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**SOARING
UPWARDS**
MALAYSIAN HIGHER EDUCATION

POSTGRADUATE RESEARCH DAY 2017

IN CONJUNCTION WITH
14TH STUDENT SCIENTIFIC CONFERENCE

EMPOWERING SCIENCES
FOR POSTERITY

DATE:

27TH APRIL 2017 (THURSDAY)

VENUE:

SCHOOL OF DENTAL SCIENCES
UNIVERSITI SAINS MALAYSIA, HEALTH CAMPUS

ABSTRACT BOOK



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PGRD 2017/14th SSC Organizing Committee

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Message from the Dean



The School of Dental Sciences, Universiti Sains Malaysia (USM) is proud to welcome speaker, participants and everyone to the Postgraduate Research Day 2017 (PGRD 2017), which is held in conjunction with 14th Student Scientific Conference (14th SSC); the annual conference for the school's undergraduate students.

This event is a platform for researchers, postgraduates and undergraduates, to share with others the breakthrough and discoveries which benefits the humankind. The impact of research should be measured not only by high impact factor of publications, but also through solving the communities' problems.

The theme, **Empowering Sciences for Posterity**, invites the researchers to gather all the intellectual strength to preserving the sciences for future generations to come. Remember, we do not inherit this world, we merely borrowing it from our children. It is imperative that we also yield new sciences that would help and benefit the generations to come.

This is the moment to expand your knowledge, forge collaborations, and utilize all your dedication and skills to uphold sciences and education.

Have a wonderful conference.

Professor Dr. Adam Husein
Advisor, PGRD 2017/14th SSC
Dean, School of Dental Sciences, USM

Message from the Chairperson



In the Name of Allah, the Most Gracious and the Most Merciful.

The committee welcomes you to the PGRD 2017, held in conjunction with 14th SSC. Student Scientific Conference is a platform for our undergraduates to present their research electives. This year marks a new event for our annual SSC as we organize a conference for postgraduates as well. The objectives of the event today are to nurture research interest among our undergraduates and to inculcate good research culture in all researchers including undergraduates, postgraduates as well as lecturers.

There are 25 oral and 14 poster presentations for postgraduates while for undergraduates there are 35 oral and 15 poster presentations. All the presentations will be presented concurrently in parallel sessions at five venues. Interestingly, pitching is our new approach for the postgraduate oral competition to present their research output within 3 minutes.

As in previous years, we are honoured to have participants from Indonesia and Thailand. On behalf of the PGRD/14th SSC Organising Committee, I welcome all of you to this event. Let us make this scientific conference as a platform to educate, to inspire and to connect not only among us in School of Dental Sciences, USM but with the world.

I would also like to extend my gratitude to all the committee members for their excellent contributions and valuable time in making this event successful.

“Empowering Sciences for Posterity”
Thank you.

Associate Professor Dr. Dasmawati Mohamad
Chairperson, PGRD 2017/14th SSC

Postgraduate Research Day 2017/14th Student Scientific Conference

School of Dental Sciences, Universiti Sains Malaysia

27th April 2017

Time	Programme	Venue
8.00 am	Registration	DK 1, 2 nd Floor
8.30 am	Ceremonial procession of VIPs	
8.45 am	Doa recital	
8.50 am	Welcoming and officiating speech by Dean, School of Dental Sciences	
9.15 am	Multimedia presentation	
9.20 am	Break up session	
9.30 am	<u>Presentations</u> 14th SSC Oral (Basic Sciences) 14th SSC Oral (Clinical Sciences) 14th SSC Oral (Public Health) PGRD 2017 Oral 3-minute pitching 14th SSC Poster, PGRD 2017 Poster	DK 1, 2 nd Floor DK 2, 2 nd Floor Conf. Room, 2 nd Floor Auditorium, Ground Floor Seminar Room, 2 nd Floor
1.00 pm	Lunch break	
2.30 pm	Talk by Invited Speaker Title: Proposal to Publication: Ethical Concerns Professor Dr. Nik Soriani bt. Yaacob Director, Nexus Medical and Health Sciences	DK 1, 2 nd Floor
3.45 pm	Award presentation and closing ceremony	

DK 1 (Dewan Kuliah 1/*Lecture Hall 1*)

DK 2 (Dewan Kuliah 2/*Lecture Hall 2*)

Conf. Room – Conference Room



Postgraduate Research Day 2017

School of Dental Sciences
Universiti Sains Malaysia Health Campus
16150 Kota Bharu, Kelantan
27th April 2017

Oral 3-min pitching

Venue: Auditorium, Ground Floor

Judges:

1. Professor Dr. Suzina Sheikh Ab Hamid
2. AP Dr. Norhayati Luddin

No.	Authors	Title	Time
O01	<u>Abdul Manaf Abdullah</u> , Tuan Noraihan Azila Tuan Rahim, Dasmawati Mohamad, Hazizan Md Akil	Tensile properties of hybrid CF/ZnO filled PA 6 composites for craniofacial reconstruction application	9.30 am
O02	<u>Asrar Elahi</u> , Haslina Taib ¹ , Zurairah Berahim, Azlina Ahmad, Suzina Sheikh Ab Hamid	Evaluation of amniotic membrane as a scaffold for periodontal ligament fibroblasts: <i>An in vitro</i> study	9.38 am
O03	<u>Fatin Hazwani Fauzi</u> , Nurhayu Ab. Rahman, Suharni Mohamad	Detection of high-risk human papillomavirus in saliva samples of healthy subjects in Kelantan population	9.46 am
O04	<u>Hasan Subhi</u> , Fazal Reza, Adam Husein, Asma Abdullah Nurul	Gypsum-based materials for direct pulp capping: Effects of chitosan and BMP-2 inclusion on physical, antibacterial, and cellular properties	9.54 am
O05	<u>Imran Alam Moheet</u> , Ismail Ab Rahman, Norhayati Luddin, Nik Rozainah Nik Abdul Ghani	The evaluation study of adding nano- hydroxyapatite-silica into glass ionomer cement	10.02 am
O06	<u>Mohamed Kosba</u> , Zuliani Mahmoud, Rozita Hassan	Malocclusion and orthodontic treatment needs of transfusion-dependent thalassemia patients among Malays: A pilot study	10.10 am
O07	<u>Nazrul M. Yusoff</u> , Yanti Johari, Ismail Ab. Rahman, Dasmawati Mohammad, Fadhli Khamis, Adam Husein, Zaihan Ariffin	Hardness of flowable resin composite from rice husk	10.18 am
O08	<u>Muhamad Ropi Mamat</u> , Marzuki Omar, Adil Hussein	The use of alloplastic implant materials in orbital floor reconstruction: Titanium mesh versus porous polyethylene	10.26 am
O09	<u>Mushrath Islam</u> , Asilah Yusof, Mohammad Khursheed Alam	A 3D CT sagittal analysis of Bangladeshi population	10.34 am
O10	<u>Najian Ibrahim</u> , Thirumulu Ponnuraj Kannan, Azlina Ahmad, Khairani Idah Mokhtar	Cell viability and expression of cell cycle regulatory genes in stem cells from human exfoliated deciduous teeth treated with perivitelline fluid from horseshoe crab	10.42 am
Tea break, 10.50 am – 11.20 am			
O11	<u>Nasar Um Min Allah</u> , Zurairah Berahim, Azlina Ahmad, Thirumulu Ponnuraj Kannan	Effect of polypeptide growth factors on the viability of human gingival fibroblasts and umbilical vein endothelial cells	11.20 am
O12	<u>Nashid Fareen</u> , Mohammad Khursheed Alam, Mohd Fadhli Khamis, Norehan Mokhtar	Analysis of tweed's facial triangle in mixed dentition children with Class III malocclusion treated by two different appliances	11.28 am

No.	Authors	Title	Time
O13	<u>Nor Ain Fatihah Azlisham</u> , Zuliani Mahmood, Dasmawati Mohamad	Fluoride release profile of glass ionomer cement (GIC) with the incorporation of coumarin derivative	11.36 am
O14	<u>Nor Ainon Maziah Ghazali</u> , Wan Zaripah Wan Bakar, Ismail Ab Rahman	The assessment of compressive test for new modified GIC-nanosilica-hydroxyapatite-zirconia hybrid	11.44 am
O15	<u>Normah Yacob</u> , Raja Azman Raja Awang	Measuring tooth position discrepancy in relation to chronic periodontitis using 3D digital models	11.52 am
O16	<u>Nur' Aini Pungut</u> , Yanti Johari, Mohd Fadhli Khamis	Microleakage of dual cure composite, flowable composite, Biodentine, and MTA as furcal perforation repair materials in molar permanent teeth	12.00 pm
O17	<u>Nurul Hafizah Mohd Nor</u> , Zurairah Berahim, Azlina Ahmad, Khairani Idah Mokhtar@Makhtar, Thirumulu Ponnuraj Kannan	Differentiation and characterization of fibroblasts from stem cells from human exfoliated deciduous teeth (SHED)	12.08 pm
O18	<u>Nurul Izzati Hamzan</u> , Fatin Hazwani Fauzi, Nurhayu Abdul Rahman, Irfan Mohamad, Suharni Mohamad	Preliminary evaluation of nested polymerase chain reaction for detection of human papillomavirus 16 in oral squamous cell carcinoma	12.16 pm
O19	<u>Shamima Easmin Nishi</u> , Norma Ab Rahman, Rehana Basri, Mohammad Khursheed Alam, Adam Husein, Nor Farid Mohd Noor	Chewing activity of masseter and temporalis muscle in Class II malocclusion with different overbite	12.24 pm
Lunch break & Zuhur prayer			
O20	<u>Sharmin Sultana</u> , Md. Zakir Hossain, Norma Ab Rahman	Evaluation of children and their parents concern for orthodontic treatment need and DHC of IOTN assessment by clinician	2.00 pm
O21	<u>Siti Nazihahasma Hassan</u> , Suharni Mohamad, Rosline Hassan, Selamah Ghazali, Wan Suriana Wan Ab Rahman	Detection of Miltenberger blood group among anti-Mi ^a antibody suspected patients by genotyping	2.08 pm
O22	<u>Siti Nurnasihah Md Hashim</u> , Muhammad Fuad Hilmi Yusof, Hamshawagini Chandra, <u>Wafa' Zahari, Zul Faizuddin Osman</u> , Thirumulu Ponnuraj Kannan, Suzina Sheikh Abdul Hamid, Khairul Bariah Ahmad Amin Noordin, Azlina Ahmad	Effect of vascular endothelial growth factor on stem cell and angiogenic profile of stem cell from human exfoliated deciduous teeth on human amniotic membrane	2.16 pm
O23	<u>Wafa' Zahari</u> , Hamshawagini Chandra, Muhammad Fuad Hilmi Yusof, Siti Nurnasihah Md Hashim, Zul Faizuddin Osman, Thirumulu Ponnuraj Kannan, Azlina Ahmad, Khairul Bariah Ahmad Amin Noordin	Effect of IL-8 on PI3K/Akt/mTOR pathway during odontogenic differentiation of SHED	2.24 pm
O24	<u>Wan Nur Fadilla Wan Hamad</u> , Abdul Manaf Abdullah, Dasmawati Mohamad	Shrinkage evaluation on PMMA composite	2.32 pm
O25	<u>Zul Faizuddin Osman</u> , Azlina Ahmad, TP Kannan, Khairul Bariah Ahmad Amin Noordin	Application of Western blot to elucidate signaling pathway involved in interleukin-8 mediated differentiation of SHED into odontoblast-like cells	2.40 pm

Judges

1. Professor Dr. Adam Husein
2. Professor Dr. Shaharum bin Shamsuddin

No.	Authors	Title	Time
P01	<u>A'attiyah Ab Alim</u> , Wan Afiqah Syahirah Wan Ghazali, Nor Azah Mohd Ali, Thirumulu Ponnuraj Kannan, Suharni Mohamad, Ahmad Azlina	Cytotoxic and phytochemical analysis of <i>Clinacanthus nutans</i>	9.30 am
P02	<u>Farhana Omar</u> , Mohamad Syahrizal Halim, Zuryati Ab.Ghani, Normastura Abd. Rahman	Over-the-counter and professionally-prescribed bleaching agent: <i>In vitro</i> evaluation of its effectiveness and its safety	9.38 am
P03	<u>Fatimah Suhaily Abdul Rahman</u> , Habsah Hasan, Hasnah Osman, Dasmawati Mohamad	Antibacterial activity of fabricated glass ionomer cement (GIC) containing hydrazinyl coumarin derivative (HCD)	9.46 am
P04	<u>Fazal Shahid</u> , Norma Ab Rahman, Mohammad Khursheed Alam, Mohd Fadhli Khamis, Adam Husein, Rehana Basri	Effectiveness of low-level laser therapy in enhancing tooth movement, bone density changes, averting relapse, and pain management throughout orthodontic treatment in humans: A systematic review	9.54 am
P05	<u>Muhammad Fuad Hilmi Yusof</u> , Hamshawagini Chandra, Wafa' Zahari, Siti Nurnasihah , Khairul Bariah Ahmad Amin Noordin, Ahmad Azlina	The role of MEK pathway during angiogenic differentiation of SHED in 3D culture of human amniotic membrane and VEGF treatment	10.02 am
P06	<u>Hamshawagini Chandra, Wafa' Zahari, Siti Nurnasihah</u> Md Hashim, Muhammad Fuad Hilmi Yusof, Khairul Bariah Ahmad Amin Noordin, Thirumulu Ponnuraj Kannan, Nazia Abdul Majid, Khairani Idah Mokhtar, Sarina Sulong, Ahmad Azlina	Interaction of osteo-odontogenesis molecules in relation to NF-κB pathway of SHED induced by BMP-2 seeded on human amniotic membrane scaffold	10.10 am
P07	<u>Hii Siew Ching</u> , Norhayati Luddin, Ismail Ab Rahman, Kannan Thirumulu Ponnuraj	The cytotoxicity effect of nanohydroxyapatite-silica-GIC and conventional GIC on dental pulp stem cells (DPSCs): A preliminary study	10.18 am
P08	<u>Johari Abdullah</u> , Zainul Ahmad Rajion, Adam Husein, Helmi Hadi	Comparison of commercial and three open-source medical imaging software for reconstruction of 3D skull models from computed tomography data	10.26 am
P09	<u>Maher M. Abosadeqh</u> , Shaifulizan Ab. Rahman, Norkhafizah Saddki	Association of traumatic head injuries and maxillofacial fractures among patients treated by Oral & Maxillofacial Surgery Unit, Hospital Universiti Sains Malaysia	10.34 am
P10	<u>Md. Mosharraf Hossain</u> , Mohammad Khursheed Alam, Mohd Fadhli Khamis	Determination of facial angle in deferent ethnicity in Malaysia	10.42 am
Tea break, 10.50 am – 11.20 am			
P11	<u>Tamzid Ahmed</u> , Norma Ab Rahman, Mohammad Khursheed Alam	Bond strength of orthodontic brackets <i>in vivo</i> : A systematic review	11.20 am
P12	<u>Wael Ahmed</u> , Rozita Hassan	Wright treatment of Class III malocclusion in an adolescent with ASSD appliance: A case report	11.28 am
P13	<u>Wan Afiqah Syahirah Wan Ghazali</u> , Thirumulu Ponnuraj Kannan, Nurul Asma Abdullah, Khairani Idah Mokhtar	Immunomodulatory properties of <i>Clinacanthus nutans</i>	11.36 am
P14	Shifat A Nowrin, <u>Fazal Shahid</u> , Norma Ab Rahman, Mohammad Khursheed Alam	Camouflage treatment of skeletal Class III malocclusion associated with tooth agenesis and tooth size discrepancy: A rare case report	11.44 am

Abstracts

Postgraduate Research Day (PGRD)

Kota Bharu, Kelantan, Malaysia. 27th April 2017

Oral Presentations

(O01) Tensile properties of hybrid CF/ZnO-filled PA 6 composites for craniofacial reconstruction application

Abdul Manaf Abdullah¹, Tuan Noraihan Azila Tuan Rahim², Dasmawati Mohamad¹, Hazizan Md Akil²

¹School of Dental Sciences, Universiti Sains Malaysia, 16150 Kota Bharu, Kelantan, Malaysia.

²School of Materials and Mineral Resources Engineering, Universiti Sains Malaysia, 14300 Nibong Tebal, Penang, Malaysia.

Introduction: Exothermic burn reaction, lack of integration with bone, and inflammation can restrict the PMMA application for craniofacial reconstruction.

Objective: To evaluate the mechanical properties of hybrid carbon fibre (CF)/zinc oxide (ZnO)-filled polyamide 6 (PA 6) for potential craniofacial reconstruction application.

Methodology: PA 6 was compounded with 5 wt% of ZnO together with 15-, 20-, 25-, and 30-wt% of CF using a twin-screw extruder (PSM 30, Sino-Alloy Machinery). The obtained pellets were injection moulded (Boy 22M, Dr.Boy GmbH) to form tensile specimens. The tensile specimen in dumbbell shape were mechanically evaluated using a universal testing machine (AGX-2plus, Shimadzu) at crosshead speed of 10 mm/min. Fractured surface of the specimens were further analysed via field emission scanning electron microscope (FESEM). Statistical analyses of one-way ANOVA and posthoc Tukey test ($p < 0.05$) were employed using IBM SPSS software version 22.0.

Results: Overall, incorporation of hybrid CF/ZnO significantly increased the tensile strength and modulus of PA 6 composites to 72.19-117.07, 2858.71-4818.21 MPa, respectively, as compared to unfilled PA 6 (50.66, 1268.86 MPa). FESEM showed that CF and ZnO were homogeneously distributed in PA 6 matrix. **Conclusion:** Hybrid CF/ZnO filler effectively reinforced the PA 6 matrix. With outstanding mechanical properties, novel hybrid CF/ZnO-filled PA 6 composite has demonstrated its potential for craniofacial reconstruction application.

(O02) Evaluation of amniotic membrane as a scaffold for periodontal ligament fibroblasts: An *in vitro* study

Asrar Elahi¹, Haslina Taib¹, Zurairah Berahim¹, Azlina Ahmad¹, Suzina Sheikh Ab Hamid²

¹School of Dental Sciences, Universiti Sains Malaysia, 16150 Kota Bharu, Kelantan, Malaysia.

²Tissue Bank, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kota Bharu, Kelantan, Malaysia.

Introduction: Human amniotic membrane (HAM) is a natural biomaterial with many advantages. It is biocompatible and provides good characteristics for cell attachment and proliferation. **Objective:** To evaluate the efficacy of HAM as a scaffold for human periodontal ligament fibroblasts (HPDLFs) for future use in periodontal tissue regeneration. **Methodology:** Commercially-available hPDLFs (Lonza, USA) were cultured in α -MEM till passage 6. The hPDLFs (5.0×10^4 cells) were then seeded on 1 cm² glycerol preserved HAM (USM Tissue Bank, Malaysia) in 6-well plate at 37°C with 5% CO₂. HAM only, was used as a control. The attachment and proliferation of cells were evaluated through scanning electron microscopy (SEM), histological analysis, and alamarBlue[®] proliferation assay from day 1 until day 21. $P < 0.05$ was considered as significant. **Results:** SEM analysis demonstrated that flat-shaped HPDLFs had attached and became overlapping on HAM surface up to day 7. Histologically, there was a monolayer to multilayers of cells on HAM. However, by day 21, the cells demonstrated alteration in their morphology and became rounded in shape. Assessment of cell viability by Friedman's two-way analysis of variance using SPSS version 22.0 showed that the proliferation rate of HPDLFs on HAM had increased significantly from day 1 to day 7 ($p = 0.012$). Conversely, final observation at day 21 revealed significant cell reduction ($p = 0.005$). **Conclusion:** HAM is capable to function as a scaffold for HPDLFs within 7 days. However, the efficacy of HAM over longer culture duration requires further investigations.

(O03) Detection of high-risk human papillomavirus in saliva samples of healthy subjects in Kelantan population: A pilot study

Fatin Hazwani Fauzi, Nurhayu Ab. Rahman, Suharni Mohamad

School of Dental Sciences, Universiti Sains Malaysia Health Campus, 16150 Kota Bharu, Kelantan, Malaysia.

Introduction: The concomitant of human papillomavirus (HPV) might be the primary oncogenic factor to induce carcinogenesis in oral cancer patients who are non-tobacco and non-alcohol consumers. Some oncogenic types of the HPV have been found in the oral cavity of cancer-free individuals. No information was obtained about oral HPV prevalence among healthy individuals in Kelantan population; therefore, this pilot study was conducted to provide more detailed information about oral prevalence of high-risk HPV among healthy patients in Kelantan. **Objective:** To determine the high-risk HPV prevalence in saliva samples of healthy subjects. **Methodology:** A group of 26 healthy adult subjects at USM Dental School was selected to participate in this study. The genomic DNA was isolated from the subjects' saliva samples. Human beta globin gene was amplified in all samples with GH20/PCO4 primers to control the sample quality and adequacy. Positive samples for this gene were subjected to high-risk HPV detection by nested polymerase chain reaction using MY09/11 and GP5/6 consensus primers. **Results:** From the 26 healthy subjects examined, one subject (3.8%) was found to be positive for high-risk HPV in this study. **Conclusion:** The results of this study may be of significant value to further our understanding of oral health and disease risk, as well as exploring the role of other factors that influence oral HPV exposure. Further evaluation using larger sample size could provide more extensive estimates of oral HPV infection within this population.

(O04) Gypsum-based materials for direct pulp capping: Effects of chitosan and BMP-2 inclusion on physical, antibacterial, and cellular properties

Hasan Subhi¹, Fazal Reza¹, Adam Husein¹, Asma Abdullah Nurul²

¹School of Dental Sciences, Universiti Sains Malaysia Health Campus, 16150 Kota Bharu, Kelantan, Malaysia. ²School of Health Sciences, Universiti Sains Malaysia Health Campus, 16150 Kota Bharu, Kelantan, Malaysia.

Introduction: Effective pulp capping materials must have adequate physical and antibacterial properties and induce dentin bridge formation; however, many current materials do not satisfy clinical requirements. **Objectives:** To determine the physical and antibacterial properties of experimental gypsum (Gyp)-based material and evaluate its effects on cell viability, alkaline phosphatase (ALP) activity, and cell attachment of stem cells from human exfoliated deciduous teeth (SHED). **Methodology:** The experimental material was tested with different concentrations of chitosan (CHT) with and without BMP-2. Physical properties, such as setting time, compressive strength, and pH were then determined. Agar diffusion method was used to evaluate the antibacterial activity of the material against *Streptococcus mutans* and *Streptococcus sobrinus*. In addition, MTS assay, colorimetric ALP assay, and scanning electron microscopy (SEM) were used to assess cell viability, ALP activity, and cell morphology and attachment, respectively. **Results:** The setting time, compressive strength, and pH obtained were 4.1–6.6 min, 2.63–5.83 MPa, and 6.5–5.7, respectively. Gyp-CHT showed potent antibacterial activity against *S. mutans* and *S. sobrinus*. In the MTS assay, the cell viability to Gyp with different CHT concentrations was similar to that of the control on day 1 but statistically different from that of Gyp alone on day 3. The ALP activity of SHED was significantly higher ($p < 0.05$) in CHT- and BMP-2-containing materials than those in the control and Dycal at both days 3 and 14. The SEM image revealed that flattened cells were distributed across and adhered to the material surface. **Conclusion:** Gyp-CHT-BMP-2 material shows promise as a potential alternative to conventional materials for direct pulp capping.

(O05) The evaluation study of adding nano-hydroxyapatite-silica into glass ionomer cement

Imran Alam Moheet, Ismail Ab Rahman, Norhayati Luddin, Nik Rozainah Nik Abdul Ghani

School of Dental Sciences, Universiti Sains Malaysia, 16150 Kota Bharu, Kelantan, Malaysia.

Introduction: Glass ionomer cements are used in dentistry due to their self-adhesive, anti-caries, and good biocompatibility properties. However, it has low strength. **Objectives:** To evaluate and compare the material characterisation, compressive strength, and surface hardness of material following the addition of nano-hydroxyapatite-silica (NHS) into the conventional glass ionomer cement (GIC) matrix. **Methodology:** NHS was synthesised using one-pot sol-gel with different concentration of TEOS. It was then characterised using Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), scanning electron microscope (SEM), and transmission electron microscope (TEM). GIC specimens were fabricated according to the instructions from manufacturer. NHS was added at different percentage by weight. Modified GIC specimens were conditioned for 24 hours in distilled water at 37°C. Compressive strength and surface hardness of the conventional and modified GIC were evaluated. The mean data obtained for hardness and compressive tests of specimens were analysed by one-way ANOVA and Tukey's test. Level of significance was set at $p < 0.05$. **Results:** FTIR and XRD analyses confirmed the formation of hydroxyapatite-silica nano-composite. SEM and TEM images showed all hydroxyapatite crystals were elongated and covered by smaller silica particles. The nano-powder consisted of a mixture of spherical silica particles (50 nm) and elongated hydroxyapatite particles were in the range between 100-200 nm. Hardness and compressive strength of HA-35SiO₂-GIC were higher than that of HA-21SiO₂-GIC, HA-11SiO₂-GIC, with the highest hardness achieved by 10% HA-35SiO₂-GIC giving 64.77±6.18 HV (~36% increase). Similarly, highest compressive strength achieved was 141.89±16.05 MPa (~17% increase). **Conclusion:** The addition of NHS to conventional GIC significantly enhanced the mechanical properties of the material. Hence, it can be used as a potential dental restorative material in dentistry.

(O06) Malocclusion and orthodontic treatment needs of transfusion-dependent thalassemia patients among Malays: A pilot study

Mohamed Kosba, Zuliani Mahmood, Rozita Hassan

School of Dental Sciences, Universiti Sains Malaysia Health Campus, 16150 Kota Bharu, Kelantan, Malaysia.

Introduction: There is no clear data about the occlusal status or orthodontic treatment needs among transfusion-dependent thalassemia patients in Malay population. **Objectives:** To evaluate the frequency of malocclusion and assess the orthodontic treatment needs in transfusion-dependent thalassemia patients among Malay ethnic group. **Methodology:** Twelve transfusion-dependent thalassemia patients, 5 females and 7 males, age range from 12-23, with mean age 16.2 years, without previous orthodontic treatment, from Hospital Sultanah Bahiyah, Kedah were selected. An alginate impression was taken, followed by upper and lower casts poured with dental stone type IV. Ten occlusal traits of Dental Aesthetic Index (DAI) were assessed on each pair of study models by a single examiner. Cumulative DAI scores were calculated according to standard DAI method to differentiate the severity of malocclusion and orthodontic treatment need. Prevalence of malocclusion was determined in term of Angle's classification. Data was analysed with SPSS version 22.0 and Mann-Whitney *U* test was carried out for a level of significance between gender at $p < 0.05$. **Results:** There was no statistically significant difference in malocclusion or DAI between genders. 41.67% of the samples were Class I Angle's classification, while 58.34% were Class II Angle's classification and no Class III was recorded. With regard to DAI, 58.34% fall in the minor malocclusion category, 25% of the samples were categorised in the definite category, while only 16.66% of patients were identified in the severe category and no handicapped category was recorded. **Conclusion:** The gathered data suggested a tendency towards Class II malocclusion with a favourable orthodontic treatment need in the group of transfusion-dependent thalassemia patients.

(O07) Hardness of flowable resin composite from rice husk

Nazrul M. Yusoff, Yanti Johari, Ismail Ab. Rahman, Dasmawati Mohammad, Fadhli Khamis, Adam Husein, Zaihan Ariffin

School of Dental Sciences, Universiti Sains Malaysia Health Campus, 16150 Kota Bharu, Kelantan.

Introduction: Flowable resin composites (FRCs) were produced by reducing the filler content or altering the viscosity of the monomer mixture. The material composition such as the filler size and content and the monomer used influenced the FRCs hardness. In this study, FRCs that used nanohybrid silica extracted from rice husk had been prepared by altering the monomer mixture to decrease their viscosity.

Objective: To evaluate the hardness of two experimental dental FRCs from rice husk in comparison to other commercial FRCs.

Methodology: Two commercial FRCs namely Filtek Z350 flow and Tetric N flow and the experimental FRCs with different loading of Bis-GMA at 50% and 40% were used. Ten cylindrical specimens (5 x 2 mm) for each material were prepared in acrylic mould, light-cured, and polished. Prior to hardness test, all composites were immersed in distilled water at 37°C for 24 h. The Vickers' hardness number (VHN) was measured using Vickers' hardness tester and their surface morphology was investigated using scanning electron microscopy (SEM). The data were analysed by one-way ANOVA followed by Dunnett's posthoc test ($p < 0.05$). **Results:** Filtek Z350 flow was significantly higher with regard to VHN compared to the other FRCs tested. There was no significant difference in VHN between the Tetric N flow and the two experimental FRCs. SEM showed a well distributed embedded spherical filler particle in all FRCs. **Conclusion:** The two experimental FRCs were comparable to Tetric N flow. However, Filtek Z350 flow exhibited the highest hardness. This was possibly attributed to different filler loading. Between the experimental composites, 40% Bis-GMA had a higher hardness which can be explained by dilution effect on monomer system. In general, mechanical properties improved with increased filler loading and dilution of base monomer.

(O08) The use of alloplastic implant materials in orbital floor reconstruction: Titanium mesh versus porous polyethylene

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Introduction: Floor of the orbit, due to its thinness, may get fractured following trauma. **Objectives:** To analyse clinical outcomes and complications after orbital floor repair and specifically comparing the outcomes between titanium mesh and porous polyethylene. The size of the orbital floor and the defect were also measured based on preoperative 3D computed tomography scan. **Methodology:** A cross-sectional study was conducted on 17 patients after at least six months postoperatively. Demographic data were collected from the patients' record and operative notes. Patients who fulfilled the criteria were assessed for diplopia, gaze limitation, enophthalmos, and other complications such as infection, implant extrusion, entropion, and extropion. The size of orbital floor and its defect were estimated using OsiriX software. Data were analysed using SPSS version 22.0. Nonparametric test and Mann-Whitney test were used for comparison. The significance level was set as $p < 0.05$. **Results:** Postoperatively, 52.9% of subjects were reconstructed with titanium mesh and 47.1% with porous polyethylene. After orbital floor repair, 35.3% of subjects had complications. However, there was no significant difference between the two materials in terms of complication rate ($p > 0.05$). The mean size of orbital floor was 6.134 cm² and the mean defect was 2.253 cm². Only 5.9% had fracture defect involving more than half of the orbital floor. **Conclusion:** Titanium mesh and porous polyethylene are comparable in terms of clinical outcome and complication for use in orbital floor reconstruction. Measurement of the size of orbital floor defect based on CT scan image may help in deciding suitable implant material prior to the reconstruction surgery.

(O09) A 3D CT sagittal analysis of Bangladeshi population

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Introduction: The anteroposterior error is normally of most extreme concern to patients and guardians and henceforth has attained extreme consideration in orthodontics. Sagittal analysis has dependably been a fundamental piece of diagnosis. Previously established parameters such as the ANB angle, Beta angle, Yen angle, and W angle have been characterised and utilised viably for the assessment of anteroposterior inconsistencies influencing the apical bases of the jaws. **Objectives:** The purpose of this study was the skeletal sagittal appraisal of the Bangladeshi populace by utilising ANB, Wits appraisal, Beta angle, W angle, and Yen angle 3D CT sagittal analysis. **Methodology:** A total of 117 (91 males and 26 females) Bangladeshi subjects who had computed tomography (CT) scan for reasons other than because of craniofacial surgeries or deformations were researched. A 3D imaging programming (Mimics 11.02 Materialize) was used to prepare the CT pictures where measurements were done for ANB, Wits appraisal, Beta angle, W angle, and Yen angle. SPSS was utilised for distinct investigation of data and t test was applied to assess the sexual dimorphism for measured values. **Results:** The majority of the deliberate examinations were equivalent to the established norms. There was insignificant difference found in the obtained values between males and females. **Conclusion:** Bangladeshi norms for ANB, Wits appraisal, Beta angle, W angle, and Yen angle were built up in 3D CT. All the performed estimations were similar to the established norms. No huge sexual dimorphism was found in this study.

(O10) Cell viability and expression of cell cycle regulatory genes in stem cells from human exfoliated deciduous teeth treated with perivitelline fluid from horseshoe crab

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Introduction: Perivitelline fluid (PVF) of horseshoe crab has been reported to be non-genotoxic and non-mutagenic to stem cells from human exfoliated deciduous teeth (SHED). **Objectives:** To study the cell viability and gene expression of cell cycle regulatory genes in SHED treated with PVF from horseshoe crab. **Methodology:** The effect of PVF (0.019 mg/ml) on SHED was investigated for cell viability using LIVE/DEAD viability/cytotoxicity kit. Gene expression analyses of cell cycle regulatory genes (*CDKN2A*, *BCL2L11*, *PTEN*, *MDM2*, *TP53*) using reverse transcriptase polymerase chain reaction (RT-PCR) were done for 21 days of incubation. Concomitant controls without treatment with PVF were employed. Mann-Whitney test was employed to test the significance ($p \leq 0.05$). **Results:** PVF was effective in enhancing the viability of SHED as observed by the higher live cell percentage compared to control under the fluorescence microscope. The gene expressions of *CDKN2A*, *BCL2L11*, *PTEN*, *MDM2*, and *TP53* were determined at day 1, 3, 7, 14, and 21. *CDKN2A*, *PTEN*, and *TP53* expressed significantly higher in the treatment group which gradually increased from day 3 until 14 and decreased on day 21, suggesting that PVF enhances cell growth and proliferation. However, *MDM2* expressed at low levels in the treatment group indicating that PVF treatment does not result in tumorigenic growth. With regard to *BCL2L11* expression, it appeared to be faint and disappeared completely in PVF treatment group from day 1 until day 14, but suddenly increased on day 21. This could be due to the overcrowding of SHED in the confined culture flask on day 21 would have induced the activation of this apoptotic gene, *BCL2L11*. **Conclusion:** PVF enhances cell cycle, proliferation, and growth as well as the viability of SHED.

(O11) Effect of polypeptide growth factors on the viability of human gingival fibroblasts and umbilical vein endothelial cells

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Introduction: Growth factors are soluble-secreted proteins that facilitate and command different cellular processes involved in tissue healing and regeneration.

Objectives: To assess the effect of fibroblast growth factor (FGF-2) and platelet-derived growth factor (PDGF-BB) on monolayer culture of human gingival fibroblasts (HGnFs) and human umbilical vein endothelial cells (HUVECs), respectively. **Methodology:** An *in vitro* experimental study where HGnFs and HUVECs were plated at a density of 5×10^3 cells in 96-well plates in complete medium and allowed to adhere overnight. Next day, the cultures were exposed to different concentrations of FGF-2 and PDGF-BB (5-, 10-, 15-, 20-, 25-, and 30-ng each). Cells treated with medium only, served as a negative control. After 72 hours, the 3-(4,5-dimethylthiazol-2-yl)-2,5 diphenyltetrazolium bromide (MTT) assay (5 mg/ml in PBS) was performed as per standard procedures. Optical density was measured at 570 nm. In each experiment, conditions were tested in triplicate and independent experiments were performed thrice. Statistical evaluation of the results was performed using one-way ANOVA for comparisons between two means followed by Bonferroni posthoc test with $p < 0.05$ considered statistically significant. **Results:** The effect of FGF-2 was dose-dependent and was optimum at a concentration of 5 ng/ml ($p = 0.001$), while, that of PDGF-BB was optimum at a concentration of 20 ng/ml ($p = 0.004$).

Conclusion: The stimulatory effect of FGF-2 and PDGF-BB on the viability of monolayer culture of HGnFs and HUVECs, respectively, is supportive for proangiogenic activity. Further investigation on the synergistic effects of these polypeptide growth factors in a co-culture system would provide more information for tissue regeneration.

(O12) Analysis of Tweed's facial triangle in mixed dentition children with Class III malocclusion treated by two different appliances

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Introduction: Reverse twin-block (RTB) and reverse pull face mask (RPFM) are two commonly used orthodontic appliances to treat Class III malocclusions in mixed dentition children. **Objectives:** To evaluate and compare the treatment effect of RTB and RPFM on facial aesthetics in children with Class III malocclusion of both early and late mixed dentition. **Methodology:** This retrospective cross-sectional study analysed 190 pre- and post-treatment lateral cephalograms of 95 mixed dentition children having Class III malocclusion; where 49 children were treated with RTB and 46 children were treated with RPFM. The samples were of both early (8-9 years) and late (10-11 years) mixed dentition stage. The impact on facial aesthetics was evaluated by Tweed's facial triangle using CASSOS software. In each cephalogram, 71 anatomic landmarks were traced and then measurements of Tweed's analysis were generated. For statistical analyses, paired and independent t-tests were performed. **Results:** In the RPFM group, Frankfort Mandibular Plane angle was significantly increased in both age groups. Whereas, the Incisor Mandibular Plane angle was significantly reduced in early mixed dentition group only. A significant reduction in the Incisor Mandibular Plane angle was also noticed in early mixed dentition group of RTB. Regarding different age groups, children in both early and late mixed dentition stage showed a similar response to the appliance therapy.

Conclusion: Both appliances produced similar treatment effects on Tweed's facial triangle. However, samples treated with RPFM appliance revealed more balanced aesthetics, particularly in early mixed dentition stage.

(O13) Fluoride release profile of glass ionomer cement (GIC) with the incorporation of coumarin derivative

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Introduction: Distinct feature of glass ionomer cement (GIC) from other restorative materials is its fluoride releasing property. The fluoride released is capable of inhibiting bacterial growth, which helps in decreasing the number of residual bacteria in cavities. However, the amount released is not sufficient to combat the bacterial destruction for a longer period of time. Thus, the search continues for antibacterial agent to be incorporated in GIC without compromising the fluoride release. **Objective:** To evaluate the effect of incorporation of synthesised coumarin derivative, hydrazinyl thiosemicarbazide as antibacterial agent on the fluoride release of GICs. **Methodology:** Two commercial GICs, Fuji II LC and a high fluoride content Fuji VII (GC Tokyo, Japan) were used in this study and act as control groups. Hydrazinyl thiosemicarbazide was locally synthesised and incorporated into both GICs during its manipulation at weight percentages of 1% and 2%. The disc-shaped specimens were immersed in 5 ml of deionised water and stored at 37°C in water bath. The extract solution was collected and replaced with fresh deionised water from day 1 until day 21. The amount of fluoride released was measured using a pH/ISE benchtop meter equipped with fluoride selective electrode (Thermo Orion, USA). **Results:** The pattern of fluoride release for both materials was similar in which the highest release was seen on day 1, then decreased sharply on day 2 and remained constant starting from day 10 until the end of study time. The incorporation of hydrazinyl thiosemicarbazide at 1% and 2% (wt%) for both Fuji II LC and Fuji VII showed higher fluoride release during the first day compared to the control groups. **Conclusion:** Coumarin derivative enhances the release of fluoride from GIC.

(O14) The assessment of compressive test for new modified GIC-nanosilica-hydroxyapatite-zirconia hybrid

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Introduction: Conventional glass ionomer cement (cGIC) has low mechanical strength especially compressive strength which needs further research to modify the powder composition. **Objective:** To modify the powder composition of the cGIC (Fuji IX) by incorporating nanoSiO₂-HA-ZrO₂ to improve strength. This new modified GIC-nanosilica-hydroxyapatite-zirconia (GIC-nanoSiO₂-HA-ZrO₂) hybrid will be analysed and assessed for potential improvement in compressive strength. **Methodology:** NanoSiO₂-HA-ZrO₂ powder was synthesised using one-pot synthesis method. The nanopowder was mixed with GIC powder at a different weight, ranging from 1%-15% using mortar and pestle at a controlled grinding process. This new GIC-nanoSiO₂-HA-ZrO₂ hybrid was fabricated and subjected to the compressive test using Universal Material Testing Machine (Shimadzu, Japan). For each percentage of addition, 10 samples were prepared in a cylindrical shape with the dimension of 6 mm (height) and 4 mm (diameter) according to ISO 9917 specification. The compressive test was performed on each sample after 24 h with a crosshead speed of 1 mm/min. Compressive values of the new GIC-nanoSiO₂-HA-ZrO₂ hybrid were then compared with conventional GIC. **Results:** The compressive values started to increase at 1% addition of nanoSiO₂-HA-ZrO₂ with the highest value of 152 MPa achieved at 7% addition. Comparatively, this value was higher than cGIC compressive value which was recorded at 149 MPa, even though the difference is not statistically significant. **Conclusion:** Within the limitation of this study, incorporation of nano-SiO₂-HA-ZrO₂ into GIC has shown an increase in the compressive strength of cGIC.

(O15) Measuring tooth position discrepancy in relation to chronic periodontitis using 3D digital models

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Introduction: Subjects who are susceptible to chronic periodontitis, not all teeth are equally affected by the disease. Differences in severity of the disease in the same oral cavity are linked to the role of local factors such as tooth malposition, gingival biotypes, and interdental papilla height. At present, there are limited studies investigating the relationship between these local factors and occurrence of chronic periodontitis at healthy and diseased sites of the same individual subject. The 3D digital model approaches are deficient in this area of study. **Objective:** To evaluate the association between tooth position, gingival biotypes, and interdental papilla height and periodontal parameters in the same subject using 3D digital models. **Methodology:** Thirty participants were recruited from subjects attending the Dental Clinic, School of Dental Sciences, Universiti Sains Malaysia, Kelantan, Malaysia. Subjects with basic periodontal examination (BPE) score 3 and 4 at least at one sextant and having at least three malpositioned teeth were selected for this study. Periodontal parameters such as plaque score, bleeding on probing, clinical pocket depth, gingiva recession, and gingiva biotypes were recorded in a single visit. Upper and lower impressions were taken for construction of study models. Then, 'RapidWorks' software and Next Engine 3D scanner were used to create 3D images of upper and lower casts. The measurement of tooth position and height of interdental papilla were carried out in the laboratory. **Results:** Our initial finding showed pattern of higher clinical probing depth and bleeding on probing at malpositioned teeth. **Conclusion:** We anticipate that greater discrepancy in tooth position will exhibit greater clinical probing depth and bleeding on probing. It is possible that malpositioned teeth hinder the effectiveness of self-cleansing mechanisms and mechanical plaque removal.

(O16) Sealing ability of injectable composite resins, Biodentine, and MTA as furcal perforation repair materials in permanent teeth

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Introduction: Furcal perforation occurs at the floor of pulp chamber on the bifurcation area. Most common material that has been used is MTA due to its benefits which include good sealing ability, biocompatibility, low cytotoxicity, and its ability to promote odontoblastic activity to form a hard barrier. However, due to its weaknesses including long setting time and relatively expensive, the search of alternative materials still continues. **Objective:** To compare the sealing ability of injectable composite resins, Biodentine, and MTA as furcal perforation materials. **Methodology:** Sixty-four extracted human molar teeth were decoronated 3 mm above cemento-enamel junction (CEJ) and horizontally cut off at mid-root. Root canal orifice and apical end were sealed with composite resin. A perforation was created in the furcal area. Specimens were divided into four groups: repaired with dual cure composite (Paracore Automix, Coltene), flowable composite (G-Aenial Universal Flo), MTA (ProRoot MTA), and Biodentine. All specimens were completely immersed in 2% basic fuchsin for 24 hours at 37°C. The teeth were sectioned buccolingually in the centre of perforation. Linear dye penetrations were measured using HIROX digital stereomicroscope. The data were analysed using Median Test. The significance level was set at $p < 0.05$. One specimen for each group was inspected under scanning electron microscope (SEM). **Results:** The percentage of dye penetrations were significantly higher in MTA and Biodentine than in injectable composite resins groups ($p < 0.001$). Injectable composite resins also demonstrated fewer gaps at material tooth interface under SEM. **Conclusion:** The injectable composite resins sealed furcal perforation better than MTA and Biodentine.

(O17) Differentiation and characterisation of fibroblasts from stem cells from human exfoliated deciduous teeth (SHED)

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Introduction: This study focused on the differentiation of stem cells of human exfoliated deciduous teeth (SHED) into fibroblasts to be used subsequently in the future development of a 3D oral mucosa model. **Objectives:** To differentiate and characterise fibroblast-like cells from SHED. **Methodology:** The differentiation of fibroblasts from SHED was carried out using supplementation of specific connective tissue growth factor (CTGF). To characterise the differentiated fibroblasts from SHED, cells were subjected to immunofluorescence staining. The commercial primary human gingival fibroblasts served as a control in this study. The results from characterisation analysis were compared with that of the commercial cells to ensure that the cells differentiated from SHED were fibroblasts. **Results:** The present data demonstrated a successfully induced SHED-derived fibroblasts. Characterisation profile by immunofluorescence staining showed positively stained fibroblastic cells using antibodies against COL1A1, FSP1, and TE-7. The same expression patterns were found in primary human gingival fibroblasts while the undifferentiated SHED, which acted as a negative control, showed no signal, thus supporting the validity of the staining. **Conclusion:** The success of SHED differentiation would enhance further knowledge on the SHED behaviour and its ability of future co-culture into a 3D model which will be very useful for *in vivo* and *in vitro* research. Significantly, the present finding also demonstrated the ability of SHED differentiation into fibroblasts which has not been reported before.

(O18) Preliminary evaluation of nested polymerase chain reaction for detection of human papillomavirus 16 in oral squamous cell carcinoma

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Introduction: Oropharyngeal squamous cell carcinoma (OPSCC) is strongly associated with human papillomavirus (HPV) infection. Production of p16^{INK4a} protein has been established as an important cofactor and its detection is routinely done using immunohistochemistry method in tissue specimen. Nevertheless, nested HPV-DNA PCR (n-PCR) also has been proposed for HPV-16 detection. **Objective:** To determine the reliability of n-PCR detection of HPV-16 against p16^{INK4a} immunohistochemistry (IHC) expression in oral squamous cell carcinoma (OSCC) specimens. **Methodology:** A total of seven samples from OSCC patients which consisted of saliva and blood were subjected to DNA extraction using QiaAMP DNA extraction kit. HPV-16 DNA was detected using n-PCR by consensus MY09/11 and GP5/6 primer sets. For formalin-fixed tissue specimens (FFPE), p16 protein expression was detected by p16-IHC kit. The sensitivity and specificity were determined. **Results:** HPV-16 was detected in one of the saliva and blood samples using n-PCR and was also positive by p16-IHC. The sensitivity and specificity was 100%. **Conclusion:** This finding indicated that n-PCR is a potentially reliable method for detection of HPV-16 in OSCC patients as it showed high level of sensitivity and specificity. However, further evaluation using larger sample size is needed.

(O19) Chewing activity of masseter and temporalis muscles in Class II malocclusion with different overbite

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Introduction: Class II malocclusion cases have a tendency to reduce chewing activity during masticatory process in temporalis and masseter muscles and shows hyperactivity for the perioral muscles. A normal overbite is defined as a certain amount of vertical overlap (2-3 mm) between the upper and lower incisors. But commonly, this is increased in Class II Division II malocclusions. **Objective:** To investigate the electromyographic activity of masticatory muscles (masseter and temporalis) during chewing phase in Class II malocclusion patient with different overbite (normal, increased, and decreased). **Methodology:** Thirty-two of Class II malocclusion patients were identified through screening from School of Dental Sciences, Hospital Universiti Sains Malaysia (Hospital USM). Overbite was measured clinically and the chewing activities (rest, chew, and post-chew rest) of masseter and temporalis muscles were assessed by using surface electromyography. Data were analysed by using one-way ANOVA (Bonferroni) test in IBM SPSS Statistics version 22.0. **Results:** The mean age of the patients were 19.72 years. Right temporalis muscle showed a significant difference during rest ($p=0.030$), as well as chewing phase ($p=0.022$) in different overbite. Patients with decreased overbite group were found to have higher electromyographic activity than the normal and increased overbite groups. **Conclusion:** Right temporalis muscle showed increased chewing activities in Class II malocclusion patient with different overbite. It can be specified that in Class II malocclusion, right temporalis was hyperactive than right masseter, left masseter, and left temporalis muscles. This may have deleterious effects on the muscles involved and the masticatory system in the long term which may warrant correction of Class II malocclusion.

(O20) Evaluation of children and their parents' concern for orthodontic treatment need and DHC of IOTN assessment by clinician

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Introduction: Index of Orthodontic Treatment Need (IOTN) allows the orthodontists to prioritize the severity of malocclusion in order to improve the patients' self-perception of dental appearance. **Objective:** To evaluate the relationship between children and their parents' concern for orthodontic treatment need and dental health component (DHC) of IOTN assessed by clinicians. **Methodology:** A descriptive cross-sectional study. A random sample of 1200 school children aged 11–15 years was selected from different schools in Dhaka City, Bangladesh. A structured questionnaire was delivered to every child and interviewed on sociodemographic details, utilisation of dental services, and perception of orthodontic treatment need and use of orthodontic devices. A total of 800 parents returned their copy. The DHC and the aesthetic component (AC) of the IOTN were assessed by the clinician. **Results:** DHC grade assessed by clinician did not overlap, and showed a good agreement. According to definite treatment need (grade 4-5) children and parents' agreement was 64.1% and 52.3%, respectively. Whilst for the no need to moderate treatment need (grade 1-3) children and parents' agreement was 8.8% and 7.5%, respectively. Children and parents orthodontic concern was significantly related to normative orthodontic treatment need assessed by clinician. **Conclusion:** The IOTN is a very useful method of defining the severity or degree of occlusal traits that may constitute a threat to the longevity of the dentition. For effective orthodontic care, not only the normative treatment need of the children needs to be assessed, but children's and parents' self-perception and concern for orthodontic treatment are other important factors to ensure patients' satisfaction.

(O21) Detection of Miltenberger blood group among anti-Mi^a antibody suspected patients by genotyping

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Introduction: Miltenberger blood group consists of 11 low incidence antigens that result from homologous recombination between glycoprotein A (*GYPA*) and glycoprotein B (*GYPB*) genes. Out of these, GP.Mur distribution is relatively common in Southeast Asian countries. **Objective:** To detect the Miltenberger glycoprotein hybrid (*GYP B-A-B*) among anti-Mi^a antibody suspected patients by polymerase chain reaction (PCR). **Methodology:** Forty-seven blood samples from patients who were positive for the anti-Mi^a antibody by serological screening detected on cell-III in the Diamed ID-DiaCell I-II-III Asia (Mia+) (Bio-Rad, USA) were included in this study. The samples were typed by PCR amplification and 22 samples were sequenced to identify the *GYP (B-A-B) hybrid* subtypes (GP.Mur/Hop/Bun/HF/). **Results:** Miltenberger glycoprotein hybrid (*GYP.Mur*) was detected among anti-Mi^a antibody suspected patients. **Conclusion:** We confirmed that the patients were genetically GP.Mur(+) and not having anti-Mi^a, anti-Mur, anti-MUT, anti-Hil, and anti-MINY antibodies. The gene encoded for the GP.Mur red cells was a hybrid derived mainly from *GYPA*.

(O22) Effect of vascular endothelial growth factor on stem cell and angiogenic profile of stem cell from human exfoliated deciduous teeth on human amniotic membrane

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Introduction: Human amniotic membrane is a natural scaffold made up of an extracellular matrix. It provides a suitable niche for cells to grow. We hypothesised that stem cells that grow on this scaffold would assist in angiogenic differentiation. With the aid of vascular endothelial growth factor (VEGF), stem cells from human exfoliated deciduous teeth (SHED), which has a capability to differentiate, possibly can express angiogenic gene profile upon culture on human amniotic membrane (HAM). **Objectives:** To determine the stem cells and angiogenic gene expression level between SHED treated with VEGF (SV), SHED on HAM (SA), and SHED-treated VEGF on HAM (SAV). **Methodology:** SHED was cultured in an alpha-minimum essential medium (α MEM) supplemented with 15% foetal bovine serum and 1% of penicillin/streptomycin. SHED was then cultured into three groups: SHED treated with VEGF (SV), SHED on HAM (SA), and SHED-treated VEGF on HAM (SAV). The VEGF concentration used was 250 ng/ml. On day 1, 3, 7, 10, 14, 21, and 28, the RNA was extracted and used for one-step RT-PCR. The amplified genes were detected using gel electrophoresis. Average density value (ADV) of stem cells markers (Nestin, Nanog, CD29) and angiogenic markers (IL-8, VEGF, MMP-2) relative to housekeeping gene, β -actin, were quantified. The graph was plotted and statistical analyses were performed using repeated measures analysis of variance (ANOVA). **Results:** Nestin and Nanog expressions were expressed regularly from day 1 until day 28, whereas CD29 expression exhibit fluctuation along the experimental period. For angiogenic markers, IL-8 showed significant differences in all groups on day 1 and day 28. Furthermore, VEGF expression revealed significant differences existed in the earliest days, while MMP-2, which is involved in matrix modulation, demonstrated significant changes on day 7 and day 14 onwards. **Conclusion:** HAM provided a suitable niche for dental stem cells to promote angiogenic differentiation. Differential potential at the early experimental period proved that SHED was undergoing an early activation of angiogenesis stages.

(O23) Effect of IL-8 on PI3K/Akt/mTOR pathway during odontogenic differentiation of SHED

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Introduction: Interleukin-8 (IL-8) is an important regulator for acute inflammatory response, where it is rapidly synthesised at the local sites of inflammation. In dentin tissue repair, IL-8 is one of the major mediators which contribute to the accumulation of neutrophils at tissue injury sites. IL-8 can also promote the recruitment of stem cells to the injury site. In dental pulp studies, activation of PI3K/Akt/mTOR signalling plays an important role in tissue repair and regeneration. PI3K/Akt/mTOR pathway is necessary for cellular proliferation, differentiation, and death in multiple cell types including mesenchymal stem cells. PI3K/Akt/mTOR signalling can be triggered in response to the presence of IL-8. **Objective:** To investigate the effect of IL-8 on PI3K/Akt/mTOR pathway when stem cells from human exfoliated deciduous teeth (SHED) were treated with bone morphogenetic protein-2 (BMP-2), and seeded on human de-epithelialised amniotic membrane (HAM) differentiated into odontoblast-like cells. **Methodology:** Induction and inhibition of IL-8 response were done using recombinant human IL-8 and reparixin, respectively. The effect of IL-8 was investigated by evaluation of gene expression of downstream molecules of PI3K/Akt/mTOR pathway (PI3K, Akt, mTOR, and STAT3) using quantitative real-time PCR. **Results:** Real-time PCR analysis revealed that addition of IL-8 activated PI3K/Akt/mTOR pathway by increasing the expression of PI3K, Akt, mTOR, and STAT3 gene. Contrastingly, inhibition of IL-8 activity caused reduction in the expression of these molecules. **Conclusion:** IL-8 has a potential role in promoting odontogenic differentiation of SHED *in vitro* through PI3K/Akt/mTOR pathway. Hence, it may have a potential in facilitating dental pulp tissue regeneration.

(O24) Shrinkage evaluation of PMMA composite

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Introduction: Polymethylmethacrylate (PMMA) is the most widely accepted material in maxillofacial implants due to its biocompatibility. However, undesired properties of shrinkage occurred during polymerisation process. Hence, improvement of the shrinkage need to be catered by adding fillers onto PMMA. **Objective:** To investigate the shrinkage of PMMA/ β -TCP/ZnO composites at different fillers compositions. **Methodology:** β -TCP and zinc oxide (ZnO) were purchased from Sigma-Aldrich and Nacalai Tesque, respectively. Pure PMMA as control, 5%, 10%, and 15% β -TCP-filled, 15% β -TCP with 2.5% ZnO-filled, as well as 15% β -TCP with 5% ZnO-filled PMMA were prepared according to weight percentages. Hence, there were six groups (n=7 per group) tested. PMMA were mixed together with β -TCP and ZnO manually according to the percentages specified until it has reached the homogeneous state. Specimens were prepared by casting the paste in silicone mould (3.2 mm height, 12.7 mm width, 127 mm length) which has been fabricated using 3D printer. The shrinkage of specimens was calculated based on volumetric shrinkage. Statistical analysis of one-way ANOVA was employed to compare the shrinkage percentage of each group. **Results:** Shrinkage percentages of pure PMMA, 5%, 10%, and 15% β -TCP-filled, 15% β -TCP with 2.5% ZnO-filled, and 15% β -TCP with 5% ZnO-filled PMMA were 8.29 (3.81), 7.54 (1.47), 6.62 (1.89), 5.51 (0.74), 6.10 (1.23), and 4.80% (0.55), respectively. The addition of either β -TCP or β -TCP with ZnO-filled PMMA decreased the shrinkage value. However, there was no significant difference between the PMMA pure and PMMA composites ($p>0.05$), except for 15% β -TCP and 5% ZnO-filled PMMA. **Conclusion:** PMMA composites with addition of 15% β -TCP and 5% ZnO fillers have reduced shrinkage phenomenon.

Postgraduate Research Day (PGRD)

Kota Bharu, Kelantan, Malaysia

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(O25) Application of Western blot to elucidate signalling pathway involved in interleukin-8 mediated differentiation of SHED into odontoblast-like cells

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Introduction: This study aimed to elucidate the interleukin-8 (IL-8) pathway in stem cells from human exfoliated deciduous teeth (SHED) differentiated into odontoblast-like cells. The previous study has shown an overexpression of IL-8 during the differentiation process. However, to our best knowledge, there is no study which has been conducted to describe the role of IL-8 immunomodulatory pathway in odontoblast differentiation of SHED cultured on amniotic membrane (AM) scaffold and treated with bone morphogenetic protein-2 (BMP-2) growth factor. **Objectives:** To investigate the role and mechanism of IL-8 immunomodulatory pathway in the odontoblast differentiation of SHED cultured on AM with BMP-2 supplementation. **Methodology:** Western blot analysis was carried out for samples of SHED on AM scaffold and treated with BMP-2 growth factor and IL-8 inhibitor, reparixin, using anti-protein kinase B (AKT) and anti-nuclear factor- κ B (NF κ B) antibodies. The analyses were performed at different time points (day 1, 7, 10, and 14) to determine the expression of protein of interests. **Results:** Our current data showed that during differentiation of SHED into odontoblast-like cells, AKT and NF κ B expression was significantly increased from day 1 to day 14, whereas other proteins of interests did not show significant increase in expression over time. **Conclusion:** Activation of NF κ B mediated by AKT regulation is known to induce transcription of a variety of genes encoding for cell adhesion molecules, cell proliferation, and cell survival. The significant increase of AKT and NF κ B expression further suggested that this pathway may be involved during the differentiation process of SHED into odontoblast-like cells. Furthermore, pharmacological inhibition of IL-8 by reparixin subsequently reduced the expression of AKT and NF κ B protein, suggesting possible IL-8 mediation of the proteins turnover.

Poster Presentations

(P01) Cytotoxic and phytochemical analysis of *Clinacanthus nutans*

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Introduction: *Clinacanthus nutans* (*C. nutans*) is a perennial herb that has been used traditionally as a treatment of various diseases in Malaysia. **Objectives:** To determine the phytochemical constituents of *C. nutans* using gas chromatography mass spectrometry (GCMS) and its cytotoxic effect using MTT assay on human gingival fibroblast cell line. **Methodology:** The powdered leaves of *C. nutans* were extracted separately with ethanol and water. The chemical compounds present in the extracts of *C. nutans* were analysed using Agilent Technologies Gas Chromatography-Mass Spectra (Hewlett Packard 6890 series Gas Chromatograph with 5973N Mass Selective Detector and Chemstation Data System). The mass spectra of the compounds detected in the extracts were matched with the National Institute of Standards of Technology (NIST) library and WILEY library. *In vitro* cytotoxic activities of *C. nutans* extracts with various concentrations (6400, 3200, 1600, 800, 400, 200, 100, 50, and 25 µg/ml) were investigated on human gingival fibroblast cell line (HGF-1) using MTT assay. **Results:** The GCMS analysis revealed that 47 compounds were present in the ethanol extracts of *C. nutans* while 29 compounds were present in the aqueous extracts of *C. nutans*. Both the aqueous and ethanol extracts of *C. nutans* did not exhibit any cytotoxic effect on the human gingival fibroblast cell line at the concentrations studied. **Conclusion:** The results indicated that aqueous and ethanol extracts of *C. nutans* demonstrated non-cytotoxic effect on the human gingival fibroblast cell line. Further analysis also identified a list of potential phytochemical compounds that could offer beneficial effects.

(P02) Over-the-counter and professionally-prescribed bleaching agent: *In vitro* evaluation of its effectiveness and its safety

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Introduction: Aesthetic has become a great demand in modern dentistry, involving largely teeth whitening which are more conservative, easy and faster treatment to achieve the desired outcomes. **Objectives:** To evaluate the efficacy and safety of the professionally-prescribed and over-the-counter bleaching agents on extracted human upper central incisors. **Methodology:** Extracted human upper central incisors were prepared and stained with red wine for 14 days before subjected to four different bleaching agents: Professionally-prescribed Opalescence PF 15% (PB Opal), professionally-prescribed VOCO Perfect Bleach 10% (PB Voco), over-the-counter Crest 3D Whitestrips (OTC Crest), and over-the-counter Whitelight Teeth Whitening System (OTC WL). Colorimetric measurement was performed with Vita Easyshade Handheld Spectrophotometer, enamel surface microhardness was measured using Vickers Hardness machine, while enamel surface roughness was measured with Profilometer before and after bleaching sessions of each sample. Scanning electron microscope (SEM) evaluation was done. **Results:** All bleaching products showed the same efficacy to whiten stained enamel. PB Opal had significant increase in the microhardness of the enamel after bleaching procedure (92.69 ± 68.316), whereas for surface roughness, all groups gave significant increase on the enamel ($p < 0.05$). SEM evaluation showed that PB Opal gave same microscopic appearance as unbleached enamel while PB Voco and OTC WL gave mild to moderate irregularities to enamel surface and accentuated irregularities observed in OTC Crest 3D. **Conclusion:** Professionally-prescribed bleaching agent of Opalescence PF 15% is effective to whiten the tooth with positive outcomes in maintaining enamel surface hardness *in vitro* while the other bleaching products used in this study may be effective but have deleterious effects to the enamel.

(P03) Antibacterial activity of fabricated glass ionomer cement (GIC) containing hydrazinyl coumarin derivative (HCD)

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Introduction: Reducing or preventing oral bacterial growth is a major task to make sure the restoration material could sustain in a longer period. Hence, coumarin derivatives have been introduced and incorporated with glass ionomer cement (GIC) to act as antibacterial agent due to their promising biological properties.

Objective: To determine the antibacterial activity of fabricated GIC containing hydrazinyl coumarin derivative (HCD) at different concentrations which are 0.5, 1.0, and 1.5 (wt%). **Methodology:** HCD was synthesized at laboratory scale via Schiff base reaction under reflux condensation. *Streptococcus mutans* (ATCC 35668) and *Streptococcus sanguinis* (ATCC 10556) were cultured on Columbia Horse blood agar in anaerobic condition. The antibacterial activity of fabricated materials was determined using 0.5 McFarland bacteria suspension ($\sim 1.0 \times 10^9$ cfu/ml). The data was recorded hourly for 22 hours incubation period to observe the bacteria growth profile. **Results:** The results showed the incorporation of HCD in GIC has a positive effect on antibacterial activity against *Streptococcus mutans* and *Streptococcus sanguinis* compared to unloaded GIC. Those results were further supported by scanning electron microscopy (SEM) images which showed that the accumulation of bacteria on fabricated materials at 0.5 and 1.0 wt% seemed to be similar; however, it was lesser than the GIC alone. **Conclusion:** Modifying GIC by incorporating hydrazinyl coumarin derivative reduced the accumulation and growth of common oral bacteria.

(P04) Effectiveness of low-level laser therapy in enhancing tooth movement, bone density changes, averting relapse, and pain management during orthodontic treatment in humans: A systematic review

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Introduction: Orthodontic treatment involves stagewise complex steps normally for almost two years duration. To accelerate the orthodontic treatment, low-level laser therapy (LLLT) is currently considered as a useful adjunct. **Objectives:** To elaborate the effect of LLLT administration in humans for: (i) enhancing tooth movement at various stages of treatment (until levelling and alignment of canine and incisors retraction), (ii) bone density changes, (iii) averting relapse, and (iv) pain management during fixed appliances.

Methodology: The systematic review was subjected to Goodman's four-step model. Literature was searched using NCBI, MedPilot, EMBASE, and Google Scholar from January 2001 until February 2017. Original articles were included as per inclusion criteria. The quality of evidence was rated according to the GRADE system and PRISMA guidelines.

Results: The search identified 300 articles, twenty of which fulfilled the inclusion criteria: Five on acceleration of tooth movement by LLLT and 15 on LLLT modulation of pain. No study on LLLT for prevention of relapse and bone density was identified. The selected studies reported promising results for LLLT; elevated acceleration of tooth movement and lower pain scores, than controls. With respect to method, there were wide variations in type of laser techniques. **Conclusion:** There is limited literature available supporting the role of LLLT in accelerating orthodontic tooth movement, modulating pain, and in stagewise application. Furthermore, no literature was available for evaluating LLLT in averting relapse and bone density changes. The results highlight the need for high quality research with consistency in study design to determine whether LLLT can enhance fixed appliance treatment in humans at various stages of orthodontic treatment.

(P05) The role of MEK pathway during angiogenic differentiation of SHED in 3D culture of human amniotic membrane and VEGF treatment

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Introduction: Stem cells from human extracted deciduous teeth (SHED) are a population of multipotent mesenchymal stem cell, with the known capacity for angiogenic lineage which further supports dental tissue regeneration. Vascular endothelial growth factor (VEGF) is a potent inducer of angiogenesis. However, the effect of VEGF on the usage of the human amniotic membrane (HAM) as a scaffold for SHED angiogenic differentiation is unknown.

Objectives: To elucidate the role of MEK pathway during angiogenic differentiation of SHED, in HAM three-dimensional (3D) culture and VEGF supplementation.

Methodology: 8×10^4 of SHED cells/cm² was seeded on 5 cm² HAM. For angiogenic differentiation, media consisting of α -MEM, 15% foetal bovine serum, 1% pen-strep and 25 ng/ml VEGF were used. MEK inhibitor, PD184352, was selected to define the functional role of MEK pathway. Total protein was extracted from treated SHED, harvested at day 1, 7, 14, 21, and 28. The expression of Cox2 was determined by Western blot. Human umbilical vein endothelial cells (HUVEC) were included as a positive control. **Results:** Western blot analysis revealed that the induced SHED culture from all groups (VEGF-untreated, VEGF-treated, and VEGF-treated with PD184352) differentially expressed angiogenic Cox-2 protein. **Conclusion:** Expression of Cox-2 protein suggested that SHED seeded on the HAM with VEGF treatment successfully differentiated into endothelial cells. Inhibition of MEK pathway showed no effect on SHED differentiation process, potentially suggesting involvement of another relevant pathway.

(P06) Interaction of osteo-odontogenesis molecules in relation to NF- κ B pathway of SHED induced by BMP-2 seeded on human amniotic membrane scaffold

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Introduction: While it is known that NF- κ B signalling inhibits osteoblast formation in bone, no study has been done to investigate the signal contribution of stem cell odontogenesis for dental pulp regeneration. **Objective:** To investigate the effect of NF- κ B pathway when SHED were treated with bone morphogenetic protein-2 (BMP-2), and seeded on human de-epithelialised amniotic membrane (HAM), odontoblast differentiation model.

Methodology: 5.0×10^4 cells/cm² seeding density was used for the gene expression analysis. For differentiation protocol, media consisting of α -MEM, 15% foetal bovine serum, and 1% penicillin-streptomycin were used. The experimental treatment groups consisted of differentiation media, supplemented with BMP-2. Cells were harvested on day 1, day 7, day 10, and day 14, followed by RNA extraction. Quantitative real-time PCR (qRT-PCR) was carried out to quantify the levels of gene expression. β -actin was used as an internal reference gene. The relative quantification of gene expression was evaluated using the comparative cycle threshold (CT) method and the fold change calculated using $\Delta\Delta$ CT. **Results:** *DSPP*, *IL-8*, *TNF- α* , and *RANKL* were expressed throughout the experiments. When SHED was differentiated into odontoblast-like cell with addition of BMP-2, the expression of *DSPP* and *IL-8* were increased. In contrast, *RANKL* and *TNF- α* were decreased when SHED was induced with BMP-2. **Conclusion:** It is suggested that *DSPP*, which is an odontoblast marker, showed an opposing effect towards the NF- κ B-associated molecules, *RANKL* and *TNF- α* .

(P07) The cytotoxicity effect of nanohydroxyapatite-silica-GIC and conventional GIC on dental pulp stem cells (DPSCs): A preliminary study

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Introduction: The addition of nano-hydroxyapatite-silica (nanoHA-silica) to conventional GIC (cGIC) has shown to improve the strength of cGIC. However, the potential toxic effect of this material on dental pulp cells is unknown. **Objective:** To compare the cytotoxic effect of nanoHA-silica glass ionomer cement (nanoHA-silica-GIC) with cGIC (Fuji IX) on human dental pulp stem cells (DPSCs). **Methodology:** 100 mg of nano-HA-silica powder was added to 1900 mg of cGIC (Fuji IX, GC Japan) powder, to obtain a 5% HA-silica-GIC powder mixture. cGIC was prepared and mix according to the manufacturer instruction. The test materials were then introduced into paraffin wax moulds. After being sterilised, the set cement capsules of cGIC and nano HA-silica-GIC were added into prepared a-MEM and incubated for three days. The material extracts were diluted at seven different concentrations and then were applied to 96-well-plates seeded with DPSCs and incubated for 72 hours. The cell viability was evaluated using dimethylthiazol diphenyltetrazolium bromide (MTT) assay and the data were analysed using ANOVA and Tukey's test. The significance level was set at $p < 0.05$. **Results:** NanoHA-silica-GIC showed slight cytotoxicity at 3.125 mg/ml, 6.25 mg/ml, and 12.5 mg/ml and moderate cytotoxicity at 25 mg/ml and 50 mg/ml concentrations, respectively. At 100 mg/ml and 200 mg/ml, nanoHA-silica-GIC demonstrated severe cytotoxicity. On the contrary, cGIC was found to be non-cytotoxic to DPSCs except for the highest concentration (200 mg/ml) which exhibited slight cytotoxicity. Significant differences in cytotoxicity were observed between nanoHA-silica-GIC and cGIC at all concentrations, except for 3.125 mg/ml ($p < 0.05$). **Conclusion:** Within the limitation of this study, cGIC exhibits less cytotoxic effect and better cell viability compared to nanoHA-silica-GIC.

(P08) Comparison of commercial and three open-source medical imaging software for reconstruction of 3D skull models from computed tomography data

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Introduction: The processing of computed tomography (CT data) is routinely performed with commercial software which increases the cost of operation and patient management for a small clinical setting. Usage of open-source software as an alternative to commercial software for 3D reconstruction of the skull from CT data is scarce. **Objectives:** To compare and analyse the 3D skull models produced using commercial Materialise Mimics software (reference/gold standard) with the 3D skull models produced using open-source Medical Imaging Interaction Toolkit (MITK), InVesalius, and 3D Slicer software. **Methodology:** Ten CT data in Digital Imaging and Communications in Medicine (DICOM) format were processed to segment the skull using thresholding method which separates the pixels' intensities into ranges that correspond to the tissue types. After post-processing the data, the constructed 3D models of the skull were then saved in STereoLithography (STL) format and exported to 3matic and Cloud Compare software for morphometric and geometric analyses. All segmentation and post-processing processes were performed using automatic method to minimise human error. Those 3D models were compared using Kruskal-Wallis test by ranks and Hausdorff Distance. **Results:** No significant differences were obtained between the 3D models of the skull produced using Mimics software and the three open-source software. The 3D models of the skull produced using MITK, InVesalius, and 3D Slicer open-source software are comparable to the commercial Mimics software. **Conclusion:** The open-source medical imaging software could be used as an alternative to expensive commercial software in clinical setting for surgical applications and pre-operative planning to minimise the operational cost.

(P09) Association of traumatic head injuries and maxillofacial fractures among patients treated by Oral & Maxillofacial Surgery Unit, Hospital USM

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Introduction: The association between traumatic head injury (THI) and maxillofacial fractures (MFF) is a controversial health concern worldwide in spite of the close anatomical proximity of maxillofacial bones to the cranium. **Objectives:** To assess the association between THI and MFF. Other factors associated with THI in patients with MFF were also investigated. **Methodology:** A hospital-based retrospective study was conducted at the OMFS Unit, Hospital USM, Kelantan, Malaysia. From June 12, 2013, to December 31, 2015, a total of 473 patient records with MFF were reviewed to evaluate the association of THI and MFF. The factors associated with THI were determined at both univariable and multivariable to achieve that aim. The Chi-squared test was used for determining the association of Glasgow coma scale (GCS) score. **Results:** A total of 331 patients (69.98%) presented with concomitant THI. The most common associated THIs were cranial bone fractures (68.6%) followed by intracranial injuries and concussion. A significant association existed between the GCS score and the presence of THI concomitant MFF with $p < 0.001$. The univariable logistic regression analysis revealed that age group (31-40 years), cause (road traffic accident, RTA), all midface fracture types, and most of the mandibular fracture types were statistically associated with the presence of THI. The multivariable logistic regression analysis revealed that the cause of the injury (RTA) and MFF types (nasal bone, zygomatic complex, zygomatic arch, orbital, maxillary sinus wall, and the alveolar process of mandible fractures) were statistically significantly associated with THI in patients with MFF. **Conclusion:** A high prevalence of THI among patients with MFF is considered as one of the highest percentages worldwide.

(P10) Determination of facial angle in different ethnicities in Malaysia

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Introduction: The facial profile is a crucial factor which determines facial attractiveness. Facial angle is an important tool in making facial profile. The facial angle is used to measure the degree of protrusion and retrusion of the lower jaw which are related to the mandibular prognathism and retrognathism. Most cephalometric studies like facial angle have proven that the 'norms' should be based on ethnicity, sex, and age differences. **Objectives:** The present study aimed to establish a cephalometric norm on the facial angle in Malaysian population and make a comparison between Malaysian Malay and Chinese population. **Methodology:** The subjects employed in this study were recruited from Hospital Universiti Sains Malaysia orthodontic clinic archive. Patients with all sound erupted permanent teeth with no history of previous orthodontic treatment were selected. A retrospective study was performed using 300 standardised lateral cephalometric radiographs. The subjects included 150 Malaysian Malay and 150 Malaysian Chinese. The age of the subjects ranged from 18 to 30 years with a mean age of 20.58. All cephalometric landmarks were located and determined and subsequently tracing was done according to Tideman analysis using CASSOS software. All data were analysed using IBM SPSS 22.0. **Results:** Mean values of cephalometric norms of the facial angle of this study were different than that of the Tideman established cephalometric norms. The present study showed that there was a difference between Malaysian norm (mean 86.51, SD 5.8) and established Caucasian norm (mean 87.8, SD 6). The results of the present study also revealed a statistically significant difference in facial angle in both Malaysian Malay and Chinese subjects ($p > 0.023$). **Conclusion:** It can be concluded that the facial angle of Malaysian Malay is greater than Malaysian Chinese and the facial angle of Malaysian is lesser when compared to the standardised Caucasian norm.

(P11) Bond strength of orthodontic brackets *in vivo*: A systematic review

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Introduction: Measuring the bond strength of orthodontic brackets inside the oral environment has been a challenge for researchers. Therefore, there is a need to review the available literature on the *in vivo* bond strength of orthodontic brackets to find out the potential research gaps and future perspectives. **Objective:** To systematically review the available literature on the *in vivo* bond strength of orthodontic brackets under different experimental conditions. **Methodology:** A thorough search was performed in four different databases: Pubmed, Web of Science, Scopus, and Cochrane with these three keywords: Bond Strength, Orthodontic Brackets, and *In Vivo*. Full-text articles measuring bond strength of orthodontic brackets with a suitable device *in vivo* were included. *In vivo* clinical failure rates or bracket survival rates, and studies measuring bond strength of orthodontics brackets after exposing them to oral environment temporarily were excluded. The search strategy was performed by strictly following the PRISMA 2009 guidelines. **Results:** The total number of articles found were 209, 38 abstracts relevant to our study were retrieved, out of which 7 full-text articles could be assessed and analysed. Finally, only one article was rejected because the authors did not apply their experimental device to measure the *in vivo* bond strength of orthodontic brackets. **Conclusion:** Further experiments required in this study field by maintaining a standardised study method with a validated device which is comfortable from the patients' perspective and does not cause iatrogenic damage to the tooth structure.

(P12) Wright treatment of Class III malocclusion in an adolescent with ASSD appliance: A case report

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Introduction: The conventional treatment for patients with a skeletal Class III malocclusion and maxillary deficiency during early childhood is a combined protraction facemask and rapid maxillary expansion (FM/RME). However, when the patient gets older, the effect of (FM/RME) treatment becomes limited as well as patient's compliance. There has been growing interest in intraoral appliances for correcting Class III malocclusion in adolescent. **Objectives:** (1) To improve the skeletal jaw relationship by protracting the maxilla anteriorly in relation to the cranium; (2) to achieve Class I incisor, canine, and molar relationship; (3) to obtain ideal overjet and overbite; (4) to obtain ideal aesthetic and function. **Methodology:** Two Class III patients, 11 and 14 years old boys, were treated using ASSD appliance; treatment effects were determined using lateral cephalometric analyses. In the 11 years old boy, two mini implants were inserted in the paramedian region in the palate at the level of the first premolar and connected to the upper appliance with two looped arm with expansion appliance. Class III elastic was applied bilaterally with force level about 400 gm in every side. In the 14 years old child, upper appliance has expansion screw that was united to two mini implants inserted in the paramedian region at the level of the first premolar. The patients were asked to do cycles of expansion and constriction for one month period with the aim to luxate the circummaxillary suture. Nickel titanium spring was applied bilaterally with force level 400 gm in every side. **Results:** Class III dental relation corrected into Class I, lateral soft tissue profile improved and skeletal analysis showed more forward relation of maxilla to cranium and mandible as proven by increase in SNA, ANB, and A-FP. **Conclusion:** This case report shows that Class III skeletal malocclusion in adolescent can be successfully managed using ASSD appliance.

(P13) Immunomodulatory properties of *Clinacanthus nutans*

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Introduction: Numerous medicinal plants can be found in Malaysia that possesses high medicinal values. One of the medicinal plants of interest is Sabah snake grass with the scientific name *Clinacanthus nutans* (*C. nutans*) which comes from the family *Acanthaceae*. Immunomodulators are becoming well known worldwide because it is a substance that will help our body to regulate the immune system. The lack of scientific information on the immunomodulatory properties warrants further experiments to validate the effects of *C. nutans* on immunomodulation. **Objective:** To assess the immunomodulatory properties of *C. nutans* using nitric oxide assay on murine macrophage cell line. **Methodology:** Nitric oxide production macrophages were determined using Parameter™ Total Nitric Oxide and Nitrate/Nitrite Assay from R & D Systems. Three concentrations used in this study were 250 µg/ml, 125 µg/ml, and 62.5 µg/ml for both ethanol and water extracts of *C. nutans*. Cell culture supernatants were used as the tested sample. After incubation for 72 hours, the culture solution was collected and assayed using nitric oxide (NO) assay kit according to the manufacturer's instructions. **Results:** The results of both extracts showed dose-dependent effect; there was an increase in the NO activity as the concentration increased. Ethanol extract showed higher NO production in comparison to water extract and untreated group. Phytohemagglutinin (PHA) for stimulation of T cells showed higher NO production as opposed to normal cells. **Conclusion:** In conclusion, *C. nutans* exhibit great potential in enhancing the immune response because all activity in cells increased dose-dependently when compared to the untreated group.

(P14) Camouflage treatment of skeletal Class III malocclusion associated with tooth agenesis and tooth size discrepancy: A rare case report

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Introduction: Improvement in facial aesthetics is the primary reason of patients approaching for orthodontic treatment. Skeletal Class III is one of the types of skeletal dysplasia which is often associated with excessive mandibular growth and maxillary deficiency in sagittal plane. **Objective:** Reporting camouflage treatment of skeletal Class III malocclusion with tooth agenesis and tooth size discrepancy. **Methodology:** This case report presents a 23-year-old non-growing female patient with severe skeletal Class III malocclusion associated with maxillary anterior cross-bite, unpleasant smile, and excessively protracted mandible. Difficulty increases more when tooth agenesis lead to tooth size discrepancy. The camouflage treatment was carried out with fixed braces. **Results:** The rare case of skeletal Class III malocclusion associated with tooth agenesis and tooth size discrepancy was successfully managed via orthodontic camouflage fixed orthodontic appliances. Ideal Class I molar, canine, and incisors relationship with ideal overjet and overbite were achieved. The profile and smile of the patient were greatly improved. Lower anterior cross-bite, with unpleasant smile and excessively protracted mandible were managed as per orthodontic treatment. **Conclusion:** The advent of fixed appliances in orthodontics has broadened the spectrum of camouflage treatment to manage the cases with tooth agenesis and tooth size discrepancy in Class III skeletal pattern.



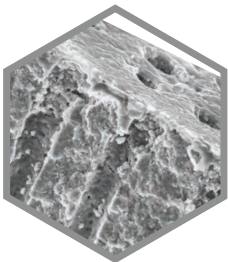
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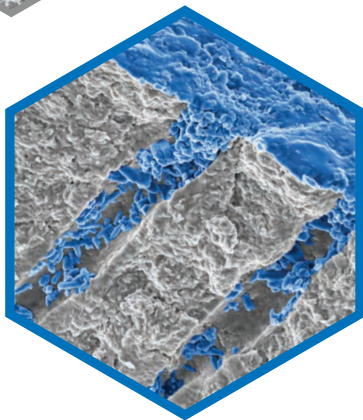


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Reference: 1 Ayad F, Ayad N, Delgado E, et al. *J Clin Dent*. 2009;20(Spec Iss):115-122.
*vs potassium-based toothpaste. **Patient Experience Study, EU 2015, IPSOS.

Intended for dental professionals / academia only.

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