared to the dry process. These results were further supported by the SEM analysis, showing that wet process nanosilica consists of greater particle size distribution with narrower interparticulate distance distribution, compared to the dry process. In conclusion, wet process of nanosilica powder can be expected to produce dental nanocomposite of superior qualities.

The efficacy of *Salvadora persica* in antiplaque

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Salvadora persica is a traditional chewing stick that be used for tooth cleansing. It has beneficial effects in antiplaque and antimicrobial properties. The objectives of this study were to assess the efficacy of *Salvadora persica* in antiplaque and to compare the efficacy of *Salvadora persica* used in different forms of teeth cleaning on plaque removal; electric toothbrush modified with miswak, electric toothbrush with miswak toothpaste and miswak chewing stick with electric toothbrush with toothpaste as positive control and saline as negative control. This is a randomized clinical trial study with cross over design. 14 caries free participants who volunteered to abstain for 12 hours from all oral hygiene procedures prior to the test were enrolled in this study. Plaque accumulation was measured using the Turesky modification of the Quigley & Hein Index before brushing (t_1), after brushing (t_2) and one hour after brushing (t_3). All participants had undergone all 5 interventions in 5 visits with 3

Note: Underlined names indicate presenting authors.

days of washout period. The study showed that in all interventions, there was a significant difference of plaque changes after teeth cleaning and one hour after teeth cleaning. However there was no significant difference between the 5 groups. We concluded that the *Salvadora persica* has antiplaque effect for short period and uses of *Salvadora persica* in different forms of teeth cleaning give similar level of plaque removal in caries free profiles.

Remineralization of artificial dentinal lesions by CPP-ACP and topical fluoride: An *in vitro* study

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The potential for remineralization of dentinal lesion will have significant clinical implications. The aim of this study was to determine *in vitro* the effect of topical fluoride, CPP-ACP or both on remineralization of artificial caries-like lesions formed on human dentine surfaces by using Vickers microhardness test. Ten permanent intact human third molars were sectioned sagittally and transversely to produce four tooth specimens per tooth. All tooth specimens were coated with nail varnish leaving an exposed window on dentine measuring 6mm x 6mm. Each sample was then subjected to demineralizing solution for four hours followed by treatment with topical fluoride, CPP-ACP or combined treatment of topical fluoride and CPP-ACP also for four hours. All samples were then subjected to Vickers hardness test. The difference in Vickers hardness at baseline and post remineralization among the tested groups was analyzed by using one-way ANOVA. Topical fluoride, CPP-ACP and combined treatment of topical fluoride and CPP-ACP significantly increased the Vickers hardness of remineralized dentinal lesions ($p < 0.05$). There were no significant differences in Vickers hardness post remineralization with different remineralizing agents ($p > 0.05$). The results of this *in vitro* study confirmed the remineralizing effects of topical fluoride, CPP-ACP and combined treatment of CPP-ACP and topical fluoride on artificial dentinal lesion. However, the effects of different remineralizing agents were not statistically significant different.

Oral care attitudes and practices of intensive care nurses in Hospital Universiti Sains Malaysia

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Maintaining a healthy oral environment in critically ill patient has been recognized as a

difficult and challenging issue for nursing staff working in ICU setting. The purpose of this study was to determine oral care attitudes and practices among intensive care unit nurses in Hospital Universiti Sains Malaysia (HUSM). This was a cross sectional study on 108 nurses in General ICU, Cardiac Care Unit (CCU) and High Dependency Ward (HDW). A self-administered questionnaire was used in this study. A total of 93 nurses completed the questionnaire making a response rate of 86.1%. The majority of respondents (81.7%) strongly agree that oral care should be given a very high priority. However, 40.8% nurses claimed that oral cavity is difficult to clean and 16.2% expressed that cleaning oral cavity is an unpleasant task. Methods of oral care practiced in both intubated and non intubated patients include cotton swab, suction tooth brush, manual toothbrush, mouth wash, tongue cleaner and oropharyngeal suction. None of the nurses used electrical tooth brush on their patients. A variety of products and solutions were used as oral hygiene aids. Petroleum jelly was most commonly used moisturizer (88.2%) while benzydamine-contained chlorohexidine solution (Diffiam-C®) was the most commonly used solution either as mouthwash or swab solution. In conclusion, the ICU nurses in HUSM have good attitudes towards patient oral care and most oral care practices were appropriate based on the available current evidence.

Salivary characteristics and dental caries of the children with hearing impairment

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A cross sectional study was done to determine caries prevalence and experience as well as its association with salivary characteristics among children with hearing impairment at *Sekolah Pendidikan Khas Lati*, Pasir Mas, Kelantan. Sixty-three children aged between 7 to 14 years old were randomly selected. Socio demographic data was obtained and salivary parameters were measured for resting flow rate and resting pH using Saliva-Check BUFFER®. Oral examination was done using disposable probe and mouth mirror. Caries experience was recorded as DMF(T) for permanent dentition and dft for deciduous dentition. The children's treatment needs were also noted. It was found that the mean age was 11.7 years (SD 2.17) with 54.0% being female. The majority (98.4%) were Malays. The prevalence of dental caries was 88.0% (95% CI: 73.0, 100.0) in primary dentition and 85.0% (95% CI: 73.0, 96.0) in permanent dentition. The mean dft was 6.1 (SD 4.14) and the mean DMF(T) was 4.9 (SD 3.28). The mean resting flow rate was 0.14 mL/min (SD 0.08) while mean pH was 6.8 (SD 0.79). Most of the children required pits and fissure

sealants (84.1%), conservative restorations (84.1%), and topical fluoride application (66.7%). Extraction was required by 44.4% of the children. Only 1.6% did not require any treatment. There were no significant correlations between both salivary parameters and caries experience in primary or permanent dentition. In conclusion, caries prevalence was high in primary and permanent dentition among children with hearing impairment. Resting flow rate and pH of saliva did not influence caries experience. Advocating early pit and fissure sealant could prevent caries occurrence.

***In vitro* study on antifungal effects of *Stichopus hermanii* extract**

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Sea cucumber or better known as gamat in Malaysia is one of the natural resources that were widely used as traditional medicine for a very long time. This *in vitro* experimental study was conducted to analyze the possible antifungal activity of *Stichopus hermanii* extract towards three fungal species which are Amphotericin B-sensitive *Candida albicans*, *Trichosporon asahii*, and Amphotericin B-resistance *Candida guilliermondii*. The objectives of this study were to determine the zone of inhibition and Minimum Inhibitory Concentration (MIC) of extract towards the three fungal species and to determine if there are antifungal activities towards the fungi that are resistant to Amphotericin B. The antifungal activity of the liquid and powder forms of the commercialized extract (Gamodulin[®]) was evaluated by using a well diffusion technique. Amphotericin B (2gm/ml) was used as comparative drug and distilled water was used as a negative control. The initial concentration of extract was 75%; six serial dilutions 1:1, 1:2, 1:4, 1:8, 1:16 and 1:32 were used. The results showed that the liquid form of the extract had no antifungal effect towards all three fungi while the powdered form showed marked antifungal effect towards the three species. The MIC of fungi tested was similar which was at 6.25 mg/ml. *Candida guilliermondii* showed resistance to Amphotericin B, with no zone of inhibition noted. This preliminary study revealed that the powdered Gamodulin[®] have antifungal effect towards the three fungi. Further *in vivo* study was recommended to explore the potential use of sea cucumber as antifungal agent against fungal infection.

Antibacterial effects of *Streblus asper* Lour leaves crude in ethanol extract on oral bacteria

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With the increasing interest in development of antimicrobials using natural plant products and the rise in bacterial resistance to antibiotics, this study was commenced to explore the possibility of natural plant products to be used in oral health care products against oral bacteria. The objective of this study was to confirm the bacteriostatic and bactericidal effects of crude extracts of natural plant products on oral bacteria. This is an *in vitro* experimental study which employed 8 types of oral bacteria and 1 type of natural plant product. The natural plant was Shahokata (*Streblus asper* Lour). The oral bacteria were *Streptococcus mutans*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *streptococcus sobrinus*, *Lactobacillus salivarius*, *Streptococcus pneumoniae*, *Streptococcus Group A* and *Escheria coli*. From the results, crude *Streblus asper* Lour in ethanol extract shown bacteriostatic and bactericidal effect on *Staphylococcus aureus* and *Pseudomonas aeruginosa* in conclusion, this study result show that *Streblus asper* Lour have great potential in oral health care product though further studies and investigation are needed to find out the active substances.

Gingival fibroblasts attachment to Luxacore resins

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During endodontic treatment, perforation related errors can occur which can be repaired by a few materials. Luxacore Dual Cure is the composite resin which is less soluble than glass ionomer and sets faster than mineral trioxide aggregate and shows promise as an alternative repair material. The only possible disadvantage is that, their monomer constituents may be harmful to fibroblast cells in the periodontal ligament space. The purpose of this study was to observe the viability and attachment of gingival fibroblasts to Luxacore. Standardized direct cytotoxicity test (ISO 10993-5) were used to test and compare the fibroblast cells attachment and viability of Amalgam silverfil (negative control), Luxacore dual cure (DMG) and Thermanox (positive control). Cells attachment and viability were assessed by immunofluorescence technique and observed under confocal microscope (Leica, Germany). Gingival fibroblast cells were observed to be attached to Luxacore resins.

Immunomodulating effects of *Stichopus hermanni* and *Streblus asper* Lour

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Stichopus hermanni (sea cucumber) and *Streblus asper* Lour are known to have medicinal properties. However, immunomodulating effect is scarcely studied. Therefore, the main objective is to determine the effects of *Stichopus hermanni* and *Streblus asper* Lour root on phagocytosis. Crude extract of *Streblus asper* Lour root and freeze dried purified polypeptide of *Stichopus hermanni* were prepared into 3 different concentrations (5mg/ml, 1mg/ml and 0.2mg/ml). The samples were incubated with heparinized normal human blood at different time durations (15 minutes and 45 minutes). Then, quantification of phagocytic activity was done according to the protocol in Phagotest kit by ORPEGEN Pharma followed with flow cytometry analysis. Based on flow cytometry analysis, purified polypeptide of *Stichopus hermanni* showed reduction of granulocytes and monocytes activity on phagocytosis in dose-dependent manner (granulocytes: about 13% different from positive control, monocytes: about 23% different from positive control), whereas, the *Streblus asper* Lour root showed reduction in granulocytes and monocytes activity on phagocytosis, but in time-dependent manner (granulocytes: about 23% different from positive control, monocytes: about 47% different from positive control). In conclusion, this study demonstrates the preliminary evidence of immunosuppression effect of *Stichopus hermanni* and *Streblus asper* on phagocytosis. Further investigations both *in vitro* and *in vivo* are necessary to elucidate the mechanism that had given rise to its immunosuppressive effect.

Age estimation based on pulpal changes in 14 to 24 year old Malay

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Secondary dentin formation is a slow continuous process that occurs following completion of dental development which leads to a continuous decrease in the size of pulp cavity. Changes in the pulp size of young permanent teeth with completed root formation provide an alternative and additional biomarker for age estimation. This study was conducted to explore the association between pulp size and chronological age in Malay young adults with respect to different sides and sex. Orthopantomograms of 165 healthy Malay males and females each with an age ranging from 14 to 24 years old were used. Pulpal changes were evaluated by

calculating the ratios of measured length and width of tooth and root of mandibular canines: the pulp/root width at three levels i.e. root and pulp width at CEJ level (A), root and pulp width midway between measurements A and C (B); and root and pulp width midway between apex and CEJ(C). The ratios were measured using Vixwin Pro 2000 version 1.5. Pulp changes between the right and left canines were tested using paired *t*-test and showed bilateralism trend. A multiple regression analysis indicated that sex and tooth ratios did not make significant contribution to the prediction of age. This study illustrates the symmetrical trend and lack of sexual dimorphism of pulp changes with weak correlation between pulpal size and chronological age in Malay young adults.

Maxillofacial fractures in HUSM: a retrospective study from 2005 to 2009

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The objective of this study was to determine the demographic data as well as distribution sites, causes and time of occurrence, of patients with maxillofacial fractures in Hospital Universiti Sains Malaysia (HUSM). A five-year retrospective study involving 447 patients with maxillofacial fractures in HUSM from January 2005 to April 2009 was done. Data regarding gender, age, race, distribution sites of maxillofacial fractures, causes of injury and time of occurrence were analyzed. 87.5% were males and 12.5% females with a ratio of 6:1. The age range was from 3 years to 82 years with a mean age of 25.8 years. Motor Vehicle Accidents (MVA) is the main cause of maxillofacial fractures (85%), followed by falls (5%), fights and assaults (4%), sports related injuries (3%), industrial accidents (2%) and others (1%). Zygomatic bone is the most frequent fracture site in the maxilla (34.0%) followed by nasal bone (19.6%), orbital bone (19.2%), Le Fort II (9.0%), frontal bone (8.0%), Le Fort I (6.3%), Le Fort III (2.3%), dentoalveolar bone (1.5%). The most frequent fracture site in the mandible is the parasymphysis region (29.7%) followed by the angle of mandible (19.7%), condyle (17.0%), symphysis (14.3%), body (12.7%), dentoalveolar (5.0%) and ramus (1.5%). Motor vehicle accidents (MVA) were the main cause of maxillofacial fractures in Kelantan, Malaysia. The most common maxillary fracture was of the zygomatic bone, and the mandibular fracture was the parasymphysis region. Therefore, it is necessary to reinforce the legislation aimed to prevent road traffic accident and the total enforcement of existing laws to reduce maxillofacial fractures.

Craniofacial morphology of nasopharynx in non-cleft and un-operated cleft lip and palate

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The aim of the study is to compare the craniofacial morphology of nasopharynx in non-cleft and un-operated cleft lip and palate children in Kelantan using geometric morphometric software. A retrospective study utilized the available computed tomography (CT) scan data on thirty eight patients. Patients selection for this study were age 0-12 months old with the mean age 5 (SD 2.9) months old, including 26 un-operated and non-syndromic cleft lip and palate and 12 non-cleft indicated for CT scan such as hydrocephalus or meningitis. Retrieval of data regularized in the date of taken in September 2001 till August 2002. The landmarks of CT scan of nasopharynx for all the patients were digitized and transformed into a file extension format (*.txt). Data were inserted into Morphostudio software version 3.0 to be analyzed. Descriptive analysis was done with SPSS 12.0.1 using Mann Whitney test for evaluation of significant *p*-value, Z statistic, median and interquartile range of various dimensions of nasopharynx in between un-operated cleft lip and palate and non-cleft patients. Results showed the nasopharyngeal shapes, widths and heights of un-operated cleft lip and palate patients are significantly larger ($p < 0.05$) compared to the non-cleft patients. This study had shown that craniofacial morphology of nasopharynx of un-operated cleft lip and palate patients are significantly different compared to the non-cleft patients.

Oral yeast prevalence in patients receiving radiotherapy for head and neck cancers

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Oral mucosal colonization and infection with *Candida* species are common in patients receiving radiotherapy for head and neck cancers. The objective of this study was to estimate the prevalence and types of oral yeast in head and neck cancer patients before and after radiotherapy and to find its association with age, gender, and personal habits. A total of 54 patients with head and neck cancers, 24 before and 30 after radiotherapy were selected. Relevant information such as demographic profile was obtained by questionnaire. Oral rinse was performed and fungal detection was carried out using API 20C AUX System test (Analytical Profile Index) and Corn-Meal Agar test for

microscopic identification. Quantification of fungus was done by serial dilution. Ten patients (41.7%) were found to have *Candida* sp. colonization before radiotherapy while 21 patients (70%) were found to have *Candida* sp. after radiotherapy and these results were found to be statistically significant ($p=0.036$). However, no association was found between *Candida* sp. infections with age, gender, and personal habits such as smoking, betel nut or tobacco leaf chewing and alcohol consumption ($p > 0.05$). *Candida albicans* 1 was the yeast that was most frequently isolated from patients before (50.0%) and after radiotherapy (47.6%). Other yeasts isolated were *C. albicans* 2, *C. dubliniensis*, *C. glabrata*, *C. krusei*, *C. parapsilosis*, *C. ciferrii* and *C. tropicalis*. For quantification, there were more colonies detected in patients after radiotherapy. Thus, our study shows that there is significant association between oral yeast infection and radiotherapy with *Candida albicans* 1 being the most frequently isolated species.

The antibacterial activity of *Ocimum Tenuiflorum* and *Piper betel* against *Streptococcus mutans* and *Enterococcus faecalis*

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Ocimum tenuiflorum and *Piper betel* are valued for their medicinal and therapeutic properties. Essential oil from the extracts of these herbs is said to exhibit antibacterial properties. *Streptococcus mutans* and *Enterococcus faecalis* are commonly associated with dental caries and endodontic infections. The aim of this study was to determine the antibacterial activity of both extracts against *Streptococcus mutans* and *Enterococcus faecalis*. Agar-well diffusion assay was performed and inhibition zone diameters (IZD) with different concentration of extracts were measured. Broth dilution assay was carried out to determine the minimum inhibitory concentration (MIC) for these extracts by visual inspection as well as using a spectrophotometer. Both of these extracts exhibited antibacterial properties against *S. mutans* and *E. faecalis*. *O. tenuiflorum* was found to exhibit more antibacterial activity than *Piper betel*. The antibacterial property shown by the synergistic action of the two extracts was even better than the individual effects of the extracts. These preliminary results suggest potential use of these extracts against *S. mutans* and *E. faecalis*. Further studies need to be done to elucidate the therapeutic usage of these herbs in dental infections.

Antibacterial activity of *Strobilus asper* Lour leaf and branch water extract against oral bacteria

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With the increasing interest in development of antimicrobials using natural plant products and the rise in bacterial resistance to antibiotics, this study was conducted to explore the possibility of *Strobilus asper* Lour leaf and branch water extract to be used in oral health care products against oral bacteria. The objective of this study was to confirm the bacteriostatic or bactericidal effects of crude water extracts of *Strobilus asper* Lour leaf and branch water extract on oral bacteria. This is an *in vitro* experimental study which employed 9 types of bacteria. These bacteria were inoculated on blood agar media and Mueller Hinton agar for Gram +ve and Gram -ve bacteria respectively. Crude extract of *S. asper* Lour leaf and branch with concentration of 0.55g/ml and 2.89g/ml were further diluted into 4 different concentrations using serial dilution. 50µl of the different concentrations were pipetted into the wells prepared in the media which were then incubated overnight at 37°C before measuring the inhibition zone. The crude extract was found to be bactericidal only towards *Streptococcus sobrinus*. In conclusion, this study results show that crude water extract of *S. asper* Lour leaf and branch has bactericidal effect towards *Strep. sobrinus* but not for *Strep. mutans*, *Strep. group A*, *Staph. aureus*, *E. coli*, *Klebsiella pneumonia*, *Lactobacillus salivarius*, *Strep. Pneumonia* and *Pseudomonas aeruginosa*. Further investigation is necessary to find out the active substances and its specificity of action against *Streptococcus sobrinus* only.

Scanning electron microscopic evaluation of root canal wall cleaning efficiency after calcium hydroxide removal using two irrigation solutions

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Calcium hydroxide has been advocated as an intracanal medication in the root canal treatment. However, if it is not completely removed, it may be present as debris on the canal walls or incorporated into the smear layer. The aims of this *in vitro* study were to compare smear layer elimination by 5.25% sodium hypochlorite (NaOCl) in conjunction with 17% ethylene diamine tetra acetic acid (EDTA) and an EDTA with tension-active agent (Smear Clear®) after calcium hydroxide removal and to determine the root canal wall cleanliness at the coronal, middle and apical thirds regions. Eight

single rooted extracted mandibular second premolar were instrumented with Protaper® rotary system (Dentsply-Maillefer, Switzerland) using a crown-down technique and randomly divided into two groups namely Group A, 5.25% NaOCl with 17% EDTA and group B, 5.25% NaOCl with Smear Clear® (Synbron Endo, Orange, CA). After longitudinal sectioning, the dentinal walls were examined using scanning electron microscope (SEM) at 1000X magnification. Data were scored using 1 x 1 cm grid scale and a 5-step scoring system. Residual smear layer on the dentinal walls were evaluated by three calibrated investigators. Data were statistically evaluated using Kruskal-Wallis and Mann-Whitney tests. Results showed no statistically significant difference of smear layer removal at the coronal and middle thirds regions between NaOCl-Smear Clear and NaOCl-17% EDTA groups ($p>0.05$). However, NaOCl-17% EDTA shows superior result in cleaning efficiency at the apical third region compared to Smear Clear irrigation solution ($p<0.05$).

Fracture resistance of endodontically treated teeth: an *in vitro* study

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Endodontically treated teeth are generally weaker than sound teeth. The aim of the study was to compare the fracture resistance of endodontically treated teeth restored with different restorative techniques. Fifty intact human maxillary central incisors of standardized size were divided into five groups of 10 teeth. Group 1 was left intact as the control group. Other groups were all endodontically treated followed by restorations using different restorative techniques: Groups 2, 3, 4 and 5 were treated with light cured composite resin, crown, post, and post and crown respectively. The specimens were loaded in a universal testing machine with a static force at a crosshead speed of 0.5 mm/min at 135° to the long axis of the root until failure. The means and the standard deviations of the maximum load at failure for groups 1, 2, 3, 4 and 5 were 1259.11N (379.12N), 578.63N (196.70N), 667.13N (298.72N), 1247.65N (294.48N) and 623.60N (193.75N) respectively. The results of one-way ANOVA showed statistically significant differences existed among the groups tested ($p<0.001$). Independent *t*-test showed that the fracture resistance of specimens restored with either light cured composite resin or crown was statistically lower than the natural tooth ($p=0.001$ and $p=0.003$). Restoring endodontically treated with post significantly increased its fracture resistance to the level of sound tooth ($p=0.002$). Within the limitations of this study, endodontically treated teeth restored

with post exhibited similar strength with sound natural teeth. Endodontically treated teeth restored with either light cured composite resin or crown had lower fracture resistance than natural teeth.

A comparison of fracture resistance between few techniques in repairing porcelain with composite resin

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Porcelain from prosthesis such as crown or bridge could be fractured if exposed to trauma or motor vehicle accident. They usually could be repaired at chairside using composite resin. The aim of this study was to investigate the fracture resistance of few different techniques of repairing fractured porcelain with composite resin. Eighty samples of 6mm length x 5mm width and 2mm thick of porcelain blocks were prepared, later divided into 4 groups based on different surface treatments which were Cimara repairing kit, Porcelain etch kit with hydrofluoric acid, Panavia F resin cement and sandblasting with aluminium oxide. Then, the composite resin was bonded to gain a size of 12mm x 10mm x 2mm. Twenty other samples of control group were prepared from pure porcelain with size of 12mm x 10mm x 2mm. Fracture resistance of each samples were tested using Instron machine (UK). Repaired porcelain with hydrofluoric acid showed the highest value of fracture resistance (3.038 ± 1.0444 Mpa), which was the only not significant result when compared to control group (3.046 ± 1.4184 MPa) at ($p < 0.05$). Hence, etching with hydrofluoric acid could be used to repair fractured porcelain with composite resin at chairside.

Craniofacial morphology of the cranial base in non-cleft and un-operated cleft lip and palate: morphometric analysis

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The objective of the study is to compare the morphology of cranial base in patients with cleft lip and palate and non-cleft group by using Computed Tomography (CT) Scan imaging data and geometric morphometric software. It is a retrospective study on morphology of the cranial base among cleft group children (cleft lip and palate) compared to non-cleft children who attended HUSM for treatment. With the image from the CT scan, the x, y, z co-ordinates, eleven homologous landmarks, eleven links and seven J-links were marked. The data then converted into MorphoStudio file and by using that software, Procrustes analysis of shaped

was computed. J-links statistical analysis was done and cranial base morphology configuration for length, height and shape were detected using Finite Element analysis. When comparing the morphology of cranial base in cleft and non-cleft group, it shows that, there are no significant differences in J-link statistical analysis. Hence, the length and height of cranial base have no difference between both groups. However, by Finite Element analysis, the shape of cranial base was significantly larger ($p = 0.033$) in cleft group when compared with the non-cleft group. Regarding the size, the cleft group have only significant larger ($p = 0.025$) size of cranial base in Spheno-Occipital-Synchondrosis area compared to the non-cleft group. Other than that, there is no significant difference in both groups. So, it can be concluded that there is differences in the morphology of cranial base of cleft patients when compared to non-cleft patients.

Effect of different number of thermal cycling on the marginal leakage of class V restoration using nano tooth coloured materials

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Nano tooth coloured materials may have been produced as an ideal restorative material, however thermally induced stresses may lead to microleakage between restorative material and tooth structure which may cause unwanted complications. Thermocycling has been an important method to emulate the thermal changes of the oral cavity. This study was aimed to investigate the effect of increasing number of thermal cycles on the marginal leakage of nano tooth coloured materials. 56 Class V cavities were prepared on the buccal surface of the extracted single rooted human premolars and restored with either Filtek Z350 (3M ESPE, USA) or Ceram X (Dentsply, Germany). The samples were then divided into four groups with ($n = 7$): 1) 0 thermocycle, 2) 500 cycles, 3) 5000 cycles, 4) 10000 cycles. All samples were immersed in 2% methylene blue dye for 4 hours at room temperature, sectioned and viewed under stereomicroscope for dye penetration. Data were analyzed using *t*-test and one-way ANOVA with post-hoc Scheffe with $p < 0.05$ considered to be significant. Microleakage was only evident in both materials at 5000 cycles and above. There was a significant difference in microleakage between 5000 and 10000 cycles for both materials (Filtek Z350: $p < 0.001$; Ceram X: $p < 0.001$). However, there was no significant difference in microleakage between Filtek Z350 and Ceram X at 5000 cycles ($p = 0.194$) and at 10000 cycles ($p = 0.499$). Microleakage increases with the duration of thermal cycling in both nano-tooth coloured materials. Both materials showed

similar pattern of microleakage when challenged to a higher number of thermal cycles.

Suppression effect of *Streblus asper* root extract on osteosarcoma cells growth and proliferation

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The plant extracts are promising nutraceuticals product for control cancer disease and *Streblus asper Lour* is an example. It finds place in Ayurvedic Pharmacopoeia of India and also been described in some monographs, but none have reported its activity as chemopreventive agents and the underlying mechanisms remain unclear. In this preliminary *in vitro* experimental study, the IC₅₀ of *Streblus asper* root extract was determined and observed its effect on the osteosarcoma cells morphology that changes within time, the anti-proliferative pattern and live-death analysis under confocal microscope analysis. The results showed that the root extracts inhibited the growth of the osteosarcoma cells which also exert apoptosis features like cell shrinkage (atrophy) and vocalization in time and dose-dependent manner. The plant extracts IC₅₀ doses were at 0.05% of root extracts and it also demonstrated the anti-proliferative effect by suppressed the cells growth as early as 12 hours of treatment and marked cell death till day 3. On live-death analysis under confocal microscope using Calcein and Ethidium staining confirmed that *Streblus asper* root extract exert cell death to osteosarcoma cells. As this is a preliminary study, further investigation must be performed as to determine its genotoxicity and cytotoxic effect on normal cells (osteoblast), *in vivo* systemic effect and molecular mechanism of apoptosis as part of the cancer chemopreventive agent development.

Oral health status of children of with congenital heart disease in HUSM and their parents' knowledge, attitudes, practices on oral health

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The objectives of this study were to ascertain the caries experience, plaque pH and *Strep mutans* counts in saliva in children with congenital heart disease (CHD). The knowledge, attitude and practice (KAP) among

parents' of CHD and healthy children in HUSM were also compared. In the CHD children, the oral health status were assessed for caries experience (deciduous dft; permanent, DMFT), plaque pH and *Strep mutans* counts in the saliva. Face to face interview was conducted to assess for KAP among parents of both groups using questionnaires. A total of 40 CHD children, mean age 7.1 (SD 4.60) years were examined and their parents' KAP were compared to 51 parents from control group. Children with CHD had high caries experience, mean of dft score of 6.8 (SD 7.08), DMFT 1.7(SD 3.11) and the plaque pH was acidic, mean score 5.9 (SD 0.45). Only 12.5% of children with CHD had *Strep mutans* counts more than 5x100 000 CFU per mL in the saliva. The parents of CHD group had poorer oral health knowledge and scored lower for attitudes [2.9 (SD 0.85)] compared to in the control group [3.4 (SD 0.87)]. About 65.0% of children in the CHD group had dental visits; significantly lower ($p<0.001$) than control group (94.1%). Early prevention need to be targeted for children with congenital heart disease by the oral and medical health professionals to reduce the caries experience and increase KAP of the parents.

Candidal infection in denture wearers

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Candida species is a harmless commensal of oral cavities of healthy individuals. Recently, it has received increasing attention as it causes opportunistic infection in immunocompromised patients as well as in denture wearers. The aim of this study was to estimate the prevalence of candidal infection and its type in denture wearers. A cross-sectional study using self-administered questionnaire was carried out in HUSM dental clinic. Sixty denture wearers and 40 non-denture wearers were enrolled following informed consent. Relevant medical history was obtained and oral examination was performed. Oral rinse was taken using sterile distilled water in sterile container and *Candida* species were cultured and identified with commercially purchased fungal identification system API 20C AUX (Analytical Profile Index). The majority of denture wearers (63.3%) were found to be positive for *Candida* species compared to 35% in non-denture wearers. In denture-wearers, 18 out of 38 positive candidal samples were found to be *Candida albicans* whereas in non-denture wearers, the same species was found in 9 out of 14 positive candidal samples. However, non-albicans species were also found which include *C. tropicalis*, *C. dubliniensis*, and *C. glabrata*. The prevalence of candidal infection in denture-wearers was significantly higher than in non-

denture wearers. A significant association was found between denture wearing and candidal infection. However, age, sex, types of denture, denture age, denture hygiene, overnight wearing and denture cleaning had no significant influence on oral candidal infection.

An anthropometric study of upper lip in Malays

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Facial anthropometric data provides measurements which can serve as a guideline for maxillofacial surgery, this include reconstruction of cleft lip and palate and craniofacial deformity. The objectives of this study were to establish normal dimensions of upper lip in Malay adults. Fifty two Malay females and 36 Malay males were included in this study. Standardized photos were taken and the distances between the marked points measured using Morpho Studio software. The various distances measured ranged as follows: Oral commissure -cupid's bow peak 2.65 - 4.75 cm in females and 3.06 - 4.79cm in males, cupid's bow limb length 0.73 - 1.32cm in females and 0.83 - 1.45cm in males, lateral border of nostril - oral commissure 5.25 - 7.63cm in females and 6.19 - 9.02cm in males, philtral column height 1.95 - 4.19cm in females and 2.56 - 5.82cm in males, midline philtrum height 2.25 - 4.53cm in females and 2.62 - 5.43cm in males, midline vermilion height of upper lip 1.16 - 2.70cm in females and 1.10 - 2.75cm in males, upper end phitrum width 0.97 - 2.33cm in females and 1.13 - 2.18cm in males, lower end philtrum width 1.22 - 2.12cm in females and 1.37 - 2.48cm in males. In conclusion, geometric morphometry can quantify upper lip dimension in Malays.

Diabetes mellitus type 2 and periodontal disease among patients attending HUSM diabetic clinic

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A cross sectional study was done to determine the prevalence and status of periodontal disease as well as its association with diabetes mellitus type 2 (DM type 2). The data were compared with non-diabetic patients. Seventy eight patients (25 DM type 2 and 53 non-diabetic) were randomly selected. Socio demographic data were obtained and periodontal status was determined according to plaque index, gingivitis index and probing pocket depth. Data were analysed using SPSS version 12.0. The majority of the patients were

Malay (100% in non diabetic and 60% in diabetic patients). The mean age was 36.5 (SD 11.12) and 53.5 (SD 8.45) years old in non diabetic and diabetic patients respectively. The prevalence of periodontal disease were significantly higher in diabetic (64%; 95% CI: 44.0%-84.0%) compared to non-diabetic patients (15%; 95%CI: 5.0%-25.0%); ($p<0.001$). There was a significant difference of plaque index in diabetic compared to non diabetic patients (mean difference -0.397; $p<0.001$). However, the mean gingivitis index was not significantly different between these groups (mean difference -0.069; $p=0.305$). The mean pocket depth of diabetic patients was significantly higher [2.46 (SD 0.827)] compared to non-diabetics [1.15 (SD 0.472)]; $p<0.001$. The periodontal disease was significantly associated with DM type 2 ($p<0.001$). In conclusion, there was a significant association between periodontal disease and DM type 2. Advocating regular dental check up especially for uncontrolled diabetic patients to prevent or control periodontal disease would improve their diabetic status.

Scanning electron microscopic study of two lubrication agents in removing smear layer on human dentine

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Smear layer should be removed before root canal filling in order to improve sealing ability of obturated root canal. The aim of this study was to compare two lubricating agents, SlickGel® (water based gel) and Glyde® (paste type), in removing smear layer on human dentine using scanning electron microscope (SEM). Eight single rooted extracted human mandibular second premolar teeth were instrumented with Protaper® rotary system (Dentsply-Maillefer, Switzerland) using a crown-down technique and randomly divided into two groups. In the first group, SlickGel® was used as lubricating agent while Glyde® was used in the second group. Both lubricating agents were used after each instrument change, followed by 5.25% sodium hypochlorite (NaOCl) irrigations. After longitudinal sectioning, the dentinal walls were examined using SEM at 1000X magnification. The presence of residual smear layer on the dentinal walls was assessed and given scores by three calibrated investigators. Results indicated that SlickGel® was more effective in removing smear layer compared to Glyde® on coronal and middle third of the root canal; however the differences were not significant.

Absence of nucleotide alteration in regions of *NOTCH1* and *NOTCH2* receptor gene analyzed in oral cancer samples: a preliminary observation

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Oral cancer is one of the common cancer cases identified in the developing countries. Genetic mutation and overexpression of certain genes and proteins have been associated in the development of this cancer. NOTCH signalling pathway; involved in controlling the development processes of vertebrates and invertebrates, was found to be responsible in the formation of certain cancers including oral cancers. Activation of this pathway requires binding of the ligands to its receptors. Four NOTCH receptors (*NOTCH 1, 2, 3* and *4*) have been identified in mammals. Thus, any disruptions occurring to these molecules might interfere with the normal functions of this signalling pathway. Hence, this study was conducted to detect mutations of NOTCH receptor genes which might be occurring in the oral cancer cases obtained from the local population. Ethical approval was obtained prior to conduct the study. DNA extracted from fresh-frozen tissue biopsy of the tongue and buccal mucosa from 10 confirmed cases of oral cancer were subjected for PCR amplification using the specific sets of primers. The PCR products were sent for sequencing before final results were analysed. Due to time and cost limitation, only two out of four NOTCH receptor genes; *NOTCH1* and *NOTCH2*, were used in this analysis. The results revealed absence of nucleotide changes for both NOTCH receptor genes amplified from these oral cancer samples. More samples and further analysis looking into other regions in these genes are required to be done to conclude the involvement of NOTCH receptor genes mutation in causing oral cancer.

Root-crown ratios of permanent teeth in Malay patients attending HUSM dental clinic

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This study aimed to assess the root-crown (R/C) ratio of mature permanent teeth in Malay patients from orthopantomogram radiographs (OPGs). The objectives of this study were to determine the normal mean value of the R/C ratios and their variations by sex and arch. Two thousand nine hundred and twenty teeth with fully developed roots were measured from 112 OPGs. Subjects with history of maxillofacial trauma or orthodontic therapy were excluded.

The mean age of the subjects was 19.1(SD2.08) years old for males while females 18.9 (SD2.19) years old in the range from 15 to 22 years old. The intra-examiner reproducibility of the assessment method was good (Intraclass correlation coefficient 0.81; Cronbach's Alpha 0.90; $p < 0.001$). Results of this study showed that there was no significant difference between R/C ratios of males and females groups. However, the ratios of the antagonist teeth for both males and females were significantly greater in the mandible than in the maxilla ($p < 0.05$ for right and left lateral incisors and right first premolars in male; $p < 0.001$ for all other teeth). In both gender, the highest R/C ratio were mandibular second premolars and the lowest R/C ratio were maxillary central incisors. The root-crown ratio could be used as a baseline data and reference to help in orthodontic diagnosis, treatment planning and prognosis.

The effects of shade, light curing method and exposure time on surface microhardness of nanocomposite material

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Microhardness is an important parameter that has a bearing on the behavior of dental composite resin restorations. The aim of this study was to evaluate the effects of shade, light curing method and exposure time on surface microhardness of nanocomposite material (Filtek Z350, 3M, ESPE). Sixty disc-shaped specimens (2mm of thickness x 5mm of diameter: shade A2, C2) were prepared using plastic molds. The specimens were divided randomly into 3 subgroup for each shade according to light curing method and exposure time (n=120). Two light curing units were used: a Quartz Tungsten Halogen (QTH) and Light Emitting Diode (LED), with exposure time of 20s (LED) and 40s (QTH and LED). After storage for 24 hours in distilled water at 27°C, surface microhardness was determined using a digital microhardness tester. A 5kg load was applied through Vickers indenter with a dwell time of 20s. Three indentations were made at random on each specimen, and the mean values were recorded (Vickers Hardness Number, VHN). Data were analyzed using Mann-Whitney and ANOVA, and results with $p < 0.05$ were considered significant. A2 shade nanocomposite had significantly higher microhardness value compared to C2 after polymerization with both light curing units ($p < 0.05$), except for LED 20s. Forty seconds exposure time using LED and QTH resulted in nanocomposite material with significantly higher microhardness value compared to 20s LED ($p < 0.001$). In conclusion, shade, light curing method, and exposure time had significant influence on the microhardness of nanocomposite material.

Apical sealing ability of endodontic sealers by two obturation techniques: an *in vitro* study

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An *in vitro* dye leakage study carried out to evaluate and compare the apical sealing ability of Sealapex™, a calcium hydroxide based sealer and RoekoSeal® Automix (RSA), a polydimethylsiloxane based sealer when used with cold and warm vertical condensation. Forty single rooted human extracted teeth were instrumented and randomly divided into four groups and two teeth respectively as positive and negative control. Group 1 was obturated by cold condensation along with Sealapex™ sealer. Group 2 was also used Sealapex™ as sealer but obturated by warm condensation. Group 3 and 4 were both used RSA sealer with cold and warm condensation respectively for obturation. The samples were then immersed in methylene blue solution for seven days, longitudinally sectioned and analyzed by using a digital stereomicroscope. The groups tested showed median leakage of 1.2mm (4.78) for group 1, 0mm (1.14) for group 2, 1.6mm (2.06) and 0.9mm (2.44) respectively for group 3 and 4. There was no statistically significant different of leakage values among all the groups tested ($p=0.748$). There was also no significant different between the two obturation techniques used. In conclusion, there were no significant differences between both sealers in the sealing ability and these sealers demonstrated sufficient good sealing ability to enable them to be used clinically.

Chemopreventive effect of gamat (*Stichopus sp.*) on osteosarcoma cells

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Marine organisms such as the sea cucumber species are currently undergoing extensive research for their therapeutic potential. Gamat or the *Stichopus sp.* has been recognized to exhibit chemopreventive properties. This study aims to confirm the chemopreventive effect of Gamat (*Stichopus sp.*) or Gamodulin^R on Osteosarcoma cells. This in-vitro experimental study used 50%, 5% and 0.5% concentrations of Gamodulin^R extracts on osteosarcoma cells. Cell morphology was observed at 12, 24, 48 and 72 hours. The IC₅₀ concentration of Gamodulin^R extract was determined and the cell proliferation assay was performed using hemocytometer at day 1, 2 and 3. Confirmation of live-death status of the osteosarcoma cells were analysed by confocal fluorescence microscope. Gamodulin^R extracts showed significant effects on the osteosarcoma cells. The IC₅₀ concentration for

Gamodulin^R was 5%. At 12 hours, there were significant changes in the morphology of the osteosarcoma cells. The morphological changes were in time-dependent manner whereby significant reduced cell proliferation was seen by day 3. Confocal scanning light microscopy confirmed the presence of dead osteosarcoma cells. Conclusion: This study showed preliminary evidence of the suppression effect of 5% Gamodulin^R on osteosarcoma cells. Thus Gamat (*Stichopus sp.*) have the potential to prevent osteosarcoma cell proliferation. However, further studies are needed to investigate the exact bioactive compound of this marine organism in order to enable its chemopreventive use.

***In vitro* antifungal analysis of *Streblus asper* root-extract**

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Apparently failure of conventional therapy due to drug resistance and undesirable effect is quite common. Therefore, research on traditional herbal medicines which are believed to have unlimited source of bioactive compounds to treat fungal infection keep arising. This was an *in vitro* experimental study, to analyze the antifungal activity of *Streblus asper* Lour (*S. asper*) root –extract. The objectives were to determine the zone of inhibition and Minimum Inhibitory Concentration (MIC) of *S. asper* Lour root against *Candida albicans* and *Trichosporon asahii*. Three root extract materials of *S. asper* Lour were tested. They were solutions of commercialized aqueous extracts of root *S. asper* Lour and paste form of 50% ethanol root extract. Amphotericin B (1mg/ml) was used as a comparative drug. Antifungal activity of the three extracts was evaluated by using well diffusion technique. Commercialized and aqueous extracts of root *S. asper* showed no zone of inhibition toward the two fungi. The two organisms also showed resistant to 50% ethanol extract as no zone of inhibition was seen. Whereas, the Amphotericin B showed zones of inhibition of 17mm and 15mm toward *C. albicans* and *T. asahii* respectively. In conclusion, the root extracts of *S. asper* Lour showed no antifungal activity towards *C. albicans* and *T. asahii*. Future study is recommended to test the antifungal effect of the *S. asper* Lour from different part of the plant using various alternative techniques of extractions.

Patients' satisfaction with dental aesthetics

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Dental aesthetic has becoming an important aspect of dentistry that can influence the patients' physical and mental health. The purpose of this study was to determine the factors influencing patients' satisfaction with their dental appearance. A cross sectional study was carried out on patients attending Dental Clinic of Hospital Universiti Sains Malaysia. Using a standardized questionnaire, total of 132 patients, age 18 and above who understand Bahasa Malaysia, were interviewed. The patients were grouped as young adult (18-30years) and older adult (>30 years). The majority of the subjects were females (72.7%) and the mean age of all subjects was 31.3 years (SD 11.78). Data was analysed by descriptive statistic and chi-square analysis. The results revealed that female patients (67.7%) were significantly more dissatisfied with their dental appearance compared to male patients (47.7%) ($p= 0.031$). Tooth colour was the primary reason for dissatisfaction in 62.9% of patients, followed by dental caries in anterior teeth (30.3%). Protruding teeth was a concern factor in 25.8% of the patients and it was associated with dissatisfaction with teeth appearance ($p=0.02$). Significantly more patients in the young adult group felt that they have crowded teeth and poorly aligned teeth ($p<0.001$). Patients' most desired aesthetic treatment was tooth whitening (43.2%) while only 3.8% of patients wanted orthodontic treatment. In conclusion, female patients were more conscious about dental aesthetics, and the young adults were more concerned about crowded and malaligned teeth. Protruded teeth influenced the patients' dissatisfaction, but in contrast, most patients from this study desired to improve their appearance by tooth whitening.

Comparison between etoricoxib, celecoxib and mefenemic acid for post-operative pain control in third molar surgery

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Patients experiencing acute pain after surgery, including dental surgery, often require analgesia. Ideally, the chosen analgesic should have rapid onset and sustained effects. Commonly used analgesics are the non steroidal anti-inflammatory drugs (NSAIDs) such as mefenemic acid and celecoxib. Etoricoxib, a newer analgesic from the COX-2 inhibitor family, is also being used. The purpose of this prospective randomized study was to compare the effectiveness of mefenemic acid, celecoxib,

and etoricoxib for pain control following surgical removal of impacted third molars. Fifteen eligible subjects attending the Hospital Universiti Sains Malaysia (HUSM) dental clinic for surgical removal of an impacted lower third molar were randomly assigned into three groups, receiving either mefenemic acid, celecoxib, or etoricoxib for post-operative pain control. Patients were assessed for seven days post-operatively. Self administered visual analogue scale (VAS) was given for each patient to record their pain level. No significant differences in post-operative pain scores between the three drugs were observed. However, the results of mean pain scores suggested that etoricoxib may have provided better analgesic effects for pain after dental surgery compared to celecoxib and mefenemic acid.

In vitro study of antibacterial activity of *Streblus asper* Lour root and Gamodulin® (*Stichopus hermanii*) extract

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With the increase of bacterial resistance as well as the unwanted effects of antibiotics, this *in vitro* experimental study had been done to explore the potential of natural products as an alternative to overcome this problem. This study aimed to confirm the bacteriostatic and bactericidal effect of *Streblus asper* Lour root and *Stichopus hermanii* extract, the Gamodulin® against 9 bacteria species. An *in vitro* experimental study was done using the well diffusion and disc diffusion method. Water extract of *S. asper* Lour root, commercialized *Streblus asper* Lour root solution and deep freeze powder of *Stichopus hermanii* extract known as Gamodulin® were used. The bacteria species used were *Klebsiella pneumoniae*, Methicillin Resistance *Staphylococcus Aureus* (MRSA), *Pseudomonas aeruginosa*, *Escherichia coli*, *Streptococcus mutans*, *Streptococcus group A*, *Streptococcus pneumoniae*, *Streptococcus sobrinus*, and *Lactobacillus salivarius*. All tests were done in triplicates. It was found that commercialized *Streblus asper* Lour root extract exhibit both bacteriostatic and bactericidal effect towards *Streptococcus sobrinus* at 12.5 mg/ml [Mean 20.7(SD1.15)]. For the Gamodulin®, at 1000mg/ml, it has both bacteriostatic and bactericidal effect towards all bacteria species except for *Streptococcus mutans* and *Streptococcus Group A*. However, water extract of *Streblus asper* Lour root showed no antibacterial effect towards all bacteria species tested. In conclusion, the antibacterial potential of commercialized *Streblus asper* Lour root and Gamodulin of *Stichopus hermanii* can be used in oral health care as well as medical care. Thus, further

investigation should be done to explore the active compound of these products.

Choice of analgesic in third molar surgery in HUSM

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Surgical removal of impacted third molar is a common minor oral surgical procedure done at the Hospital Universiti Sains Malaysia (HUSM) dental clinic. The operative procedure is associated with acute post operative pain which can be controlled with appropriate use of analgesics. The choice of analgesics prescribed may vary according to operators' preference and the choice of drugs available. The aim of this study was to determine the type of analgesics used following third molar surgery in HUSM. All 334 records of patients who had undergone surgical removal of only one impacted lower third molar in HUSM under local anesthetic (LA) from 1st January 2006 to 31st December 2008 were reviewed. Data on post surgical analgesics prescribed were obtained. Results showed that the majority of operators prescribed celecoxib (23%) for their patients. Other analgesics prescribed include mefenamic acid (22%), diclofenac sodium (19%), etoricoxib (13%), ibuprofen (11%), paracetamol (10%) and tramadol (2%). In conclusion, celecoxib was the most common analgesic prescribed after third molar surgery in HUSM.

A study of dietary pattern among school children aged 6 to 12 years old

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It is known that dental caries is the most common chronic disease of childhood. Being in school for most of the daytime, these children easily expose themselves to frequent snacking in between meals. A cross sectional study was conducted to determine the dietary pattern, to assess nutrient intake, the nutritional status and frequency of meals as well as to correlate nutrient intake and caries status. 65 children aged 6 to 12 years attending Dental Clinic at Hospital Universiti Sains Malaysia were randomly selected. A 24-hour dietary recall was conducted. Their height and weight were recorded and they were then examined for caries status. The DMFT score was found to be ranging from 0 to 7 with mean of 1.3(SD=1.84) while dft score ranged from 0 to 19 with mean of 5.9(SD=4.73). Mean for daily carbohydrate, protein and fat are 251.7g (SD=122.20), 65.8g

(SD=33.88) and 40.7g (SD=20.78) respectively. There is a fair correlation ($r=0.45$) with p -value >0.05 between frequency of meal taken and dft score. There is no significant correlation between nutrient intake and caries status in these children. 88% of the samples were within normal growth percentile of 3% and 97%. 6% of the samples were below 3% of growth percentile while remaining 6% were above 97% of growth percentile. In conclusion, caries status was found to be high in this study but there is no strong association between dietary pattern and dental caries. The result was such because of the multiple factors that contribute to the formation of caries.

Efficacy between local honey and salicylate gel for treatment of minor recurrent aphtous stomatitis

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Recurrent aphtous stomatitis is a common oral disorder, appears as an ulcer with unknown etiology. The objective of the study is to compare the efficacy of two medications, locally produced honey and salicylate gel that is commonly use to treat minor recurrent aphtous stomatitis. This is a random clinical trial which involved 20 outpatients who attended dental clinic in HUSM that fulfilled our criterias and were randomly divided into 2 groups. Ulcer size and pain score were noted on day 1 and day 5 for each patient. All the data that was collected were then analysed using SPSS version 12.0. The result shows there is no significant different of efficacy between local honey and salicylate gel based on pain score difference ($p=0.51$) and ulcer size difference ($p=0.88$). However, the median for pain score difference in honey treated group was higher than salicylate gel treated, indicate that local honey gave more pain relief. As a conclusion, local honey has a comparable effect with more pain relief for treatment of recurrent aphtous stomatitis. Thus, local honey could be also offered as an alternative medication to patients with recurrent aphtous stomatitis.

The assessment of proliferation rate of dental pulp stem cells and stem cell from human exfoliated deciduous teeth by using two different scaffolds

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Dental pulp stem cells (DPSC) and stem cells from human exfoliated deciduous teeth (SHED) were identified to be highly proliferative and clonogenic cells. The objective was to assess the proliferation rate of DPSC and SHED in presence of two different scaffolds, synthetic granular hydroxyapatite bone graft and cancellous coral discs. All teeth were extracted and isolation of the stem cells from dental pulp was done following standard protocol. The stem cells were cultured with α Modified Eagle's Medium (GIBCO/BRL) supplemented with 10% fetal Bovine serum (Equitec-Bio, Kerrville, TX, 100 μ m L- glutamine (Wako Pure Chemicals, Osaka), 100unit/ml penicillin, and 100mg/ml streptomycin (Biofluids, Rokville, MD). The cells proliferation rate with scaffolds (GranuMasTM and cancellous coral discs) and without scaffolds was assessed using Alamar Blue (Biosource Internatioal, Inc, USA). The absorbance of the media was measured spectrophotometrically using ELISA plate reader (Tecan,DKSH) at a wavelength of 570nm and 600nm at 0 minute, 60 minutes,120 minutes, 180 minutes at day 0, day 4 and day 7. The proliferation rate of DPSC is higher compared to SHED at 7 days of observation. Cancellous coral scaffold is more suitable in promoting stem cells proliferation compared to synthetic hydroxyapatite granular bone graft at 7 days of observation. DPSCs and SHED showed good proliferation rate with or without scaffolds during the 7 days of observation. The scaffolds may play important roles in proliferation and of particular stem cells.

Position of gingival zenith in the maxillary anterior teeth in the 3rd and 4th year dental students in Universiti Sains Malaysia

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The position of gingival zenith in the maxillary anterior teeth plays an important role in aesthetic. The gingival zenith is defined as the most apical point of the marginal gingival scallop. The objective of this study was to quantify the mesio-distal and apico-coronal displacement of the gingival zenith in the

maxillary anterior teeth. A total of 300 buccal surfaces of 25 patients (3 males and 22 females) with an average age of 23 years and with healthy gingival, free from crowding and diastema and anterior restoration were evaluated. Gingival zenith positions (GZP) in the mesial-distal and apical-coronal direction from the tangent line were measured with calibrated digital calliper for each central incisor, lateral incisor and canine. Data were analysed using SPSS v.12.0.1 and significance level was set at 5%. This present study demonstrated that 100% of subjects have distal displacement for central incisors (CI) with approximately 0.9 to 1.0mm for left and right central incisors respectively. Distal displacement for lateral incisors (LI) and canines (C) were only around 76% to 32% with mean displacement for right lateral incisor=0.7mm, left lateral incisor=0.5mm, right canine=0.4mm and left canine=0.2mm. The GZP in the mesial-distal and apical-coronal direction were symmetrical for each tooth type. In conclusion, distal displacement of GZP for right and left sides showed similar trends *i.e* CI>LI>C.

A retrospective study on prevalence of infected socket mandibular post surgical removal of mandibular wisdom tooth at Hospital Universiti Sains Malaysia

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The aim of this study was to evaluate the prevalence and contributing factors of infected socket in post surgical removal of mandibular wisdom tooth. The dental records of patients who attended Hospital Universiti Sains Malaysia for surgical removal of mandibular third molars from January 2006 to December 2008 were reviewed. Patient's identification data, medical problems, oral hygiene, smoking status and occurrence of post operative complication were recorded. Total of the 342 surgical removals, 256 patients met the inclusion criteria of complete data recorded where 149 were female and the remaining 107 were male with the average age of 24.4 years. Of the 256 surgeries, postoperative infection occurred in 27 patients (10.5%). Other complications were ulcer (n = 8, 3.1%), swelling more than 1 week (n = 11, 4.3%), sensory dysfunction of the inferior alveolar nerve (n = 6, 2.3%) and trismus (n = 10, 3.9). The risk of infected socket was greater among the patients who had poor oral hygiene. There was no significant relationship between the medical problems, age, gender, smoker status and infected socket. In conclusion postoperative infection is the most common type of complication and oral hygiene is one of the contribution factors for development of infected socket.

Detection of mutations in Jagged2 gene in non-syndromic cleft lip with or without cleft palate patients

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Cleft lip with or without cleft palate (CL±P) is the most common congenital defect and lead to feeding difficulty, speech problems as well as conductive hearing problem. CL±P is a multifactorial disorder in which both environment factors and genetic factors are involved and the exact mechanism which contributes to CL±P still remains unclear. A cross sectional study was conducted to determine the mutations in Jagged2 gene among CL±P patients in Hospital Universiti Sains Malaysia (HUSM). The patients whose mother had history of taking anti-epileptic drugs were excluded from the study. Blood samples were collected from 12 non-syndromic CL±P patients and 2 controls that came to the hospital. All patients and controls were of Malay ethnicity. Primers were designed using the primer version 3.0 software and polymerase chain reaction was carried out to amplify the exons 13, 14, and 15 of Jagged2 gene. Sequencing was carried out and the results were analysed using the Bioedit software. 1 out of 12 samples of the patients showed a heterozygous mutation at intron 13 in Jagged2 gene, whereas the other samples as well as the controls did not harbour any mutation. In conclusion, mutation in Jagged2 gene may be associated with non-syndromic CL±P patients.

A study of dietary intake and its association with early childhood caries

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The objective of this study was to determine the relationship between dietary intake and early childhood caries in children aged 36 to 71 months old. This was a cross sectional study involving 56 randomly selected children who attended the dental clinic of Hospital Universiti Sains Malaysia. A 24-hour dietary recall regarding the children's food intake was obtained from the parents. The children were then examined for their caries experience. Amount of dietary intake was calculated using DIET 4 software and the data were then analysed using SPSS version 12.0. Results from the study showed that early childhood caries was observed in 85.7% of the children. The dmft score ranged from 0 to 19, with a mean of 7.3 (SD=5.01). The carbohydrate, protein and fat intakes were found to be highly varied, with a mean of 207.2g (SD=67.43),

43.9g (SD=16.58) and 36.7g (SD=14.77) respectively. The mean sugars consumption was 94.7g (SD=65.10) along with sugars exposure frequency averaged at 7.0 (SD=2.56). However, Pearson's correlation analysis found no significant relationship between the amount of dietary intake and frequency of sugars exposure with dental caries status. As a conclusion, this population showed high caries experience and sugars intake, with majority of them taking adequate amount of nutrients. Nevertheless, only a weak relationship was found between dietary intake and early childhood caries. The multifactorial etiology of dental caries and the regular use of fluoride may have contributed to this finding.

The outcome of pulpotomy in primary molars performed by students at Universiti Sains Malaysia

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One of the aims in providing treatment in paediatric dentistry is to preserve the primary dentition in an existing dental arch until the permanent successors erupt. Pulpotomy is a method of vital pulp therapy in maintaining the function of the teeth that would otherwise be intended for extraction. The purpose of this cross sectional study was to evaluate the clinical and radiographic success rate of ferric sulphate and formocresol pulpotomy in primary molars among paediatric patients attending School of Dental Sciences, Universiti Sains Malaysia (USM) undergraduate dental clinic. A total of 55 primary molars of 55 children ranging from 3 to 12 years old who have had vital pulpotomy were evaluated retrospectively and were called for clinical and radiographic review. 86.7% (39) of teeth treated with ferric sulphate and 90.0% (9) of teeth treated with formocresol remained free of any radiographic pathology. 4.4% (2) of teeth treated with ferric sulphate showed evidence of pathological root resorption and periapical radiolucency, while 10.0% (1) of tooth treated with formocresol had internal root resorption. The clinical success rate of ferric sulphate pulpotomy and formocresol pulpotomy was 44.4% (20 teeth) and 60% (6 teeth) respectively. Excessive tooth mobility was observed in 6.7% (3) of ferric sulphate and 10% (1) of formocresol group. 17.8% (8) and 20% (2) of pulpotomised teeth showed early exfoliation in ferric sulphate and formocresol group respectively. In conclusion, the overall clinical and radiographic success rate of ferric sulphate and formocresol pulpotomy are high. Both ferric sulphate and formocresol can still be utilised as pulpotomy agents in the didactic and clinical training of dental undergraduates at Universiti Sains Malaysia.

The evaluation of the effect of smoking in oral clinical variables

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Smoking was suggested to be a primary cause of many oral diseases and adverse oral conditions. Smoking could lead to periodontal problems by affecting the periodontium, the tissues that surround and support the teeth. The negative effect of smoking on the oral health is well known. This study was aimed to evaluate the effect of smoking on the clinical variables which consisted of plaque score, gingival score and DMFX. This is a case control study in which 82 walk-in subjects (63.8%) were selected from 120, based on the inclusion and exclusion criteria. Guided open ended questionnaires and expired carbon monoxide were subjected to all participants and subsequently grouped into two categories of smoker and non smoker. Plaque score, gingival score and DMFX were determined for each participant. All data were collected and analyzed by using Statistical Package for Social Sciences (SPSS) version 12.0 Statistical software. The comparison between oral clinical variables and smoking status were analyzed by using independent *t*-test. The mean gingival score was significantly higher in smoker ($p=0.041$). The other parameters for plaque score and DMFX did not show significant differences ($p=0.058$, $p=0.112$). In conclusion smokers significantly increased gingivitis compared to non smokers. Plaque score and DMFX were not significant because of multifactorial causes such as poor oral hygiene.

The effectiveness of *Salvadora persica* against *Streptococcus mutans* and *Lactobacilli*

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The miswak or *Salvadora persica* is a traditional chewing stick for cleaning teeth. Several studies have demonstrated the antimicrobial effects of *Salvadora persica*. This study aimed to assess the effectiveness of miswak, electric toothbrush modified with miswak, electric toothbrush with miswak toothpaste, electric toothbrush with toothpaste and normal saline against salivary *Streptococcus mutans* and *Lactobacilli*. The participants comprised of 14 healthy dental students who had good oral hygiene. A single-blind, randomized clinical trial study with crossover design was used. Patients' saliva and caries risk test (CRT) Vivadent was used to quantify the levels of *Streptococcus mutans* and

Lactobacilli. The results showed that there was a reduction in *Streptococcus mutans* and *Lactobacilli* risk score after using different agents i.e. miswak, colgate kayu sugi, colgate total and saline except for modified miswak. However, there was no significant difference for *Streptococcus mutans* ($p=0.158$) and *Lactobacilli* ($p=0.396$) risk score reduction when comparison was done between the groups. It can be concluded that miswak chewing stick (*Salvadora persica*) has antimicrobial effects similar to toothbrushing with toothpaste. However, modified miswak has no antimicrobial effects.

Efficacy of *Salvadora persica* in buffer capacity

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Salvadora persica or Miswak is used as a chewing stick for tooth cleaning. This study aims to compare the efficacy of Miswak, electric toothbrush modified with miswak, electric toothbrush with Colgate Kayu Sugi, electric toothbrush with Colgate Total and normal saline in buffer capacity and its ability to increase salivary flow rate. A randomized clinical trial study with crossover design was used. A total of 14 participants who had fulfilled the inclusion and exclusion criteria were selected from students of dental school USM. Participants had undergone five interventions and their saliva was collected before and after each intervention. The Caries Risk Test (CRT) buffer strip was used to assess the capability of saliva buffer systems and volume of saliva were recorded in 6 minutes to determine the salivary flow rate. Buffer capacity changes within five groups intervention using Repeated Measures ANOVA revealed significant effects ($p<0.001$), using paired sample *t*-test showed significant effects ($p<0.005$) when modified Miswak, Colgate Kayu Sugi, Miswak chewing stick and Colgate Total were compared with normal saline. The changes in salivary flow rate within five groups using Repeated Measures ANOVA revealed significant effects ($p=0.01$), using paired sample *t*-test showed significant effects ($p<0.005$) when modified Miswak, Colgate Kayu Sugi, Colgate Total and normal saline compared with Miswak chewing stick. From this study, Miswak has similar efficacy in buffer capacity as the other groups but it can increase the salivary flow rate if compared with the other groups.

The assessment of microleakage of few restorative materials after immersion in acidic solution

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Some restorative materials are susceptible to erosion but whether it also cause microleakage is not known. The aim of this study is to assess microleakage of few restorative materials after immersion in acidic drink. Standard 'U' shape cavities of 4mm in diameter X 2mm depth were prepared on buccal/lingual surface of 64 samples from human premolars and molars. They were divided into 4 groups of 13 samples with 3 controls which restored either with Fuji IX (Group 1), Fuji II LC (Group 2), Filtek Z 250 (Group 3) or Silverfill amalgam (Group 4). All surfaces were painted with nail varnish leaving only 2mm surrounding the restoration before 24 hours immersion in lemon juice (pH 2.74) and in deionised distilled water (DDW) for control samples. Surface photos for erosion were taken before immersion in methylene blue for 7 days. After sectioning, the assessment of dye penetration was done using Leica imaging system. Photos show that Fuji IX demonstrated obvious erosion but no significant changes seen on other materials. Kruskal-Wallis test indicates that microleakage between all four groups were statistically significant ($p < 0.05$). The most significant difference was between Filtek Z 250 and Fuji IX ($p < 0.05$). Conventional GIC is the most affected by the erosion process and the degree of microleakage between all the materials tested was significantly different.

Facial changes after extraction of four first premolars

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Realignment of tooth orthodontically with extraction of four first premolars might change patient's facial profile. The objective of this study is to quantify facial soft tissues and hard tissues profile changes in Malay female patients treated orthodontically with extraction of four first premolars. This is a retrospective study involving 13 Malay female patients who were orthodontically treated with extraction of four first premolars in the orthodontic clinic of Hospital Universiti Sains Malaysia. Pre- and post-treatment lateral cephalograph of patients were traced and linear and angular measurements were made. Data then were analysed using non-parametric Wilcoxon Sign-Rank test. Results showed no significant changes found in the hard tissue variables after treatment. From soft tissue profile analysis, only 'Ls-Sn-Pog' had significant changes after

treatment ($p < 0.05$), which has decreased 1.0 mm after treatment. Other variables were found to have no significant changes. This study was limited by a small sample size and time. It would suggest that an appropriately selected plan with extraction should allow treatment to be carried out without negative effects on the facial profile. Growth was not a factor in this sample; therefore, realignment of teeth due to crowding may have contributed to this finding.

The evaluation of effect of smoking on salivary variables

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Cigarette smoking had long been associated with periodontal disease. The purpose of this study is to evaluate the effect of smoking on salivary flow rate and salivary buffering capacity (resting and stimulated salivary). 82 walk-in subjects (68.3%) selected from 120 subjects were interviewed to identify their smoking status. Expired carbon monoxide (ECO) collection done where ECO concentration > 8 ppm distinguish smokers from non smokers. Resting saliva and stimulated saliva was collected. Flow rate of saliva was determined by calculating the volume of saliva/time taken to collect the sample for resting and stimulated saliva sample. Determination of buffering capacity was carried out using hand held pH meter for resting and stimulated saliva. The resting saliva flow rate between smoker and non smoker were not significantly different ($p = 0.754$). There were also no significant difference between the stimulated saliva flow rate of smokers and non smokers ($p = 0.292$). However, the mean value was generally larger for the non smokers compared to the smokers. A significant relationship was found for salivary buffering capacity of resting saliva between smokers and non smokers ($p = 0.001$). There was also a significant relationship for stimulated salivary buffering capacity between smokers and non smokers ($p = 0.006$). In conclusion, smokers will have an increased risk of developing oral problems compared to non smokers because of saliva quality reduction.

***In vitro* study of antibacterial properties of locally synthesized zinc oxide on oral bacterial**

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Zinc oxide is widely used in health related product due to its high refractive index, good thermal, and UV-protection properties. Ceramic powder of zinc oxide (ZnO) was also found to show marked antibacterial activity. Different types of zinc oxide powders were synthesized at School of Physics, Universiti Sains Malaysia namely gold, pharma and white. In this present work, the objective of the study is to measure the antibacterial activity of the synthesized zinc oxide against 5 types of oral bacteria, *Streptococcus mutans*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Streptococcus sobrinus*, and *Lactobacillus salivarius*. All the three types of zinc oxide were prepared in the concentration of 10mM. Then were mixed with the bacteria suspension by pipetted it into the microtube. The suspension of zinc oxide powders with the oral bacteria was lawned onto tryptic soy agar (TSA). After 24 hrs incubation, the number of colony forming unit (CFU) on the agar plate were counted. The results showed that all three types of zinc oxide have antibacterial effect on *S. sobrinus* and *L. salivarius* but no antibacterial effect on the other oral bacteria. In conclusion, study showed that zinc oxide selectively inhibit towards *S. Sobrinus* and *L. salivarius* compare with three other bacteria.

Effects of polishing techniques on the staining of nano-tooth coloured materials

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Surface polishing affect the staining of nano-tooth coloured materials. The objective of this study is to determine the effect of tea and coffee staining on nano-composite resin and nano-ormocers polished with 2 different systems. Eighty-four discs (5mm x 2 mm) of both Filtek Z350 and Ceram X were fabricated using acrylic moulds, divided into 3 groups of 14, according to the different polishing procedures: (1) Sof-lex (2) Enhance/Pogo (3) control (no polishing). After polishing, the tests materials were subdivided into 2 groups (n=7), then immersed in either tea or coffee for 48, 96 and 168 hours at 37°C. The colour difference (ΔE) values were assessed with a spectrophotometer (Cecil CE 2021 UV/VIS), the data analysed using Kruskal-wallis Test. From the result, the polishing procedure significantly affected the ΔE values of

both nano-tooth coloured materials ($p < 0.05$). Both Filtek Z350 and Ceram X reacted differently in coffee and tea. Significant colour difference (ΔE) values for Filtek Z350 obtained with different polishing techniques exposed to coffee in ascending order: Sof-lex < Enhance/Pogo < Mylar strip. For Ceram X, significant colour difference (ΔE) values obtained in exposure to tea in ascending order: Enhance/Pogo < Mylar strip < Sof-lex. Mylar caused more staining in Filtek Z350 whilst Sof-lex caused the least staining, thus polishing is necessary to remove the resin-rich layer in achieving a stain resistant, more aesthetically stable surface. However, in Ceram X, Enhance/Pogo caused the least staining. It may be suggested to always use the polishing system produced by the same company that produces the restorative material for better staining resistant.

Oral health-related quality of life in women living with HIV/AIDS: a preliminary study

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The objective of this study was to determine the oral health-related quality of life (QoL) in women living with HIV/AIDS (WLWHA). This was a cross sectional study conducted among WLWHA registered with the Pertubuhan Masyarakat Prihatin, Kelantan. A self-administered Malay-translated version of the Oral Health Impact Profile (OHIP) questionnaire was used to assess the impact of oral health-related problems on QoL of the women since the past year. A total of 61 WLWHA completed the questionnaire thus far. Most of the subjects were Malay with a mean age of 36.4 years (SD 7.97). On average the subjects have been living with HIV for 4.8 years (SD 3.22). Functional limitations commonly experienced by the subjects were food catching in teeth or dentures (60.7%), stale breath (55.8%) and difficulty chewing on food (52.5%). Most subjects also complained of physical pain due to problems like toothache (76.8%), painful gums (65.6%) and sensitive teeth (62.3%). More than one-third of the subjects were psychologically affected by their dental problems that have prompted worries (39.4%), interrupted sleep (37.7%) and feelings of depression (32.8%). Social disabilities experienced include difficulty in doing usual job (24.6%), been irritable with other people (24.6%), and been less tolerant of spouse or partner (14.8%). Some of the subjects were handicapped by their oral problems where 41.0% felt that their general health had worsened. In conclusion, the QoL among WLWHA was negatively influenced by their oral health-related problems.