USM UNIVERSITI SAINS MALAYSIA

APEX

50 YEARS OF LEADING KNOWLEDGE FOR CHANGE

20th PPSG

3rd POSTGRADUATE RESEARCH DAY PGRD

School of Dental Sciences, Universiti Sains Malaysia

Abstract Book

POSTGRADUATE RESEARCH DAY 2019

Excelling in Science: Challenges in 50 Jubilant Years

28TH APRIL 2019

School of Dental Sciences
USM Health Campus

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PGRD 2019

3rd POSTGRADUATE RESEARCH DAY 2019

28th APRIL 2019

School of Dental Sciences
Universiti Sains Malaysia
Kota Bharu, Kelantan

THEME

Excelling in Science: Challenges in 50 Jubilant Years

Organized by
School of Dental Sciences
Universiti Sains Malaysia

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CONTENTS

Message from the Dean

Assalamua'alaikum and Greetings.

I would like to welcome all the participants who have joined this conference. We are indeed very honoured to have all of you here with us.

The theme of the conference, "Excelling in Science: Challenges in 50 Jubilant Years" is very relevant and pertinent in the current 50 years of USM challenges. Science is fundamentally an interactive, cooperative pursuit, which requires exposing the results of research to review, learn, unlearn and relearn. The three pillars that form an excelling scientific society are scientists, administration and funding. So, it is very important for these three pillars to work together so that the fruits of science can be reaped and enjoyed by everybody in the society.

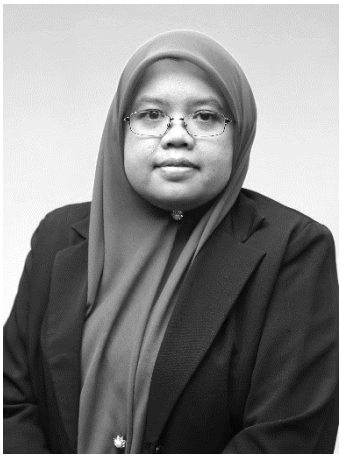
I thank all the presenters of this PGRD 2019 for sharing their findings and experiences. I would also like to take this opportunity to congratulate all the members of the organizing committee for their tremendous efforts and excellent planning in organizing this conference and hope this success will continue in the years to come.

I wish all the participants an enjoyable and successful conference.

Thank you.

Assoc. Prof. Dr. Mohd Fadhli Khamis
Dean
School of Dental Sciences
Universiti Sains Malaysia

Message from Chairperson I



Assalamua'alaikum and Salam Sejahtera.

Welcome to the 3rd Postgraduate Research Day. The previous two were held in conjunction with the Student Scientific Conference, our in-house conference for dental undergraduate students.

This year, in celebrating 50 years of USM, the organising committee decided to have it independently and invite postgraduate students from other schools and institutions as well. USM 50 years is indeed a celebration that one should be proud of. In line with that, a theme was coined reflecting USM and postgraduate students who were and are parts of this institution, "Excelling in Science: Challenges in 50 Jubilant Years". The struggles in making science and research culture in USM is real, regardless of the told tales.

Hence, only the brave ones with a little luck thrown in will come out of the journey as a graduated MSc or PhD holder. Nevertheless, it is the journey that is important. The finishing line, which is the convocation ceremony, is a mark of another beginning.

Herewith, I would like to congratulate the organising committee who has been very efficient in making this programme successful. I also thank all the sponsors for their support and welcome all the presenters and participants to this conference.

I wish everyone an enjoyable day full of knowledge.

Assoc. Prof. Dr. Azlina Ahmad
Deputy Dean
(Research, Innovation & Industry-Community Engagement)
School of Dental Sciences
Universiti Sains Malaysia

Message from Chairperson II

Assalamua'alaikum and Salam Sejahtera.

A very warm welcome to all the participants of the 3rd Postgraduate Research Day 2019, gathering academicians, researchers, and postgraduate students from various institutions and organizations.

This year's theme, "*Excelling in Science: Challenges in 50 Jubilant Years*" is in line with Universiti Sains Malaysia's 50th anniversary. As we acknowledge and celebrate our successes, it is important that we also reflect on the past with a positive outlook to determine what we could do better. Such reflection will create an opportunity to explore the challenges that lie ahead as we strive for better outcomes.

Besides providing an opportunity for participants to present their research findings, I hope this event will also serve as a platform for all to widen their professional contact, share and exchange ideas, discuss challenges in the respective fields, and create new opportunities, including establishing new collaborations.

I would like to congratulate the organising committee and to thank everyone who have contributed in so many ways to ensure the smooth running of this event. I would also like to express my sincere appreciation to all invited speakers and participants for coming here with very interesting presentations that creates a very good atmosphere for discussion and networking.

I wish everyone an enjoyable and fruitful meeting.

Assoc. Prof. Dr. Norkhafizah Saddki
Deputy Dean
(Academic, Career & International)
School of Dental Sciences
Universiti Sains Malaysia

Scientific Programme

3rd Postgraduate Research Day
"Excelling in Science: Challenges in 50 Jubilant Years"
School of Dental Sciences, Universiti Sains Malaysia
28th April 2019

Time	Programme	Venue
8.00 am	Registration	Corridor, 2nd Floor
8.30 am	Ceremonial procession of VIPs	DK 1
8.45 am	Prayer recital	
8.50 am	Welcoming speech and officiating ceremony Assoc. Prof. Dr. Mohd Fadhli Khamis *Dean, School of Dental Sciences*	
9.00 am	Multimedia presentation	
9.10 am	Photography session	
9.20 am	Break up session (Presenters, participants, and judges move to respective rooms)	
9.30 am	**Oral presentations (3-min pitching)** Basic Sciences Clinical Sciences / Public Health **E-poster presentations**	DK 1 Seminar Room
1.00 pm	Lunch break	
2.30 pm	Invited talk: "Shaping a good research aptitude" Prof. Dr. Shaharum Shamsuddin *Head of Cellular Cluster, USM-RIKEN Centre for Ageing Science (URICAS) & School of Health Sciences, USM*	DK 1
3.30 pm	Award presentation and closing ceremony	DK 1

DK 1 (Dewan Kuliah 1 / Lecture Hall 1), 2nd Floor

Invited Speaker

Brief CV

Professor Dr. Shaharum Shamsuddin is currently the Chairman of Biomedicine Programme, School of Health Sciences, Universiti Sains Malaysia, Coordinator of USM-RIKEN International Centre for Ageing Science (URICAS) and USM Senate Member for 2017-2019. His fields of specialization are in molecular biology, biochemistry, gene regulation, protein-protein interaction and nanomedicine with research interests oriented towards tumour gene regulation, molecular mechanism of disease, gene expression and epigenetics of ageing. He has guided as well as guiding many postgraduate students. Prof. Shaharum is also the prestigious winner of Anugerah Khidmat Cemerlang. He has to his credit thirteen research grants completed as the Principal investigator. Prof. Shaharum has been an external evaluator for the positions of Associate Professor and Professor and also for various academic programmes at the national level. In addition to this, he has served to be both as an internal as well as external examiner for candidates doing both Master's and PhD programmes. In view of his expertise, Prof. Shaharum has been a consultant for various local agencies, reviewer of many scientific journals and has many publications in peer reviewed journals at the international level.

Oral Presentations

Venue: DK1

No.	Presenter / Authors	Title	Time
OBS01	Afifa Safdar, Khairunnuur Fairuz Azman, Rahimah Zakaria, Che Badariah Ab Aziz, Usman Rashid	Goat Milk Improves Oxidative Status of D-galactose-induced Ageing Rats	9.30 am
OBS02	Farhana Muhammad Yusoff, Wan Syamimee Wan Ghazali, Najib Majdi Yaacob, Norhanani Mohd Redzwan	The Role of Oestrogen in Antibody Production by IL-27 Stimulated-B Cells	9.38 am
OBS03	Fathul Hakim Hamzah, Suhaily Mohd Hairon, Najib Majdi Yaacob, Kamarul Imran Musa, Fauziah Mohd Noor, Junaidden Mohamad Zain, Mohd Asyraf Mohd Nordin	Development of MyMAFI: A Mobile Application for Field Investigation of Food Poisoning Outbreak and Its Usability as a New Tool for Outbreak Investigation	9.46 am
OBS04	Izzad Farhan Fauzi, Marzuki Omar, Mohd Rizal Arshad	Simulation of Wave Transmission Between Two Layers using k-Wave MATLAB Toolbox	9.54 am
OBS05	Muhammad Fuad Hilmi Yusof, Siti Nurnasihah Md Hashim, Thirumulu Ponnuraj Kannan, Khairul Bariah Ahmad Amin Nordin, Suzina Sheikh Ab. Hamid, Ahmad Azlina	Decellularised Human Amniotic Membrane and VEGF Induced *In Vitro* Endothelial Differentiation of Dental Stem Cells via MEK Pathway	10.02 am
OBS06	Nur Awanis Mohamed Alang, Huwaina Abd Ghani, Suharni Mohamad	Antibacterial Properties of Propolis and *Piper betle* Towards *Enterococcus faecalis:* An *in-vitro* Study	10.10 am
OBS07	Nur Ellene Mat Luwi, Suhana Ahmad, Rohimah Mohamud, Armando Acosta, Maria Elena Sarmiento, Mohd Nor Norazmi, Ramlah Kadir	Uptake of Natural Liposomes from *Mycobacterium smegmatis* with Mice Bone Marrow-Derived Dendritic Cells	10.18 am
OBS08	Nur Syazwani Aziz, Azlina Ahmad, Norhayati Yusop	Differential Gene Expression of Angiogenic and Migratory Markers by Stem Cells from Human Exfoliated Deciduous Teeth and Its Potential to Enhance Tissue Healing	10.26 am
OBS09	Rabiatul Adawiyah Abdul Rohim, Wan Muhamad Amir W Ahmad, Noor Huda Ismail	Establishing an Exponential Regression Model for a Better Prediction and Inference Towards *Lactobacillus*	10.34 am
OBS10	Samiya Riaz, Ahmad Azlina, Zuliani Mahmood, Aung Thu Htun	Attachment of Dental Pulp Stem Cells Seeded on Irrigated Radicular Dentin Treated with Intracanal Medicaments	10.42 am

No.	Presenter / Authors	Title	Time
OBS11	Siti Nurnasihah Md Hashim, Khairul Bariah Ahmad Amin Noordin, Thirumulu Ponnuraj Kannan, Suzina Sheikh Abdul Hamid, Ahmad Azlina	Epidermal Differentiation of Dental Stem Cells in Indirect Co-Culture Model	10.50 am
OBS12	Wan Khairunnisa Wan Juhari, Wan Faiziah Wan Abdul Rahman, Andee Dzulkarnaen Zakaria, Wan Muhammad Mokhzani Wan Muhammad Mokhter, Bin Alwi Zilfalil, Khairul Bariah Ahmad Amin Noordin	Simultaneous Silencing of MSH2 and EPCAM, and Their Effects in the Wnt/β-catenin Pathway	10.58 am
BREAK			
OCS01	Ahmed Chaudhry, Siti Lailatul Akmar Zainuddin, Nur Karyatee Kassim, Azreen Syazril Adnan, Hanim Afzan Ibrahim, Basaruddin Ahmad	Changes of Periodontal Parameters in Pre-dialysis Chronic Kidney Disease Patients with Chronic Periodontitis Following Non-Surgical Periodontal Therapy	11.10 am
OCS02	Engku Ahmad Muzhaffar, Zurairah Berahim, Norsila Abdul Wahab, Norkhafizah Saddki	Periodontal Status and Associated Factors among Dental Students	11.18 am
OCS03	Lee Sing Chet, Siti Azrin Ab Hamid, Norsa'adah Bachok, Suresh Kumar Chidambaram	Prognostic Factors for Survival Among HIV-Infected Adults in Hospital Sungai Buloh	11.26 am
OCS04	Mohmed Isaqali Karobari , Tahir Yusuf Noorani, Mohamad Syahrizal Bin Halim, Hany Mohamed Aly Ahmed	Adoption of a New Classification System to Evaluate Root and Canal Morphology of Mandibular Anteriors in a Malaysian Sub-population Using CBCT	11.34 am
OCS05	Normah Yacob, Mohd. Zulkarnain Sinor, Raja Azman Raja Awang	Associating Tooth Related Local Factors in Relation to Periodontal Parameters Using Virtual and Conventional Dental Models	11.42 am
OCS06	Nurul Hazirah Jaafar, Zabidi Azhar Mohd Hussin, Azriani Abd Rahman, Noorizan Abd Majid, Sakinah Harith, Azizah Othman	Health Inequalities in Children With Neurological Impairments: The Current State of Nutrition and Feeding	11.50 am
OCS07	Paras Ahmad, Ramiza Ramza Ramli, Liszen Tang, Mohamad Arif Awang Nawi, Jawaad Ahmed Asif	Predictability of Distant Metastases from Head and Neck Squamous Cell Carcinoma based on Tumour Staging, Tumour Site and Histological type	11.58 am
OCS08	Samhani Ismail, Mohammed Faruque Reza	Decoding the Neural Correlates of Psychoacoustic and Cognitive Effects of Linguistic Rhythms During Listening to the Fatihah Chapter Recitation	12.06 pm

No.	Presenter / Authors	Title	Time
OCS09	Sharina Dolah, Sumaiya Zabin Eusufzai, Wan Muhamad Amir Wan Ahmad	Factors Influencing Oral Health-Related Quality of Life Among Preschool Children in Kota Bharu, Kelantan	12.14 pm
OCS10	Siti Atiyah Ali, Tahamina Begum, Faruque Reza, Nor Asyikin Fadzil, Mohamed Faiz Mohamed Mustafar	Neurocognitive Processing during Auditory Oddball Task in Dyslexic Children: An Event Related Potential Pilot Study	12.22 pm
OCS11	Siti Sarah Ayub, Mohd Zulkarnain Sinor, Basaruddin Ahmad, Noor Azlinaliana Ibrahim	Compliance of Infection Control Practice in Clinical Dental Students at School of Dental Sciences, Universiti Sains Malaysia	12.30 pm

E-poster Presentations

Venue: Seminar Room

No.	Presenter / Authors	Title
PBS01	Aina Akmal Mohd Noor, Harishini Rajaratinam, Nur Fathin Alia Che Wahab, Wan Amir Nizam Wan Ahmad, Noor Fatmawati Mokhtar, Wan Ezumi Mohd Fuad	Development of Orthotopic Breast Tumour using 4T1 Cell Line onto the Right Thoracic Mammary Fat Pad of Female BALB/c Mouse Model
PBS02	Dina Hussein Yamin, Azian Binti Harun	Proportion of *Candida parapsilosis* in Healthcare-associated Bloodstream Infections
PBS03	Hui-Pheng Kho, Candy Chuah	Elucidating the Roles of Annexin-like Alpha Giardins in the Protozoan Parasite, *Giardia Intestinalis*: An Approach to Control Giardiasis
PBS04	Mohd Faris Mohd Husin, Nor Farid Mohd Noor, Zul Izhar Ismail, Nurul Aiman Mohd Yusoff	Identification of PKD2L1-expressing Cells in the Central Nervous System and Oral Region in Postnatal Rats
PBS05	Arif Azimi, Fatin Mirza, Norazira Ismail, Wan Nor Amilah Wan Abdul Wahab, M Faizul, Aminordin, Mohd Dasuki Sul'ain	Composition of *Melaleuca cajuputi* Leaves in Pasir Puteh, Kelantan
PBS06	Nadiah Ibrahim, Aqilah Roslee, Maryam Azlan, Nurhidanatasha Abu Bakar	Effect of pH Alteration in the Digestive Vacuole of *Plasmodium falciparum* Treated with Artemisinin Measured using Flow Cytometry
PBS07	Azid Nor Azrini, Ahmad Suhana, Tan Hern Tze, Mohd Ashari Noor Suryani, Mohamud Rohimah	Determination of $CD103^{+}$ Dendritic Cells and $TNFR2^{+}$ Treg in Asthma Patients
PBS08	Norjihan Abdul Hamid, Muhammad Amiruddin Abdullah, Noor Asmaliza Abdullah, Zeti Norfidiyati Salmuna@Ayub	Seroprevalence of Cytomegalovirus Infection Among Infants and the Association Between Cytomegalovirus Viral Load and Serological Diagnosis with Clinical Outcome in Hospital Universiti Sains Malaysia
PBS09	Nurul Farah binti Azih, Tahir Yusuf Noorani, Zuryati Ab Ghani, Mohamad Syahrizal Halim	Efficacy, Hardness and Roughness of Tooth Surface After Treatment with Various Combinations of Laser and Home Bleaching Protocol
PBS10	Nurul Hafizah Mohd Nor, Zurairah Berahim, Ahmad Azlina, Thirumulu Ponnuraj Kannan	Stem Cells from Human Exfoliated Deciduous Teeth into Epithelial Cells: A Promising Venture for Dental Tissue Regeneration

No.	Presenter / Authors	Title
PBS11	Nurul Hikmah Harun, Wan Amir Nizam Wan Ahmad, Rapeah Suppian	Stimulation of Innate Immune Responses of Macrophages J774A.1 by Combination Treatment of Asiatic Acid and Madecassoside
PBS12	Victor Udo Nna, Ainul Bahiyah Abu Bakar, Azlina Ahmad, Mahaneem Mohamed	Malaysian Propolis and Metformin Abrogate Altered Testicular Lactate Transport and Germ Cell Apoptosis in the Testes of Diabetic Rats
PBS13	Wan Ahmad Faiz Wan Jamil, Kasmawati Mokhtar, Suharni Mohammad, Azlina Ahmad	*In-vitro* Antimicrobial Activity of Spirulina Extracts Against Oral Bacteria
PCS01	Fathul Hakim Hamzah, Suhaily Mohd Hairon, Najib Majdi Yaacob, Kamarul Imran Musa, Fauziah Mohd Noor, Junaidden Mohamad Zain	Food Poisoning Outbreak in Kelantan 2014-2017: Reliability and Timeliness in Reporting
PCS02	Fazal Shahid, Norma Ab Rahman, Mohammad Khursheed Alam, Mohd Fadhli Khamis, Adam Husein	Alignment Efficacy of Self-Ligating and Conventional Ligating Bracket System with Application of Low-Level Laser Therapy: A Randomized Clinical Trial
PCS03	Manahil Maqbool, Norsamsu Arni Samsudin, Tahir Yusuf Noorani	Controversies in Endodontic Access Cavity Designs: A Literature Review
PCS04	Noorul Nadiah Noor Zamry, Norkhafizah Saddki, Zuliani Mahmood	Knowledge Towards Children Oral Health Among Pregnant Women Attending Hospital Universiti Sains Malaysia and Related Factors
PCS05	Nur Tasnim Shamsuddin, Sarimah Abdullah, Norsa'adah Bachok	Chest X-Ray Findings of Pulmonary Tuberculosis and Its Associated Factors
PCS06	Sanjida Haque, Mohd Fadhli Khamis, Mohammad Khursheed Alam, Wan Muhamad Amir W Ahmad	Cheiloplasty and Palatoplasty have Detrimental Effect on Maxillary Arch of Unilateral Cleft Lip and Palate Children: A Myth or a Fact
PCS07	Sarmad Saif, Siti Lailatul Akmar Zainuddin, Fauziah Jummaat, Haslina Taib, Nur Karyatee Kassim, Basaruddin Ahmad, Nur Nadirah Ilyana	Oral Health-Related Quality of Life During Different Phases of Pregnancy
PCS08	Shifat A Nowrin, Saidi Jaafar, Norma Ab Rahman, Rehana Basri, Mohammad Khursheed Alam, Siti Aishah Zainal	External Apical Root Resorption Between Self-Ligating and Conventional Systems
PCS09	Liyana Amanina Dalial, Siti Azrin Ab Hamid, Wan Nor Asyikeen Wan Adnan, Nyi Naing, Azreen Syazril Adnan	Acute Kidney Injury in Intensive Care Unit: Prognostic Factors Influence the Survival of Patients

No.	Presenter / Authors	Title
PCS10	Syathirah Hanim Azhar Hilmy, Ruhaya Hasan, Norkhafizah Saddki, Marina Abdul Manaf	Dental Caries in Relation to 6-n-propylthiouracil Bitter Taste Sensitivity: A Cross-Sectional Study Among University Students
PCS11	Usman Rashid, Siti Lailatul Akmar Zainuddin, Zurairah Berahim, Ahmad Azlina, Basaruddin Ahmad	Assessment of Salivary Matrix Metalloproteinase-8 and Periodontal Status in Obese Adults with Chronic Periodontitis
PBM03	Md. Saiful Islam, Noor Huda Ismail, Raja Azman Raja Awang, Nafij Jamayet	A Study of Compressive Strength and Flexural Strength of Experimental Nanohybrid Dental Luting Composite Cement from the Rice Husk
PBM04	Abbas Ibrahim Hussein, Nur Atikah Ab Ghani, Ismail Ab. Rahman, Adam Husein, Nur Fatiha Ghazalli, Zuryati Ab-Ghani	Powder XRD Pattern of Zirconia Stabilized-Nano Calcium Oxide Derived from Cockle Shells
PBM05	Nurfarah Aini Mocktar, Mohammad Khairul Azhar Abdul Razab, An'amt Mohamed Noor	Kenaf and Oil Palm Nanocellulose as a Filler in Composite Brick to Reduce Radon Emanation

OBS01

Goat Milk Improves Oxidative Status of D-galactose-induced Ageing Rats

Afifa Safdar[1], Khairunnuur Fairuz Azman[2], Rahimah Zakaria[2], Che Badariah Ab Aziz[2], Usman Rashid[3]

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[2]Department of Physiology, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia
[3]School of Dental Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

Introduction: Ageing is a normal physiological process that is accompanied by oxidative DNA damage and increase in oxidative stress. D-galactose is a reducing monosaccharide which if systemically exposed causes accelerated senescence in organs and is widely being used as an ideal model to study brain ageing. Goat milk is a food of high nutritional value and has been proved to possess strong antioxidant and anti-inflammatory properties. However, little is known of its possible effects on brain especially on its antioxidant role during ageing.

Objectives: To examine the antioxidant capacity of goat milk supplementation in D-galactose-induced ageing rat model.

Methodology: Fifty-two male Sprague Dawley rats were randomly divided into four groups: 1) control group, 2) goat milk treated group, 3) D-gal treated group, and 4) goat milk plus D-gal treated group. Subcutaneous injections of D-gal at 120 mg/kg and oral administrations of goat milk at 1 g/kg were chosen for the study. Goat milk and D-gal were administered concomitantly for six weeks, while the control group received saline. Six weeks later, the animals were sacrificed, and brain homogenates were analysed for activities of antioxidant enzymes i.e. superoxide dismutase (SOD), glutathione peroxidase (GPx) and catalase (CAT) as well as for level of malondialdehyde (MDA).

Results: D-gal induced oxidative stress as evident by elevated MDA level and reduced antioxidant enzymes' activities. These effects were counteracted by goat milk as it significantly increased the activities of SOD, GPx, and CAT and decreased the level of MDA.

Conclusion: Goat milk effectively attenuates ageing-induced oxidative stress attributed to its antioxidant capacity.

Keywords: Goat milk, D-galactose, Ageing, Oxidative stress, Antioxidant

OBS02

The Role of Oestrogen in Antibody Production by IL-27 Stimulated-B Cells

Farhana Muhammad Yusoff[1], Wan Syamimee Wan Ghazali[2], Najib Majdi Yaacob[3], Norhanani Mohd Redzwan[1]

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[2]Department of Medicine, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia
[3]Unit Biostatistics & Research Methodology, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

Introduction: Systemic lupus erythematosus (SLE) is an autoimmune disease involving multiple organs lead to tissue damage and diverse clinical manifestations. IL-27 serum levels play a role in B cell development and autoantibody production. Since most SLE patients are women of child-bearing age, oestrogen has been suggested to play an important role in SLE pathogenesis. Thus, this study aimed

Objective: To elucidate the role of oestrogen in antibody production of IL-27 stimulated-B cells from normal control and SLE patient.

Methodology: B cells were isolated from 20 ml PBMC of normal controls and SLE patients using magnetic separation technique. The purity of B cells was analysed using flow cytometry. Purified B cells were stimulated with anti-IgM, CD40 ligand, rIL-27 and then treated with 1000nm of 17β-oestradiol (oestrogen) before cultured for 48 hours in 37ºC in CO_2 incubator. The supernatant of the cultured cells was collected to perform total IgG ELISA for both normal controls and SLE patients.

Results: In normal control and SLE patients, total IgG concentration is lower when IL-27 stimulated-B cells are treated with 17β-oestradiol compared with the untreated condition.

Conclusion: In normal and SLE condition, oestrogen with the presence of IL-27 stimulated-B cells only could suppress immunoglobulin (total IgG) production.

Keywords: Systemic lupus erythematosus, IL-27, 17β-oestradiol, IgG

OBS03

Development of MyMAFI: A Mobile Application for Field Investigation of Food Poisoning Outbreak and Its Usability as a New Tool for Outbreak Investigation

Fathul Hakim Hamzah[1], Suhaily Mohd Hairon[1], Najib Majdi Yaacob[2], Kamarul Imran Musa[1], Fauziah Mohd Noor[3], Junaidden Mohamad Zain[3], Mohd Asyraf Mohd Nordin[4]

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Introduction: The current practice of field investigation of food poisoning outbreak is still using the paper-based format despite the advancement in information and communication technology. This study aimed to adopt the flexibility of mobile application as an alternative tool for field investigation of food poisoning outbreak.

Objectives: To develop a mobile app for field investigation of food poisoning outbreak and to assess the usability of the mobile app as a new tool for field investigation of food poisoning outbreak.

Methodology: The design and development process of the mobile app was implemented based on ADDIE Framework (Analyse, Design, Develop, Implement, and Evaluate). Upon completion, a validated Malay version system usability questionnaire known as SKAMA (*Skala Kebolehgunaan Aplikasi Mudah Alih*) was used to assess the usability of the mobile app prototype.

Results: The mobile app-MyMAFI which was developed for Android platform basically maintained the original content and arrangement of the field investigation form and further added with a few add-on values such as auto-calculation, auto-generation of epidemic curve and auto-generation of line-listing of cases. The data entered into the mobile app is also transferrable into computer. In terms of its usability, the mean (SD) SKAMA score of MyMAFI was 71.1 (4.62) which was significantly higher (p-value<0.01) than the acceptable cut-off points for usability which is 68.

Conclusion: The newly developed mobile app–MyMAFI is a usable tool for field investigation of food poisoning outbreak.

Keywords: Mobile Application, Field Investigation, Food Poisoning Outbreak, ADDIE Framework, Usability, SKAMA

OBS04

Simulation of Wave Transmission Between Two Layers using k-Wave MATLAB Toolbox

Izzad Farhan Fauzi[1], Marzuki Omar[1], Mohd Rizal Arshad[2]

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[2]School of Electrical and Electronic Engineering, Universiti Sains Malaysia, Engineering Campus, 14300 Nibong Tebal, Pulau Pinang

Introduction: Osseointegration remains inadequately comprehended. The numerical study approach of low-intensity pulsed ultrasound (LIPUS) on dental implant ignites researchers to deeply understand the fundamental work of healing as it will shorten the healing time.

Objectives: The main objective of the numerical study is to understand the fundamental phenomena of ultrasonic waves. The simulation of wave propagation between two different media is simulated using a model in two dimensions.

Methodology: In this study, the model is built based on the equation of a series of coupled first-order partial differential that describes the active change of physical parameters (the stress and particle velocity) within the medium using k-Wave MATLAB toolbox. The needed steps that used in simulating are properties of computational grid, medium properties, source and sensor.

Result: By using k-Wave MATLAB toolbox, we demonstrated the waves propagate through the two layers. This allowed us to observe the intensity of the wave propagate through the layers. The snapshot of the intensity shows that the lower frequency waves propagate through the layers are obvious.

Conclusion: Numerical study approach helps to develop a better understanding of physical phenomena in the implant using the ultrasonic device.

Keywords: LIPUS, k-Wave MATLAB toolbox, Implant, Numerical study

OBS05

Decellularised Human Amniotic Membrane and VEGF Induced *In Vitro* Endothelial Differentiation of Dental Stem Cells via MEK Pathway

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Introduction: Regeneration of dental pulp tissue offers additional modality of endodontic treatments that are biologically and mechanically effective. In this study, stem cells from human deciduous teeth (SHED) were seeded on decellularized human amniotic membrane (HAM) and treated with vascular endothelial growth factor (VEGF). The endothelial differentiation potential of this construct via MEK pathway was evaluated. To date, the MEK-related endothelial-specific gene expression for this proposed *in vitro* model is yet to be documented.

Objectives: To investigate the effect of HAM and VEGF on the expressions of stem cells, endothelial-specific, and MEK-related genes of SHED.

Methodology: The experiment was designed to have 5 conditions; SHED (S) only, SHED+HAM+VEGF (SHV), VEGF-induced SHED (iS), VEGF-induced SHED+HAM+VEGF (iSHV) and VEGF-induced SHED+HAM+VEGF+MEK inhibitor, PD184352 (iSHVI). The RNA was extracted at day 1, 7, 10, and 14. The expression levels of stem cells (*Nanog*, *Nestin*, and *CD-73*) and endothelial specific markers (*Ang-1*, *Cox-2*, *VE-Cadherin*) was detected using reverse transcriptase-polymerase chain reaction (RT-PCR). The expression of MEK-related genes i.e. *CD-31*, *Nitric Oxide Synthase 3* (*NOS-3*) and *von Willebrand factor* (*vWF*) were studied using Real-Time PCR (qRT-PCR).

Results: Results showed that all groups expressed the stem cells and endothelial specific markers. MEK-related genes were expressed in all treatment groups and PD184352 downregulated respective genes.

Conclusions: HAM provides a pro-angiogenic environment and VEGF treatment was able to amplify endothelial differentiation of SHED. The MEK pathway regulated the endothelial differentiation of this proposed model.

Keywords: Tissue engineering, Endothelial differentiation, Stem cells from human deciduous teeth, Human amniotic membrane, Vascular endothelial growth factor

OBS06

Antibacterial Properties of Propolis and *Piper betle* Towards *Enterococcus faecalis:* An *in-vitro* Study

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Introduction: Calcium hydroxide ($Ca(OH)_2$) is the most commonly used intracanal medicament due to its wide range of antibacterial effects against common endodontic pathogens. However, its effectiveness against *Enterococcus faecalis* (*E. faecalis)* is limited and leads to exploration of other alternative agents.

Objective: To evaluate and compare the antibacterial efficacy of propolis and *Piper betle* (*P. betle*) extract against *E. faecalis* within 24 hours, 48 hours and 7 days.

Methodology: A total of ninety dentine discs were obtained and chemomechanically prepared. Following sterilisation, the test samples were inoculated with pure culture of *E. faecalis*. After 21 days of incubation, pre-medication colony forming unit (CFU) were recorded. Then, the samples were randomly divided into five groups (n=15) and treated with five different intracanal medicaments respectively. The antibacterial effectiveness of the these intracanal medicaments were recorded by determining the percentage reduction in colony count (%RCC) at the end of 24 hours, 48 hours and 7 days. The data were statistically analysed using one-way analysis of variance (ANOVA) and Tukey Honestly Significant Difference (HSD) post hoc test.

Results: Propolis, *P. betle*, combination $Ca(OH)_2$/propolis and $Ca(OH)_2$ /*P. betle* exhibited better %RCC than $Ca(OH)_2$ following 24 and 48 hours of medicament period and sustained until 7 days. Further analysis showed that propolis, *P. betle*, combination $Ca(OH)_2$/propolis and combination $Ca(OH)_2$ /*P. betle* exhibited significantly better antibacterial efficiency after the first 24 and 48 hours of medicament ($p<0.05$).

Conclusion: Propolis and *P. betle* hold promise as an *in vitro* antibacterial agent against *E. faecalis* and as an alternative short term intracanal medicament.

Keywords: Calcium hydroxide, Propolis, *Piper betle, Enterococcus faecalis*

OBS07

Uptake of Natural Liposomes from *Mycobacterium smegmatis* with Mice Bone Marrow-Derived Dendritic Cells

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Introduction: Liposomes are phospholipid vesicles which are biocompatible, biodegradable and essentially nontoxic that make them suitable for biomedical research. Liposomes have potent immunostimulatory properties and efficiently taken up by dendritic cells (DCs). These formulations were studied for their adjuvant effects with DCs, since uniquely capable of stimulating primary immune responses.

Objective: To investigate the uptake of liposomes derived from *M. smegmatis* (lip-Msmeg) by bone marrow-derived dendritic cells (BMDCs).

Methodology: Liposomes were synthesised from total lipid of *M. smegmatis* and characterized by scanning electron microscopy (SEM). DCs were generated from murine bone marrow cultured with GM-CSF and IL-4 to obtain mature BMDCs. The recognition and uptake capacity of BMDCs were observed via SEM after 24 hours exposure with lip-Msmeg.

Results: SEM images of lip-Msmeg showed the spherical structures with an average size between 20 nm-80 nm that classified our liposomes under small unilamellar vesicles. Lip-Msmeg was found to attached to the surface of BMDCs and taken up by BMDCs. BMDCs form longer dendritic projections in order to phagocyte the liposomes.

Conclusion: The present study has successfully synthesised the natural liposomes, lip-Msmeg. The results revealed that the small size of such lip-Msmeg has enabled the uptake by BMDCs for the purpose of initiating and modulating immune responses.

Keywords: Liposomes, *Mycobacterium smegmatis*, Dendritic cells, Scanning electron microscopy

OBS08

Differential Gene Expression of Angiogenic and Migratory Markers by Stem Cells from Human Exfoliated Deciduous Teeth and Its Potential to Enhance Tissue Healing

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Introduction: Stem cells from human exfoliated deciduous teeth (SHED) possess great potential benefit for cell-based therapy and tissue repair. IL8, CCR1, CXCR4 and CCL28 are chemokines involved in homing of mesenchymal and endothelial cells, to support the early stage of capillary morphogenesis. Nonetheless, the behaviour of SHED engaging in angiogenesis in terms of its migratory capacity and gene expression pattern are not fully understood.

Objective: To analyse the gene expression of SHED following *in-vitro* angiogenesis and migratory induction.

Methodology: SHED was seeded at 10,000 cells/cm^2 and supplemented with EGM-2 and vascular endothelial growth factor (VEGF) to undergo angiogenesis. Scratch test assay was performed to assess the cell migration rate. RNA was extracted at day 1,3,7,10 and 14 following the angiogenic induction and transwell migration assay protocol. Samples were analysed by RT-PCR for detection of stem cell markers, cell migratory markers and endothelial markers.

Results: The induction protocol successfully induced the migration of SHED, as well as enhancing its differentiation towards the angiogenic lineage. Elevated expression of IL8, CCR1, CXCR4 and CCL28 by the +A+M group was observed on day 10 of treatment. In comparison to the control group, significantly higher expression of IL8 in the +A-M group ($p<0.05$) and CCR1 in the +A+M group ($p<0.05$) was observed.

Conclusion: The differential gene expression of IL8, CCR1, CXCR4 and CCL28 during migration and angiogenesis suggested the potential use of SHED in accelerating tissue repair. Further understanding of SHED-chemokine interaction will enable effective use of SHED in cell-based therapies.

Keywords: Stem cells, Angiogenesis, Migration, Tissue repair

OBS09

Establishing an Exponential Regression Model for a Better Prediction and Inference Towards *Lactobacillus*

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Introduction: Bacteria belonging to the genus *Lactobacillus* are members of the Lactic Acid Bacteria (LAB) growing rapidly in pure culture. The bacteria increase dramatically in a short period of time by measuring the rate of cell population increase over time a growth curve. Therefore, exponential equation growth rate measurement is to determine the rate of change in the number of cells in a culture per unit time and also to calculate population densities of bacteria in culture.

Objective: This study aimed to develop an exponential equation with the best accuracy performance of the proposed calculation method.

Methodology: This research paper illustrates a sample of the data obtained from the established study which characterize the bacterial growth of *Lactobacillus*. Focus was given on continuous measurements and methodological approaches for expressing these methods mathematically: (1) Linear Fit (ii) Exponential Fit (iii) Square Root Fit.

Results: The results revealed that exponential fit shows a very good fitting result, followed by a linear fit and a square root fit. Exponential fit produced the highest R-Squared (0.999935) and the lowest AIC (50.89721) reading across all the methods.

Conclusion: The exponential fit reveals the finding is more explicitly compared to the other proposed method. These results provide insight into predictive microbiology and will help microbiologist and researchers to choose the proper primary growth predictive model. The approach can be applied in other areas of modern biology, such as dynamic of various cellular processes, enzyme and receptor kinetics and others.

Keywords: *Lactobacillus*, Parameter Estimate, Linear Fit, Exponential Fit, and Square Root Fit

OBS10

Attachment of Dental Pulp Stem Cells Seeded on Irrigated Radicular Dentin Treated with Intracanal Medicaments

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Introduction: Regenerative endodontics procedures (REPs) show positive outcomes with the usage of chemical irrigants and medicaments. The medicaments should be compatible with the dental pulp stem cells to promote a complete root maturation with apical closure. American Association of Endodontics (AAE) has a set of guidelines for REPs to standardise the procedure.

Objective: To assess the attachment of dental pulp stem cells (DPSCs) when seeded on irrigated radicular dentin which was treated for 4-weeks with intracanal medicaments.

Methodology: Dental chips (4x4mm) samples were prepared and divided into 3 groups; irrigation only (I.O), irrigation and TAP treatment (I+TAP) and irrigation and $Ca(OH)_2$ treatment [I+$Ca(OH)_2$]. DPSCs were seeded onto the samples and harvested at day 1, day 3 and day 7. The samples were then prepared for SEM imaging.

Results: The results showed spindle-shaped DPSCs with multiple cytoplasmic extensions distributed throughout the dentine surface in TAP as well as $Ca(OH)_2$ groups, but the presence of cytoplasmic extensions was more prominent in TAP group. Acidic TAP demineralised dentine causing the release of substantial retained growth factors from the dentine which promoted the growth of DPSCs.

Conclusion: It is suggested that TAP provides better attachment of DPSCs to dentine surface in comparison to those treated with commercial $Ca(OH)_2$.

Keywords: Regenerative, Endodontics, Medicaments, Irrigants, Stem cells

OBS11

Epidermal Differentiation of Dental Stem Cells in Indirect Co-Culture Model

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Introduction: Plasticity of dental stem cells entices scientists to study the cells for cell therapy and in this case for wound healing due to its neural crest origins. Interaction of the stem cells with epithelial cells through in-direct co-culture approach could demonstrate the cell differentiation potential.

Objectives: To observe the morphology and characterise the epidermal markers of stem cells from human exfoliated deciduous teeth (SHED) co-cultured with human epithelial keratinocyte (HEK001).

Methodology: SHED were co-cultured with HEK001 in transwell plate containing defined keratinocyte-serum free medium (defined K-SFM). SHED which was cultured in Minimum Essential Medium Alpha-Medium (α-MEM) were used as a negative control while HEK001 which were cultured in defined K-SFM served as positive control. Cells were harvested at day 1, 3, 5, 7, 10 and 14. Morphology of the cells was observed through an inverted microscope. The total RNA for all samples were extracted and subjected to One-Step RT-PCR. The amplified genes were electrophoresed on agarose gel.

Results: Morphologically, the co-cultured SHED had transformed into epithelial-like cells. Although it was unable to express keratinocyte differentiation markers (*Keratin 5*, *Keratin 14*, *DSC-1* and *E-Cadherin*), the cells expressed genes involved in epithelial-like differentiation (*Cytokeratin 18* and *Filaggrin*). Interestingly, the cells also expressed regulator genes that are crucial in epithelial-mesenchymal transition (EMT), ∆*Np63* and *Aquaporin 3* without affecting SHED stemness (*Nanog*, *Nestin* and *CD73*).

Conclusion: Co-culture model used in the study successfully promoted SHED differentiation into epithelial-like cells.

Keywords: Cell differentiation, Co-culture, Epidermal markers, Human epithelial keratinocyte, Stem cells from human exfoliated deciduous teeth

OBS12

Simultaneous Silencing of MSH2 and EPCAM, and Their Effects in the Wnt/β-catenin Pathway

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Introduction: Small interfering RNA (siRNA) has the potential as a therapeutic approach against selective pathways in colorectal cancer. EPCAM, a transmembrane glycoprotein mediating cell adhesion, was known to be involved in suppressing the Wnt/β-catenin pathway, a crucial pathway for tumour progression in colon cancer cells. EPCAM deletions caused a transcriptional read-through that may silence its neighbouring gene, *MSH2*.

Objectives: To investigate the synergistic effect of co-siRNA targeted genes, MSH2 and EPCAM, in colon cancer cell, HCT116, and their effect in modulating the Wnt/β-catenin pathway.

Methodology: Pre-designed siRNA of MSH2 and EPCAM were transfected into HCT116 cells. The cells were treated in six groups: untreated cell group, cells treated with negative control siRNA, MSH2-siRNA treated cells, EPCAM-siRNA treated cells, cells treated with both EPCAM and MSH2-siRNA, and cells treated with transfection reagent (mock control). The mRNA and protein expression following the individual and combined siRNA treatments were evaluated by two-step reverse transcription quantitative polymerase chain reaction (RT-qPCR) and Western blot.

Results: Few cells in the siRNA treated samples were observed to be detached and aggregated. The mRNA and protein expression level of MSH2, EPCAM and β-catenin was reduced in the individual MSH2 and EPCAM-siRNA treated samples as compared to the untreated sample. Further reduction of mRNA and protein expression for MSH2, EPCAM and β-catenin was identified in combined siRNA treatments.

Conclusion: Reduction of β-catenin expression by simultaneous silencing of MSH2 and EPCAM suggested that these genes may play a role in suppressing the Wnt/β-catenin pathway in cancer cells.

Keywords: Small interfering RNA (siRNA), Colorectal cancer, MSH2, EPCAM, β-catenin

OCS01

Changes of Periodontal Parameters in Pre-dialysis Chronic Kidney Disease Patients with Chronic Periodontitis Following Non-Surgical Periodontal Therapy

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Introduction: Periodontal disease has emerged as a non-traditional risk factor for chronic kidney disease (CKD). Non-surgical periodontal therapy (NSPT) is a standard treatment for periodontitis. The evidence regarding the effects of NSPT in pre-dialysis CKD patients' is limited.

Objectives: To determine and compare the effects of NSPT on the clinical periodontal parameters in CKD patients with chronic periodontitis (CP) and CP only.

Methodology: A total of 66 patients which consist of 33 pre-dialysis CKD stage III and IV patients with CP (Group 1) and 33 CP patients with no medical illness (Group 2) were enrolled. Clinical periodontal parameters including periodontal pocket depth (PPD), clinical attachment loss (CAL), gingival bleeding index (GBI) and plaque score (PS) were evaluated during the first visit and six weeks following NSPT (second visit).

Results: Majority of patients were Malay (89%), male (65%) with the mean age of (52.57±10.50). Group 1 showed greater severity of periodontitis as there is a significant increase of tooth loss (mean difference:4.84; p<0.001) and CAL measurement (mean difference: 0.55 mm; p=0.001) compared to group 2. All periodontal parameters showed significant improvement post NSPT for both groups (p<0.001). Interestingly the mean changes for PPD, CAL and PS were higher in group 1 compared to group 2 (PPD 1.98, 1.79 mm; CAL 2.07, 1.58 mm; PS 42.26, 40.11%) respectively.

Conclusion: This study demonstrated a greater severity of chronic periodontitis among CKD patients and significant improvement of periodontal parameter following NSPT. Thus, the periodontal health of CKD patients' needs to be monitored and screened for early dental interventions.

Keywords: Chronic kidney disease, Periodontitis, Periodontal parameters, Periodontal therapy

OCS02

Periodontal Status and Associated Factors among Dental Students

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Introduction: The National Oral Health Survey of Adults (NOHSA 2010) revealed that 94% of adults in Malaysia suffered from some form of periodontal disease with 48.5% of them presented with periodontal pocket depth of at least 4 mm.

Objectives: To evaluate periodontal health status of Universiti Sains Malaysia (USM) undergraduate dental students and the associated factors.

Methodology: A random sample of 150 undergraduate dental students in the academic year of 2017/2018 participated in this cross-sectional study. Clinical periodontal examination was performed to determine periodontal health status of the students which was measured using the Community Periodontal Index (CPI). Self-administered questionnaire was used to obtain information on sociodemographic profile. Data were analysed using SPSS version 24.

Results: Of 150 students, only 11 had healthy periodontium while others (92.7%) were affected by periodontal disease; 65.3% had calculus (CPI code 2), 17.3% had bleeding after probing (CPI code 1), 6.7% had shallow pockets of 4-5 mm (CPI code 3) and 3.3% had deep pockets of > 5 mm (CPI code 4). No significant association was found between the presence of periodontal pockets (CPI code 3 and 4) and the students' demographic characteristics: year of study (p=0.579), ethnicity (p=0.479), and sex (p=0.826).

Conclusion: Most USM dental students were affected with some degree of periodontal disease and calculus was detected in more than half of the students. Our findings indicate a high burden of periodontal disease, even among future dentists. Presence of periodontal pockets was not associated with demographic characteristics of the students.

Keywords: Periodontal status, Dental students, Community Periodontal Index, Periodontal health, Periodontal condition

OCS03

Prognostic Factors for Survival Among HIV-Infected Adults in Hospital Sungai Buloh

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Introduction: The benefit of antiretroviral therapy (ART) in HIV survival is well established, but variation exists across regions. Previous studies in Malaysia were limited and covered a wide range of time pre-ART. Therefore, an update of the prognostic model is necessary.

Objectives: To identify the prognostic factors for survival among HIV-infected adults in Hospital Sungai Buloh.

Methodology: A retrospective cohort study was conducted by reviewing medical records of patients who started ART between 2007-2016. ART-naïve adults aged 15 years and above were included and those who were transferred out were excluded. The systematic random sampling method was applied. The outcome of interest was all-cause mortality. Those alive or lost to follow-up were censored Cox proportional hazards regression was applied to determine the prognostic factors for survival.

Results: A total of 339 patients were included in the study, with 50 (14.7%) deaths reported. The patients had a mean age of 37.0 years (SD: 11.2) and were mainly (85.3%) male. Sexual transmission mode (79.6%) was the commonest reported. The mean for the baseline haemoglobin level was 12.7 g/dL (SD: 2.4), with 42.8% patients being anaemic. A total of 85 patients (25.1%) had tuberculosis co-infection. Prognostic factors for HIV survival were baseline haemoglobin level and tuberculosis. Patients who were anaemic at baseline had 7.39 times (95% CI: 2.87, 19.05; $p<0.001$) higher mortality risk than non-anaemic patients. Co-infection with tuberculosis increased mortality risk by 1.75 times (95% CI: 0.93, 3.29; $p=0.081$) compared to their counterparts.

Conclusion: Baseline haemoglobin level and tuberculosis co-infection were prognostic factors for survival among HIV-infected adults.

Keywords: HIV, Overall survival, Prognostic factors, Predictors, Malaysia

OCS04

Adoption of a New Classification System to Evaluate Root and Canal Morphology of Mandibular Anteriors in a Malaysian Sub-population Using CBCT

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Introduction: Successful endodontic treatment cannot be achieved without a thorough knowledge of variations in root and canal morphology in different ethnic groups.

Objectives: To determine the root and canal morphology in permanent mandibular anteriors (MA) in Malaysian subpopulation using cone beam computed tomography (CBCT).

Methodology: CBCT images of 856 patients within the age range of 14 to 70 years, having 5101 mandibular anteriors, were examined. The root and canal configuration types were investigated and classified using the new system and Vertucci. Pearson Chi-square/Fisher's exact tests were used for statistical analysis (P=0.05).

Results: Code $^{1}MA^{1}$ and Type I were the most common in central incisors (64.7%) and canines (90.5%) according to the new system and Vertucci's classification, respectively, whereas in lateral incisors, code $^{1}MA^{1-2-1}$ and Type III were the most common (51%). Several Vertucci's non-classifiable variations were recognized and classified using the new system. These include codes $^{1}MA^{2-1-2-1}$ (2.1%), and $^{1}MA^{2-1-2-1-2-1}$ (0.1%). The incidence of root canal variations in incisors was higher in males compared to females (P<0.001), Malay followed by Chinese and Indians (P<0.001), and in 20-30 age group compared to other age groups (P<0.001). Two-rooted canines were identified in six samples.

Conclusion: A wide range of root canal morphological variations were identified in mandibular anteriors in Malaysian subpopulation. Gender, ethnicity and age play a significant role in the root canal configuration and its complexity. Common root canal configurations were easily described by both classification systems. Nevertheless, in complex morphological variations the new system provided a more accurate presentation.

Keywords: Mandibular anteriors, Cone beam computed tomography, Root canal morphology, Malaysian subpopulation

OCS05

Associating Tooth Related Local Factors in Relation to Periodontal Parameters Using Virtual and Conventional Dental Models

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Introduction: It has been known that in subjects who are susceptible to periodontitis, not all teeth are equally affected to the disease. Differences in severity of the disease in the same oral cavity are linked to the role of local factors. 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.

Objective: This study evaluate association between tooth related parameters (tooth position and soft tissue) and periodontal parameters in individual tooth.

Methodology: Six hundred and sixty-one (661) teeth from 30 subjects were selected. Subjects included in this study had basic periodontal examination (BPE) score 3 and 4 and at least three malpositioned teeth. Parameters of the study such as plaque score, gingivitis score, clinical probing depth, gingival thickness and radiographic bone level were recorded in single visit for each tooth. Upper and lower impressions were taken for construction of study models. Then, Next Engine 3D scanner and 'RapidWorks' software were used to create virtual images of upper and lower casts. The measurement of tooth position and soft tissue dimension were carried out in the laboratory using both conventional and virtual study models.

Results: Plaque score showed significant relationships with proximal contact area, interdental papilla distance and gingival thickness. The proximal contact area, interdental papilla distance also revealed significant relationship with gingivitis score. Clinical probing depth displayed significant associations with gingival thickness and interdental papilla distance. Radiographic bone level in this study has negative associations with interdental papilla height and rotation.

Conclusion: From this study, several tooth related parameters demonstrated associations with certain periodontal variables. The soft tissue dimension of a tooth showed more frequent association than the tooth position factors with periodontal parameters.

Keywords: Tooth related local factors, Periodontal parameters, Virtual study models, Conventional study models

OCS06

Health Inequalities in Children with Neurological Impairments: The Current State of Nutrition and Feeding

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Introduction: The burden of malnutrition among children with neurological impairments (CNI) especially those from the developing countries are enormous, resulting in poor growth due to comorbidities such as feeding difficulties. However, feeding difficulties associated with non-clinical issues such as behaviour problems are not well addressed in the published literature.

Objective: To compare the proportion of malnutrition and feeding difficulties between healthy children and CNI in Kelantan, Malaysia.

Methodology: A cross-sectional study was conducted on matched pair healthy children (n=84) and CNI (n=85) aged 2 to 18 years. CNI were recruited at 25 community-based rehabilitation centres, while healthy children were recruited while visiting their relatives at Hospital Universiti Sains Malaysia. Data on their anthropometry was collected to include body weight, height and mid-upper arm circumference. Meanwhile, feeding difficulties were assessed using Behavioural Paediatrics Feeding Assessment Scale (BPFAS); a parent-report instrument that asses children behaviour and parents' feeling at mealtime. Independent t-test analysis was conducted to compare these data between healthy children and CNI.

Results: CNI had significantly lower z-score for weight-age [MD=3.00 (95% CI 2.20, 3.81), p<0.001), height-age [MD=3.42 (95% CI 2.84, 3.98), p<0.001) and BMI-age [(MD=0.38 (95% CI 1.79, 3.32), p<0.001) with twofold percentages of wasting, stunting and underweight than those in healthy children. They were presented with higher feeding difficulties score [MD=-19.25(95% CI -24.35, -14.15) p<0.001] and that their caregivers were more stressful at mealtime [MD=-6.82(95% CI -8.40, -5.23), p<0.001]. Problematic behaviours such as let food sit in the mouth, whine during feeding and tantrums at mealtimes were predicted from learned aversion towards food.

Conclusion: The proportion of malnutrition and feeding difficulties in CNI were significantly higher than the normal population, indicating potential health inequalities and a need to develop nutrition intervention.

Keywords: Nutritional status, Feeding difficulties, Neurological impairments, Healthy children

OCS07

Predictability of Distant Metastases from Head and Neck Squamous Cell Carcinoma based on Tumour Staging, Tumour Site and Histological type

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Introduction: In head and neck squamous cell carcinoma (SCC), therapeutic efforts have been directed predominantly toward improving loco-regional control. Survival has improved substantially over the past decade, leaving long-term survivors at risk of developing clinically apparent distant metastases (DMs).

Objectives: To predict the probability of distant metastases from head and neck SCCs based on tumour staging, tumour site, and histological type.

Methodology: A retrospective analysis of 424 patients with head and neck SCC from 1st January 2000 to 31st December 2018 was performed. Chi-square tests were performed to determine the association of tumour site, histological type and tumour staging with DMs. Posterior one-third of the tongue, poorly differentiated tumours, and stage 4 tumours were selected as independent variables whereas, distant metastasis was selected as the dependent variable.

Results: A total of 48.9% DM (211 out of 424) was observed. Chi-square showed a significant association (p=0.000), (p=0.003) and (p=0.000) between tumour site, histological type and staging with the posterior 1/3rd of the tongue (8.5%), poorly differentiated tumour (35%) and stage 4 (62%) having the highest percentages of DMs. Unadjusted odds ratio revealed that the chances of DMs from tumours of the posterior one-third of the tongue (p=0.023), poorly differentiated tumours (p=0.005) and stage 4 SCCs (p=0.025) are significantly higher than other tumour sites, histological type and tumour staging, respectively.

Conclusion: The current study revealed that SCCs of the posterior one-third of the tongue had 38%, poorly differentiated tumours had 62% and stage 4 tumours had 58% increased probability of DMs from the head and neck SCC.

Keywords: Distance metastases, Histology, Site, Squamous cell carcinoma, Staging

OCS08

Decoding the Neural Correlates of Psychoacoustic and Cognitive Effects of Linguistic Rhythms During Listening to the Fatihah Chapter Recitation

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Introduction: Brain oscillations provide temporal and spatial cues and it may interacts with internal and external communication networks to coordinate cognitive functions. The Fatihah Chapter found to be endowed with cognitive and psychoacoustical effects.

Objective: To interpret the neural association of the interaction with linguistic rhythm of Fatihah Chapter.

Methodology: Brainwaves from twenty-eight normal subjects were recorded by 128-channel EEG (Electroencephalography) in three conditions of Resting, the Fatihah Chapter and Arabic News listening and analysed by Fast Fourier Transform (FFT) to get the power spectrum in canonical frequency bands of Delta, Theta, Alpha, Beta and Gamma. Multivariate analysis of Discriminant Analysis, Agglomerative Hierarchical Clustering and Multi Linear Regression was performed using XLStat statistical packages. The linguistic rhythms of the auditory stimuli were investigated by speech analysis tools, Praat and ESection.

Results: Results from five featuring speech analysis of formants, spectrogram, pitch, intensity, rhyming and end rhyming analysis showed that the Fatihah Chapter is more rhythmic than the Arabic News. Results from the quantitative EEG study pertaining to brain oscillations activation, synchronization and correlation between EEG electrodes shows that greater neural ensemble was activated with decrease pattern of spectral power due to Fatihah Chapter listening compared to Arabic News.

Conclusion: Frontal-temporal-parietal-occipital areas involved in perceiving Fatihah Chapter rhythmic stimuli. We speculate that there are associations of brain oscillations with attention, memory, speech and emotion during Fatihah Chapter listening which improve cognition-emotion processing and speech fluency need to be elucidated in a well-controlled neurocognitive experimental setup.

Keywords: Brain oscillations, Linguistic rhythms, Multivariate Analysis, Neurocognition, Quantitative Electroencephalography

OCS09

Factors Influencing Oral Health-Related Quality of Life Among Preschool Children in Kota Bharu, Kelantan

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Introduction: Early childhood caries (ECC) is the common oral diseases of preschool children which children in Kelantan continue to have the highest caries prevalence among other states. The consequences of ECC can be led to poor individual quality of life. The Malay Early Childhood Oral Health Impact Scale (Malay-ECOHIS) is used to measure the Oral Health-Related Quality of Life (OHRQoL) of preschool children and their families.

Objectives: To assess caries experience and its association with OHRQoL of preschool children in Kota Bharu, Kelantan.

Methodology: A sample of 169 preschool children of 5-6-year-old participated and were subjected to an oral examination for their caries status by a single trained examiner. The parents were responding to self-administered Malay-ECOHIS and their socio demographic background. Descriptive analysis and chi-square test were carried out.

Results: Subjects comprised of girls (55.6%) with most parents (39%) had secondary level of education and 47.9% of them had monthly income of RM1000-RM2999. Caries prevalence was 74.6% with mean (SD) dmft was 5.27(5.22). The impacts on OHRQoL were more prevalent in the family section of Malay-ECOHIS (12.5%; 95% CI:7.5%-17.5%) than the child section (4.2%; 95% CI:1.16%-7.24%). Items related to 'felt guilty' (22.5%; 95%CI:16%-29%) and 'been upset' (20.2%; 95%CI: 14.1%-26.3%) were the frequently reported on the family impact section. In child impact section, the item related to 'pain' (36.7%;95%CI: 30%-43%) and 'difficulty eating' (20.8%;95%CI:14.7%-26.9%) were reported more frequently. ECC was significantly associated with the impact on family OHRQoL; $p<0.05$.

Conclusion: The presence of ECC was a significant predictor of poor OHRQoL.

Keywords: Caries experience, Oral health-related quality of life, Preschool children

OCS10

Neurocognitive Processing During Auditory Oddball Task in Dyslexic Children: An Event Related Potential Pilot Study

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Introduction: Dyslexia is a language-based learning commonly diagnosed at reading age of primary school. Various studies have indicated that dyslexics may have neural processing impairment in auditory attention. There is lack of study to assess the auditory cognitive function among school-age dyslexic children using the same experiment setting.

Objective: We investigated the auditory attention on primary school dyslexic children compared to non-dyslexic healthy subject using Event Related Potential (ERP).

Methodology: ERP was conducted using 128-sensor net and 19 channels of electrodes were analysed in this study. An 8-year-old dyslexic and a 9-year-old control subject were used in this pilot study. Auditory oddball paradigm was used during ERP study and the subjects counted silently on the target tone stimuli ensuring given attention and alertness while ignoring standard stimuli. Value of the mean differences between the target and standard tone stimuli between the 2 subjects were measured in 10-20- electrode system. Auditory attention sensitive waveform of P300 ERP component was targeted and analysed at 19 electrode sites.

Results: The results were obtained based on observation of P300 latencies and P300 amplitudes between a control and a dyslexic subject across 19 electrode channels. Ten electrode channels of control (Fp1, F3, Fp2, C3, C4, P3, T5, Fz, Cz, and Pz) possessed highest P300 amplitude compared to dyslexic (9 channels), while, 12 electrode sites (Fp1, F3, F4, C4, P3, T5, P4, O1, O2, Fz, Pz, and Cz) of control indicated longer latencies compared to dyslexics.

Conclusion: This pilot study suggested that the control subject had better auditory attention skill towards stimulation despite having longer processing speed. In contrast, dyslexic subject conferred poor auditory attention skill with better processing speed than control.

Keywords: Auditory attention, Event Related Potential, P300, Dyslexia, Auditory oddball

OCS11

Compliance of Infection Control Practice in Clinical Dental Students at School of Dental Sciences, Universiti Sains Malaysia

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Introduction: Infection control is an important protocol in dental treatment and it is taught and practiced at the start of the personnel training. However, there is limited report on the compliance of infection control in clinical dental students during their training.

Objective: To investigate the compliance of infection control practice in Year 4 and 5 clinical dental students at School of Dental Sciences, USM.

Methodology: In this cross-sectional study the practice of infection control procedures of students were observed using an audit checklist by two auditors. The students were followed and observed from the preparation time before a treatment until treatment completion in one clinical session. The audit checklist had 36 items and compliance was originally recorded as do not comply, comply and not applicable based on whether the procedure was performed during the session. Each item was then weighted based on the level of importance of the procedure (1=moderately important, 2=very important and 3=extremely important) and a percentage of compliance was derived.

Results: The mean percentage (SD) of compliance of infection control was 90.3(6.3). The major non-compliance observed was not washing the hands before treatment (52.6%), not wearing PPE and heavy-duty gloves during cleaning procedures (60%) and touching other parts of body while wearing gloves (20%). Females and year four students had better compliance ($p < 0.05$) and; there was no difference in compliance between the ethnicity groups and clinical specialties.

Conclusion: The compliance of infection control practice was good in clinical dental students at School of Dental Sciences, USM.

Keywords: Infection control practice, Dental students, Clinical audit, Compliance, USM

PBS01

Development of Orthotopic Breast Tumour using 4T1 Cell Line onto the Right Thoracic Mammary Fat Pad of Female BALB/c Mouse Model

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Introduction: Breast cancer (BCa) occurs when there is a malignant tissue mass in the breast tissues. In pursuing the translational clinical understanding, *in vivo* studies using 4T1 cell lines can be transplanted into the mammary gland of female BALB/c mice. Its metastatic characteristics are able to mimic the human BCa of stage IV. Originally, 4T1 cells are inoculated at the inguinal region of the mice's mammary fat pad. Therefore, the right thoracic mammary fat pad of the mice is rather preferred to be challenged.

Objectives: To develop the breast tumour using 4T1 cell lines onto the right thoracic mammary fat pad of the mice.

Methodology: 4T1 cells were cultured in Dulbecco's modified Eagle Medium supplemented with 10% foetal bovine serum. The mouse was inoculated with 4T1 mammary carcinoma $1x10^5$ cells subcutaneously onto the right third thoracic mammary fat pad. The palpable tumour can be detected using a thumb and its sizes were regularly measured.

Results: The palpable tumour was successfully developed on week 2 post the injection day. As the days progressed, the bulge of the tumour was noticeably protruded at the anatomically correct site of the mammary pad. Simultaneously, most mice had abnormal coat condition. The tumour size at the thoracic region was observed to be larger than that at the inguinal region as originally established.

Conclusion: The cultured 4T1 cell line was substantially transplanted on the right thoracic mammary fat pad yielding a successful development of mammary tumour orthotopically in mice.

Keywords: Breast cancer, 4T1 cell line, Right thoracic, Mammary fat pad, Orthotopic

PBS02

Proportion of *Candida parapsilosis* in Healthcare-associated Bloodstream Infections

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Introduction: *Candida parapsilosis* is an important cause of healthcare-associated bloodstream infections (BSI) with high mortality and morbidity in immunocompromised patients, in addition to other *Candida* species including *C. albicans, C. tropicalis, C. glabrata*, and *C. krusei*. Knowledge on recent local species distribution and trend is essential. An increase in the proportion of *C. parapsilosis* candidemia is observed recently as a result of many risk factors. The distribution of candidemia has been changing in the last three decades.

Objectives: To determine the proportion of *C. parapsilosis* candidemia in a tertiary-care hospital during January 2001- April 2018.

Methodology: This is a retrospective study performed in a 700-bedded tertiary-care hospital in north-eastern Malaysia. All in-patients with candidemia from January-2001 to April-2018 were studied by reviewing patients' records and microbiology laboratory database. The proportion of each *Candida* species was determined.

Results: Out of 1135 patients with candidemia, *C. parapsilosis* was the commonest species contributing to 28.8% (327/1135) of candidemia, followed by *C. albicans* 20.2% (229/1135), *C. tropicalis 18.5%* (210/1135), *Candida sp*. 15.3% (174/1135), *C. glabrata* 5.9% (67/1135), *C. guilliermondii* 3.8% (43/1135), *C. rugosa* 1.9% (22/1135), *C. famata* 1.7% (19/1135), *C. krusei* 1.4% (16/1135), *C. dubliniensis* 0.7% (8/1135), *C. lusitaniae* 0.7% (8/1135), *C. lipolytica 0.4 %* (4/1135), *C. pelliculosa* 0.4 % (4/1135), *C. haemulonii*, *C. kefyr*, *C. utilis* and *C. inconspicua* (1/1135 each).

Conclusion: This study has shown different scenario for the proportion of *Candida* species with *C. parapsilosis* predominating over *C. albicans*, in contrast with previous studies conducted in Malaysia and neighbouring countries, where *C. albicans* was the major cause of candidemia.

Keywords: Proportion, Candidemia, *Candida*, Malaysia, Epidemiology

PBS03

Elucidating the Roles of Annexin-like Alpha Giardins in the Protozoan Parasite, *Giardia Intestinalis*: An Approach to Control Giardiasis

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Introduction: *Giardia intestinalis* (*G. intestinalis*), causing diarrheal disease worldwide is capable of surviving in host intestine in the presence of both oxygen and reactive oxygen species (ROS). Annexin is known for its role in protecting cells from oxidative stress in both plants and mammals; and has not been reported yet in parasites. Alpha giardins are annexin-like molecules in *G. intestinalis*.

Objectives: To investigate the role of alpha giardins in the antioxidant defence system of *G. intestinalis* and to determine the gene expression level of alpha giardins in *G. intestinalis* exposed to various concentrations of Hydrogen peroxide (H_2O_2) at different time-points.

Methodology: H_2O_2 was used to induce oxidative stress. The level of intracellular oxidant with increasing H_2O_2 concentrations (0, 0.1, 1, 10, 100, 1000 mM) was determined using cellular ROS detection assay. The *in vitro* cytotoxic activity of H_2O_2-induced *Giardia* was investigated by MTT assay. Based on the percentage of cell viability, both IC_{50} and IC_{25} were determined by GraphPad Prism software. Total RNA of untreated and H_2O_2-treated *Giardia* at IC_{50} and IC_{25} was extracted at different time-points (1, 4, 8, 24 hours) for gene expression study by real-time PCR.

Results: Increased concentrations of H_2O_2 showed higher cell death due to increased accumulation of ROS in *G. intestinalis*. The values of IC_{50} and IC_{25} were calculated as 0.6085 mM and 0.2028 mM respectively. Gene expression analysis showed significant up-regulation of alpha giardins in H_2O_2-treated *Giardia* as compared to those of untreated *Giardia*.

Conclusion: The annexin-like molecules, alpha-giardins play a significant role in the modulation of oxidative stress in *G. intestinalis*.

Keywords: *Giardia intestinalis*, Alpha giardins, Oxidative stress, Antioxidant, Giardiasis

PBS04

Identification of PKD2L1-expressing Cells in the Central Nervous System and Oral Region in Postnatal Rats

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Introduction: Neurogenesis in mammals occur in several neurogenic niche area such as subventricular region and subgranular zone of dentate gyrus. This process produces acidity changes to the areas surrounding them. The PKD2L1 marker functions to detect the changes produced by this neurogenesis process.

Objectives: To identify the PKD2L1-expressing cells in the spinal cord, cerebellum, midbrain, dentate gyrus, hypothalamus and tongue.

Methodology: Three Sprague Dawley rats were sacrificed and tissues from the spinal cord, cerebellum, midbrain, dentate gyrus, hypothalamus and tongue were taken. The tissues were then processed and stained using immunohistochemistry for the PKD2L1 marker. The slides were reviewed under light microscope.

Results: The stains were positive for the tissues from the spinal cord (lamina X of the grey matter), cerebellum (granular layer of cerebellar cortex), midbrain (near fourth ventricle), centre of the dentate gyrus, hypothalamus and tongue (taste buds area).

Conclusion: The PKD2L1-expressing cells were identified in the spinal cord, cerebellum, midbrain, dentate gyrus, hypothalamus and tongue. Hence, it can be postulated that these areas may have neurogenesis activities.

Keywords: Neurogenesis, PKD2L1-expressing cells, Immunohistochemistry

PBS05

Composition of *Melaleuca cajuputi* Leaves in Pasir Puteh, Kelantan

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Introduction: Herbs are rich with nutrition and therapeutic value that are used in diets to prevent nutrient insufficiency and degenerative disorders. *Melaleuca cajuputi* (MC) is an aromatic herb that belongs to *Myrtaceae* family. *Melaleuca cajuputi* essential oil (MCEO) extracted from leaves are used as traditional medicine, cooking flavour and freshening agent in cosmetics.

Objectives: To investigate the composition of *Melaleuca cajuputi* in Pasir Puteh Kelantan.

Methodology: *Melaleuca cajuputi* essential oil (MCEO) was subjected to gas chromatography-mass spectrometry (GCMS) and proximate composition of *Melaleuca cajuputi* plant (MCP) was carried out using standard AOAC procedure to determine moisture, crude protein, crude lipid, dietary fibre, ash, calories and carbohydrates. The trace elements were determined by using in house method.

Results: The results showed about nine peaks, and the major components were α-Terpinolene (33.36%), γ-Terpinene (28.72%) and p-Cymene (13.16%). Nutritional analysis of *Melaleuca cajuputi* plant (MCP) comprised of moisture (2.74%), ash (7.76%), crude fat (4.83%), calorie (4974Cal/g), dietary fibre (9.49%), protein (6.42%) and carbohydrates (78.25%).The concentration of lead, cadmium, arsenic and mercury did not exceed maximum concentrations based on British pharmacopoeia 2008.

Conclusion: The presence of various bioactive compounds in the MCEO and high nutritional values in the leaves proved that it has therapeutic value that can be used in diet to prevent nutrient insufficiency and treat several of ailments.

Keywords: *Melaleuca cajuputi*, *Myrtaceae*, Gas chromatography, Mass spectrometry

PBS06

Effect of pH Alteration in the Digestive Vacuole of *Plasmodium falciparum* Treated with Artemisinin Measured using Flow Cytometry

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Introduction: Precise mechanistic action of artemisinin (ART), a highly potent antimalarial drug remains debatable despite decades of research. Previously, ART has been reported to target the proton pump, V-type H^+-ATPase located at the digestive vacuole (DV) membrane of *Plasmodium falciparum*. This may lead to alteration of organelle pH, which resulted in impairment of the haemoglobin degradation and subsequent haem detoxification.

Objective: In this study, the DV pH of parasites treated with ART was measured using a flow cytometry-based assay.

Methodology: A pH calibration curve was generated using a ratiometric pH indicator, fluorescein isothiocyanate-dextran (FITC-dextran) incorporated into the DV of saponin-permeabilised parasites. The ratio of fluorescence intensity was measured at two different wavelengths (530 nm and 585 nm) with the value of steady-state DV pH of 5.23 ± 0.04. Several inhibitory concentrations of ART which was selected from an inhibitory assay was employed to examine pH alteration in the DV.

Results: Interestingly, we found that the pH alteration inside the DV occurred at the sublethal concentration of ART, IC_{30} (6.55 ± 0.29) in which the parasite development started to be slowed and the parasite viability has slightly reduced compared to control without treatment. The increase of the DV pH at this concentration is similar to the effect caused by positive control, a proton pump inhibitor, concanamycin A (75 nM).

Conclusion: This suggests that ART may cause pH alteration in the DV prior to the parasite death, hence indicating an important role in generating new antimalarial drugs pertaining to the interruption of DV pH regulation.

Keywords: Artemisinin, Digestive vacuole, pH alteration, Proton pump and Sub-lethal concentration

PBS07

Determination of CD103$^+$ Dendritic Cells and TNFR2$^+$ Treg in Asthma Patients

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Introduction: Immune dysregulation of asthma pathophysiology resulted from insufficient regulatory cells to induce immune tolerance, which leads to failure in maintaining immune homeostasis. The presentation of the antigenic peptide by dendritic cells (DC) can lead to T cell priming as well as T cell tolerance. The interaction of tolerogenic CD103$^+$ DCs with regulatory T cells (Tregs) are capable to modulate the immune response by inducing immune tolerance.

Objectives: To determine the proportion of CD103$^+$ DC and TNFR2$^+$ Tregs in PBMC of the asthmatics compared to non-asthmatic controls, and the secretion of inflammatory cytokines IL-4, IFNγ, IL-10 and TNF to support on the cellular findings.

Methodology*:* PBMC was isolated using Ficol-gradient centrifugation and stained with DC markers; (HLA-DR, CD11c, CD11b, CD86, CD103) and Treg markers (CD3, CD4, CD25, TNFR2, Foxp3). The lymphocytes phenotyping were assessed by flow cytometer and analysis was performed using FlowJo Software. The cytokines from the plasma were measured using MILLIPLEX® proteomic immunoassays.

Results: Asthma patients showed a significantly decreased level of CD103$^+$ DC within HLA-DR$^+$CD11c$^+$ (P=0.008) and significantly increased the level of Foxp3 expressing TNFR2 Treg when compared with non-asthmatic controls. In addition, significantly increased concentration of IL-10 (P=0.0198) and TNF (P=0.0211) supported on the cellular findings.

Conclusion: This study suggested that the increased levels of Tregs in blood could continuously suppress the Th2 cells activation in the circulation which also supported by the increase of anti-inflammatory cytokines IL-10 and TNF. Overall, functional immunoregulation of the regulatory cells, particularly Tregs exhibit immune suppression and induce immune tolerance in association with the immune activation by the APC which control asthma symptoms.

Keywords: Asthma, Dendritic cells, Immune tolerance, Regulatory T cells, Peripheral Blood Mononuclear Cells

PBS08

Seroprevalence of Cytomegalovirus Infection Among Infants and the Association Between Cytomegalovirus Viral Load and Serological Diagnosis with Clinical Outcome in Hospital Universiti Sains Malaysia

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Introduction: Congenital Cytomegalovirus (CMV) infection was detected in 11.4% infants which significantly higher in comparison to Syphilis, Rubella, Toxoplasma and Herpes simplex virus infection. Out of 11.4%, 10.4% had central nervous system (CNS) defects. Evidence of seroconversion or positive CMV viral load is indicative of acute CMV infection.

Objectives: To determine the seroprevalence of CMV infection among infants in Hospital Universiti Sains Malaysia and the association between CMV viral load and serological diagnosis with clinical outcomes.

Methodology: A prospective cohort study was carried out among 106 infants with serum samples sent for TORCHES (Toxoplasmosis, Rubella, CMV and Herpes Simplex) screening. Infants with 1st serum sample of IgM and IgG antibody titre suggestive of CMV infection were requested to send for 2nd serum and CMV DNA quantitative PCR samples at 2 weeks. Mother's samples for serological investigation were also requested to see the evidences of passive immunity.

Results: The seroprevalence of acute CMV infection among infants was 20.8% (n=22) followed by passive immunity from the mothers, 52.8% (n=56) and 26.4% (n=28) showed inconclusive results. The commonest symptoms in acute infection were jaundice, small for gestational age (SGA), presumed sepsis and prematurity. There was no significant association between viral load and clinical outcomes of the infants.

Conclusion: Acute CMV infection was found to be higher in infants in our population with the commonest presentations being jaundice and SGA. The outcomes of the infection need to be monitored for longer period of times.

Keywords: Cytomegalovirus, Neonates, Passive infection, Acute infection, Viral load

PBS09

Efficacy, Hardness and Roughness of Tooth Surface After Treatment with Various Combinations of Laser and Home Bleaching Protocol

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Introduction: Home bleaching (HB) is the most effective bleaching protocol as compared to various power bleaching (PB) protocols. It demonstrated increased tooth surface hardness, but also significantly increased tooth surface roughness. A combination of PB and HB may give optimal results while maintaining the safety of dental hard tissues.

Objectives: To compare the efficacy and effects of various combinations of laser bleaching (LB) and HB protocol on human natural tooth structure.

Methodology: Eighty eight recently extracted human permanent central incisors were randomly divided into four groups (n=22). Teeth were stained with expired human blood. After staining, teeth were bleached using different bleaching protocols: Group 0 (control-no bleaching), Group 1 (LB + HB for 3 days), Group 2 (LB + HB for 7 days), and Group 3 (HB for 14 days). A colorimetric measurement was performed with Vita Shade @Advanced 4.0, enamel surface roughness was determined with profilometer and microhardness was measured using vickers hardness machine before and after bleaching protocol. Scanning Electron microscope (SEM) was done to assess surface topography.

Results: All protocols had significant efficacy to whiten stained enamel but there was no difference in efficacy between Group 1 and 2 ($p>0.05$). All groups had a significant increase of roughness and hardness ($p<0.05$). SEM showed that Group 1 had a similar microscopic surface appearance as unbleached enamel, while Group 3 had accentuated irregularities.

Conclusion: LB followed by HB for 3 days is the most effective in whitening stained teeth with positive effects on tooth hardness while maintaining surface topography of dental hard tissues.

Keywords: Laser bleaching, Home bleaching, Bleaching efficacy, Surface hardness, Surface roughness

PBS10

Stem Cells from Human Exfoliated Deciduous Teeth into Epithelial Cells: A Promising Venture for Dental Tissue Regeneration

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Introduction: Epithelial cells are the cells lining surfaces of the body and play a crucial part as the first line of the body's defence mechanism. In dentistry, these cells are crucially needed as part of a construct for regeneration of oral tissue. Epithelial-like cells can be derived from other stem cells outside the oral cavity, however, for oral use, it would be best to differentiate epithelial cells from SHED due to its non-invasive-dental-origin.

Objectives: To differentiate and characterise epithelial-like cells from SHED induced by multiple combinations of growth factors, i.e. keratinocyte growth factor, hepatocyte growth factor, epidermal growth factor and human insulin-like growth factor-2.

Methodology: SHED at passages 6 to 9 were grown in the induction media with the addition of multiple combinations of growth factors for epithelial differentiation. The characterisation of the induced cells was done by morphological observation, proliferation rate, gene expression analysis using reverse transcription-polymerase chain reaction (RT-PCR), flow cytometry and immunofluorescence staining. The commercial human keratinocytes served as positive control in this study.

Results: This study demonstrated the inductive effect of multiple combinations of growth factors in the epithelial differentiation of SHED. The results demonstrated that SHED derived-epithelial cells resembled native epithelial cells by having a similar morphological appearance, high expression of epithelial-associated markers in RT-PCR analysis and positive staining against E-cadherin, pan-cytokeratin and p63 in flow cytometry analysis and immunofluorescence staining. Statistical analysis using one-way ANOVA ($p<0.05$) of the proliferation assay also showed a significant correlation between the induced cells and growth factor involved. SHED as negative control indicated no signal/lower expression, therefore confirming that the differentiated cells were epithelial-like cells.

Conclusions: Epithelial-like cells can be derived from SHED with appropriate inducers.

Keywords: Differentiation, Stem cells from human exfoliated deciduous teeth, Growth factors, Characterization, Epithelial-like cells

PBS11

Stimulation of Innate Immune Responses of Macrophages J774A.1 by Combination Treatment of Asiatic Acid and Madecassoside

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Introduction: Macrophage cells play a vital role in primary immune responses mainly by producing nitrite oxide (NO) which is synthesized by inducible nitrite oxide synthase (iNOS). Asiatic acid (AA) and madecassoside (MA) are major active constituents derived from *Centella asiatica* that possess anti-inflammatory and anti-microbial properties through their ability to modulate immune responses. Thus, a normal model creating unstimulated macrophage cells was used to investigate the effects of mentioned compounds on these two important immune markers.

Objectives: To determine the effects of single and combined effect of AA and MA on the iNOS expression and NO productions of macrophage cells after 24 hours of treatment.

Methodology: Macrophage cells were cultured in complete Dulbecco's Modified Eagle Medium supplemented with 10% heat inactivated foetal bovine serum and 100 U/ml penicillin-streptomycin. Cells were cultured in 5 groups, namely, untreated macrophage, macrophage treated with lipopolysaccharides as positive control, macrophage-treated with single AA, macrophage treated with single MA and macrophage treated with mixed AA and MA. The investigations on iNOS expression and NO productions were performed using Western blot and Griess assay, correspondingly.

Results: Both methods demonstrated that combination treatment significantly enhanced the iNOS expression and NO productions of macrophage cells when compared to the untreated and single compound-treated macrophage, respectively.

Conclusion: The combination treatment was able to immunostimulate macrophage cells to provide an initial knowledge for the development of a natural product-based preventive agent against infectious diseases.

Keywords: Asiatic acid, Inducible nitrite oxide synthase, Macrophage, Madecassoside, Nitrite oxide

PBS12

Malaysian Propolis and Metformin Abrogate Altered Testicular Lactate Transport and Germ Cell Apoptosis in the Testes of Diabetic Rats

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Introduction: Testicular germ cells depend on lactate which is produced by Sertoli cells, as energy source, and a decrease in germ cell lactate supply has been linked to apoptosis induction, thus, suggesting a negative association between germ cell lactate supply and apoptosis induction.

Objectives: In the present study, we examined the effects of Malaysian propolis (MP), metformin (Met) and their combination, on testicular lactate transport, apoptosis and germ cell proliferation in diabetic rats.

Methodology: Forty adult male *Sprague-Dawley* rats weighing 250-300 g were divided into 5 groups (n=8/group) namely; normal control (NC), diabetic control (DC), diabetic+MP (300 mg/kg b.w./day), diabetic+Met (300 mg/kg b.w./day) and diabetic+MP+Met (D+MP+Met). Diabetes mellitus (DM) was induced using a single intraperitoneal injection of streptozotocin (60 mg/kg b.w.). Treatment with the different interventions was done by oral gavage for 4 weeks.

Results: We found significant decreases ($p<0.05$) in glucose transporter-3, monocarboxylate transporters (MCT2 and MCT4) and lactate dehydrogenase type c, but significant increases ($p<0.05$) in p53, Bax/Bcl2 ratio, caspase-8, caspase-9 and caspase-3 mRNA transcript levels in the testes of DC group, relative to NC group. Furthermore, cleaved caspase-3 protein expression increased significantly ($p<0.05$), while proliferating cell nuclear antigen (PCNA) expression decreased significantly ($p<0.05$) in the testes of DC group, relative to NC group. Treatment with MP, Met, or their combination, significantly reversed these negative changes, and increased PCNA expression, with the best results observed in D+MP+Met group.

Conclusion: MP, Met or their combination, abrogate altered testicular lactate transport and decreases apoptosis of testicular germ cells in diabetic rats.

Keywords: apoptosis, diabetes mellitus, lactate, monocarboxylate transporters, testes

PBS13

In-vitro Antimicrobial Activity of Spirulina Extracts Against Oral Bacteria

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Introduction: Spirulina has an international demand in healthy food, therapeutic and diagnostic industries as it is known to produce metabolites with diverse biological activities including antimicrobial activity.

Objectives: The aim of the study was to assess the antimicrobial effect on the different solvent extract of spirulina against oral bacteria such as *Streptococcus mutans*, *Streptococcus sobrinus*, *Lactobacillus acidophilus* and *Actinomyces sp.*

Methodology: The aqueous, 10% and 70% methanol extracts of spirulina were filtered, concentrated and freeze-dried to become powder form. The antibacterial activities of extracts were evaluated using well diffusion method. The inhibitory zones were recorded in millimetres. The minimal inhibitory concentration (MIC) of the spirulina extracts against *S. mutans* and *S. sobrinus* were assessed using microdilution method. MIC values obtained were subjected to minimal bactericidal concentration (MBC) analysis.

Results: No inhibition activity was shown by all types of bacteria in aqueous and 10% methanol extracts. For 70% methanol extract, only *S. mutans* and *S. sobrinus* showed inhibition and subjected to MIC and MBC test. MIC values for *S. mutans* and *S. sobrinus* was 62.5 and 31.25 mg/ml, respectively while for MBC values was 250 and 125 mg/ml, respectively.

Conclusion: In conclusion, 70% methanol spirulina extract gave greater antimicrobial activity compared to the other extracts and had higher susceptibility against *S. mutans* and *S. sobrinus*. The findings show the potential of spirulina as a good antimicrobial in the prevention of oral diseases.

Keywords: Spirulina, Antimicrobial activity, Agar well diffusion, Minimum Inhibitory Concentration, Minimum Bactericidal Concentration

PCS01

Food Poisoning Outbreak in Kelantan 2014-2017: Reliability and Timeliness in Reporting

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Introduction: Food poisoning outbreak can be defined as the occurrence of two or more food poisoning cases from the same source of food and the same exposure time. The initial report of the outbreak must be submitted within 20 hours from the time when the outbreak was declared. Within that limited timeframe, the outbreak investigation team must identify what is the most likely source of food contamination.

Objectives: To study the reliability of the initial report in determining the source of food poisoning and the timeliness in reporting of food poisoning outbreak in Kelantan 2014 – 2017.

Methodology: A cross-sectional study was conducted where the data was extracted from the initial and final report of food poisoning outbreak in Kelantan from 2014 until 2017. Cohen's Kappa was calculated to determine the reliability of the initial report in determining the source of a food poisoning outbreak compared to the final report. To assess the timeliness in reporting, three timeline milestones were measured which are the timeline; i) from the notification of food poisoning outbreak to the submission of the initial report (measured in hours), ii) from the time of the outbreak was declared to the submission of the initial report (measured in hours), iii) from the date of the outbreak was declared to the submission of the final report (measured in day).

Results: There was a moderate agreement between the initial reports and the final reports in identifying the source of food poisoning, $\kappa = 0.425$ (95% CI: 0.111, 0.739), p-value = 0.001. In terms of timeliness, the mean (SD) for the timeline I was 18.3 hours (9.20), timeline II was 9.7 hours (6.93) and timeline III was 29 days (7.84).

Conclusion: In food poisoning outbreak, accurate identification of the source of food contamination and timely reporting are very crucial to ensure effective implementation of prevention and control measures.

Keywords: Food poisoning outbreak, Kelantan, Reliability, Timeliness, Reporting

PCS02

Alignment Efficacy of Self-Ligating and Conventional Ligating Bracket System with Application of Low-Level Laser Therapy: A Randomized Clinical Trial

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Introduction: The long duration of the orthodontic treatment is a dilemma. Various modalities were applied to accelerate the tooth movement and decrease the treatment time.

Objective: The prime aim of this study was to investigate the alignment efficacy of self-ligating and conventional bracket system in conjunction with low level laser therapy (LLLT).

Methodology: A randomized clinical trial was performed with a total of 32 patients (8 patients each group) with the mean age of 22.18±2.12. All routine orthodontic diagnostic records were collected and analysed. The study subjects were assigned as experimental and control group randomly. The patients were further divided into four groups randomly. Group A,C were bonded with self-ligating brackets and group B,D were bonded with conventional brackets. LLLT was applied on group A and B. Treatment efficacy was assessed using the little irregularity index. Statistical analysis was performed by using the analysis of variance (ANOVA) to check the differences in 4 groups.

Results: ANOVA showed that, there was significant difference in time duration of finishing levelling and alignment stage among all groups (P value 0.000). However, group A, B took less time than group C,D to finish the levelling and alignment stage of the treatment. Levelling and alignment improvement percentage showed significant differences between all the groups in both maxilla and mandible (P value; 0.013 and 0.023, respectively).

Conclusion: The alignment efficacy of self-ligating and conventional bracket system in conjunction with low level laser therapy based on monthly basis showed significant improvement in treatment duration.

Keywords: LLLT, Conventional bracket, Self-ligating bracket, Orthodontic treatment

PCS03

Controversies in Endodontic Access Cavity Designs: A Literature Review

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Introduction: We have frequently heard in clinics "save as much sound tooth structure as possible", but sometimes this cannot be done. Four types of access cavity designs, namely, traditional endodontic access cavity design (TEC), contracted/conservative endodontic access cavity design (CEC), ultra-conservative or ninja endodontic access cavity design (NEC) and truss endodontic access cavity design (TREC) have been suggested and the latter three, are currently in the limelight.

Objective: To review the literature based on the best available evidence and subsequently to compare and contrast the different types of endodontic access cavity designs.

Methodology: Google Scholar search engine was used to collect and review articles from the year 2010 up to date regarding the new trends and advances in access cavity designs.

Results: Most of *in vitro* studies that have been done so far are mainly comparing fracture resistance among TECs, CECs, TRECs and NECs. Except for TECs, the other three types have not undergone clinical trials on patients. The choice of endodontic access cavity design highly affects the fracture strength of the tooth but remnants of pulpal tissue due to ineffective instrumentation, can cause failure and even, loss of the endodontically treated tooth.

Conclusion: Currently, there is no conclusive evidence available to suggest that the newly introduced access cavity designs can help in retaining endodontically treated teeth longer by increasing their fracture resistance. Besides, to validate lasting insurance and goodwill of the newly introduced access cavity designs, more research needs to be done, as the studies remain a few and fragmentary.

Keywords: Endodontic access cavity, Traditional access cavity, Conservative access cavity, Ninja access cavity, Truss access cavity

PCS04

Knowledge Towards Children Oral Health Among Pregnant Women Attending Hospital Universiti Sains Malaysia and Related Factors

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Introduction: Dental caries is one of the most prevalent diseases among children worldwide. Mothers play an important role in preventing dental caries and maintaining their children's oral health.

Objectives: To determine knowledge towards children oral health and related factors among pregnant women attending Hospital USM.

Methodology: A total of 130 pregnant women attending the Obstetrics & Gynaecology Clinic, Hospital USM participated in this cross-sectional study. Self-administered, validated questionnaires were used to measure the variables of interest. Data analysis was done using SPSS version 24.0.

Results: Most women knew that plaque and sugary foods can cause dental caries (93.1% and 91.5% respectively), and fluoridated toothpaste can prevent caries development (87.7%). However, more than half did not know or did not think that banana, dates, white bread and fruit juice are potentially cariogenic. Majority (80.7%) of women also did not know or did not think that breast milk is cariogenic although most of them knew that children can have caries from the pooling of milk in the mouth. Women with lower oral health knowledge score, mean 19.06 (4.475) were found to be less than 30 years, have lower educational attainment, lower monthly household income, and have never given birth.

Conclusions: While most pregnant women who attended Hospital USM knew about the role of plaque and foods in dental caries development, a substantial portion could not identify foods that are potentially cariogenic. Age, educational level, household income, and parity were found to be associated with the women's knowledge.

Keywords: Knowledge, Pregnant women, Children, Oral health

PCS05

Chest X-Ray Findings of Pulmonary Tuberculosis and Its Associated Factors

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Introduction: Chest X-Ray (CXR) is an instant diagnostic test for Pulmonary Tuberculosis (PTB). CXR in PTB can be classified as minimal, moderate and advanced CXR features.

Objectives: To determine the factors associated with severity of chest X-Ray features among PTB patients in Malaysia.

Methodology: Data was drawn from Tuberculosis Information System (TBIS) national registry. Inclusion criteria was patient's age 18 years and above and diagnosed with PTB within 2016 to 2017. We excluded patients without CXR radiography and those with 20% of incomplete data records.

Results: We include 2,052 PTB patients in this study. Among patients, it was found that 72.5% were male while 27.5% were female. Existence of BCG scar (p-value<0.05, 95% CI: 0.21, 0.92) and smoking habit (p-value=0.05, 95% CI: 1.06, 2.41) were significant factors associated with CXR findings among PTB patients in Malaysia.

Conclusions: Patients with smoking habit had higher probability to have advanced CXR at 1.6%. In addition, those with BCG scar had 56% less chances to have advanced CXR.

Keywords: chest X-Ray (CXR), pulmonary tuberculosis (PTB), ordinal logistic regression, smear positive, smear negative

PCS06

Cheiloplasty and Palatoplasty have Detrimental Effect on Maxillary Arch of Unilateral Cleft Lip and Palate Children: A Myth or a Fact

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Introduction: Studies have claimed that the maxillary arch dimension of unilateral cleft lip and palate (UCLP) patient are significantly smaller than a normal patient. The effects of cheiloplasty and palatoplasty are believed to be the most exacerbated factors of the treatment outcome (maxillary arch retardation) of UCLP patient.

Objectives: The aim of the study was to evaluate and compare the effect of different techniques of cheiloplasty and palatoplasty in treatment outcome based on maxillary arch dimensions using laser scanned 3D model (LS3DM) in Malaysian and Bangladeshi UCLP children.

Methodology: One hundred and seventy (85 for each population) maxillary dental casts were taken before any orthodontic treatment and bone grafting at 5 to 12 years of age. All the dental casts were scanned and converted into LS3DM by Next Engine laser scanner and 510 linear variables [Inter-canine width (ICW), inter-molar width (IMW) and arch depth (AD)] were measured using Mimics software. Multiple linear regression analyses were used to evaluate the association between different techniques of cheiloplasty and palatoplasty and maxillary arch dimensions (ICW, IMW and AD) between two different populations. The significance level was set at $p < 0.05$.

Results: Significant association was found between two techniques of palatoplasty and ICW ($p=0.029$) in both Malaysian and Bangladeshi population. Regarding cheiloplasty, a significant association was found with ICW ($p=0.001$) in the Malaysian population only.

Conclusions: Modified Millard techniques of Cheiloplasty and Bardach technique of palatoplasty had a detrimental effect on the maxillary arch in Malaysian UCLP children while only Bardach technique of palatoplasty cause similar effect on Bangladeshi UCLP children.

Keywords: Unilateral cleft lip and palate, Maxillary arch, Cheiloplasty, Palatoplasty

PCS07

Oral Health-Related Quality of Life During Different Phases of Pregnancy

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Introduction: A woman's pregnancy experience not only influences her own oral health status but also may increase her risk of other diseases. The occurrence of dental disease in pregnancy may potentially be associated with changes in diet and oral hygiene. Lower physical, psychological and social functioning may lead to high levels of oral diseases during pregnancy, this may have negative impact on the oral-health-related quality of life (OHRQoL).

Objectives: The objective of this study was to assess the perceived oral-health-related quality of life (OHRQoL) of pregnant women attending the Obstetrics & Gynaecology Clinic, Hospital Universiti Sains Malaysia (HUSM).

Methodology: This is a cross-sectional study in which participants were recruited from Obstetrics & Gynaecology Clinic, HUSM. Oral Health Impact Profile–14 questionnaires and forms related to participant demographic data, educational level and dental services utilization during pregnancy were administered.

Results: Out of the total of 81 pregnant women who participated in this study, the mean age was 26 years, the most commonly reported impacts from OHIP-14 were within the domains of "physical pain" (22%) and "psychological discomfort" (12.7%). Overall, 24% of the pregnant women reported an impact of at least one OHIP-14 item.

Conclusion: This study demonstrates higher OHIP-14 score during 3rd trimester than 2nd trimester of pregnancy, different programs should be designed to educate the pregnant women regarding the importance of oral health and to encourage them to visit oral health care provider during pregnancy.

Keywords: Pregnant women, Oral health-related quality of life, Oral health impact profile, Oral disease

PCS08

External Apical Root Resorption Between Self-Ligating and Conventional Systems

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Introduction: External apical root resorption (EARR) can be described as shortening of the root apex which can be acquired due to various mechanical and/or genetic factors during orthodontic treatment.

Objective: The purpose of this study was to evaluate the EARR between conventional and self-ligating bracket systems in orthodontic patients after the initial stage of orthodontic treatment.

Methodology: A total of 34 patients (mean age 23.42 ± 4.27) was selected for this study. Patients were divided into two equal group for both bracket system (n=17). EARR of all anterior teeth (canine to canine) were evaluated on 3D cone beam computed tomography (CBCT), before and after initial stage of orthodontic treatment using the Planmeca Romexis Software. EARR was determined using the formula EARR=R1-(R2*CF). Mean differences of the initial and final measurements of the teeth and frequency of EARR were identified using descriptive statistics. Amount of EARR on each bracket system were assessed using the paired t-test and independent t-test was used to compare the amount of EARR on both bracket systems.

Results: A total of 23.54% of EARR was evident for both bracket systems. Nevertheless, the frequency of EARR was higher in self-ligating group (12.76%) compared to the conventional group (10.78%). There was noticeable reduction of the total tooth length in both bracket groups (P value <0.05). However, the difference observed between the bracket systems was not statistically significant.

Conclusions: There was no difference in EARR between conventional and self-ligating bracket system during initial stage of the orthodontic treatment.

Keywords: EARR, Conventional bracket, Self-ligating bracket, CBCT

PCS09

Acute Kidney Injury in Intensive Care Unit: Prognostic Factors Influence the Survival of Patients

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Introduction: Acute kidney injury (AKI) is one of the issues in nephrology studies caused by severe renal and systemic problems. The issue was frequently encountered by approximately 15% of hospitalised patients. Approximately 30 to 60% of the AKI patients were referred to the intensive care unit (ICU) although their care was improved.

Objective: To identify the prognostic factors that influence the survival of AKI patients admitted to the ICU.

Methodology: A retrospective cohort study was conducted among 146 AKI patients admitted to the ICU, Hospital Universiti Sains Malaysia from year 2007 to 2013. AKI patients aged above eighteen years were included, while patients who suffered from chronic kidney failure, received organ donor, underwent kidney transplantation or chronic dialysis, or transferred from other hospitals were excluded from the study. Simple and multiple cox regression analyses were used for the data analysis.

Results: The overall mortality rate was 97.2%. The significant prognostic factors of AKI mortality were the length of ICU stays (adjusted hazard ratio (AOR): 0.57, 95%; confidence interval (CI): 0.52, 0.64, $p<0.001$) and patients' reception of peritoneal dialysis (AOR: 0.38, 95%; CI: 0.21, 0.69, $p=0.001$).

Conclusion: Length of ICU stays and the reception of peritoneal dialysis affect AKI mortality. The present findings may serve as a reference for the management of AKI that may increase the quality of life and decrease both the burden and the mortality of AKI patients.

Keywords: Acute kidney injury, Intensive care unit, Prognostic factor, Prognosis

PCS10

Dental Caries in Relation to 6-n-propylthiouracil Bitter Taste Sensitivity: A Cross-Sectional Study Among University Students

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Introduction: High sugar intake has been associated with high caries experience and it was prevalent among individuals who have a preference for sweet foods. Individual taste preferences and food selection is determined by taste sensitivity which can be tested by the ability to taste bitter compounds such as 6-n-propylthiouracil (PROP). The PROP test will identify if an individual is a super-taster, medium taster, or non-taster. Non-tasters have **a** greater preference for sweet foods than tasters.

Objectives: To investigate the association between taste sensitivity and dental caries among a sample of Universiti Sains Malaysia (USM) students.

Methodology: This cross-sectional study included 158 students aged 19-25 years, from three schools of Health Campus USM. PROP sensitivity test was carried out to determine the students' taster status, and clinical dental examination was performed to determine dental caries experience and severity which was measured using the decayed, missing and filled tooth (DMFT) index. Chi-square test and Kruskal-Wallis test were used to compare dental caries experience and severity of different taster groups.

Results: Most students were female students detected as super-tasters (46.5%), followed by non-tasters (19.8%) and medium tasters (18.2%). A 35.8% were affected by caries (DMFT>0)**.** The proportion of caries was not significantly different among the groups. The median DMFT for super-tasters, medium tasters, and non-tasters was 1.00 (IQR 2.00), 1.50 (IQR 3.00) and 1.00 (IQR 3.00) respectively – the medians were not significantly different ($p < 0.05$).

Conclusion: Dental caries was not significantly associated with taste sensitivity of USM students.

Keywords: Dental caries, Students, Taste sensitivity, Bitter taste, PROP test

PCS11

Assessment of Salivary Matrix Metalloproteinase-8 and Periodontal Status in Obese Adults with Chronic Periodontitis

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Introduction: Obesity is one of the first outstanding hazards of contemporary society. It is currently classified as a low-grade inflammatory chronic disease with a complex aetiology. Chronic periodontitis (CP) is a global public health issue. Studies have suggested CP could be linked to obesity due to their similar pathophysiological pathway. Matrix metalloproteinase-8, also known as neutrophil collagenase, contribute to extracellular matrix remodelling and degradation.

Objective: To compare the salivary levels of MMP-8 and periodontal parameters [periodontal pocket depth (PPD), clinical attachment level (CAL), plaque and gingivitis score] in obese chronic periodontitis patients with those who are non-obese chronic periodontitis patients.

Methodology: We studied 30 obese (BMI>30) and 30 non-obese (BMI<25) adults with chronic periodontitis in this case-control study. PPD, CAL, plaque and gingivitis score were measured. MMP-8 concentration was measured in saliva samples by Enzyme-linked immunosorbent assay (ELISA).

Results: Obese subjects had significantly high (0.13±0.15 ng/ml) salivary MMP-8 protein concentration as compared to non-obese (0.11±0.26 ng/ml) subjects. Periodontal parameters; PPD, CAL were also compared and found a significant difference between both groups. While we found no difference between plaque and gingivitis score.

Conclusion: In conclusion, we found evidence indicating higher net MMP-8 activity in obese adults. The increased MMP-8 levels found in obese patients suggest a possibly relevant pathophysiological mechanism that may be involved in the worsening of the periodontal disease.

Keywords: Obesity, Chronic periodontitis, Periodontal parameters, Matrix Metalloproteinase-8, Body Mass Index

PBM03

A Study of Compressive Strength and Flexural Strength of Experimental Nanohybrid Dental Luting Composite Cement from the Rice Husk

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Introduction: Selecting an appropriate luting cement is one of the most important key factors for the long-term clinical success of fixed restoration. Silica as filler, extracted from the rice husk and the zirconia and alumina were used to improve the mechanical properties of the experimental luting cement.

Objectives: To analyse the compressive strength and flexural strength of the experimental nanohybrid dental luting composite cement from the rice husk reinforced with zirconia and alumina.

Methodology: Different percentages of fillers like zirconia (3 wt %) and alumina (2 wt%, and 3 wt %) were used for this study where the filler and resin ratio remained 30/70. Specimens prepared for each group which were: Negative control or group I (no added alumina and zirconia), group 2 (added only zirconia), group 3 (added only alumina), group 4 (added both alumina and zirconia), and positive control group (RelyX™ luting cement). These tests were performed using the universal testing machine. Differences were conducted by one-way ANOVA using SPSS software version 24.

Results: The highest compressive strength was obtained with added only zirconia group (80.02MPa, SD 11.43), whereas the No added zirconia and alumina group gave the lowest values (15.832MPa, SD 8.22). For the flexural strength, added with alumina only group showed the highest value (34.168MPa, SD 8.786), whereas the lowest were observed with added both zirconia and alumina group (5.4875MPa, SD 1.544).There were significant differences between the groups.

Conclusion: Reinforcement of zirconia is favourable to increase the compressive strength and addition of alumina is also convenient to enhance the flexural strength for this experimental study.

Keywords: Zirconia, Nanohybrid, Composite, Rice husk, Flexural strength

PBM04

Powder XRD Pattern of Zirconia Stabilized-Nano Calcium Oxide Derived from Cockle Shells

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Introduction: Different oxides have been used to stabilise zirconium oxide (ZrO_2) in a stable phase. Previously, a study reported that calcium oxide (CaO) has been used as a stabiliser, however, the commercially prepared cap has been utilised for these purposes.

Objectives: To study the crystalline structure and phase of the zirconia stabilized by nano CaO derived from cockle shells and commercial CaO after sintering at a different temperature.

Methodology: In this study, nano CaO derived from cockle shells and commercially purchased were physically mixed with ZrO_2, packed into a mould and sintered at different temperatures from 1200 to 1500 °C. Then, zirconia stabilised by CaO derived from cockle shell and commercial CaO were analysed using X-ray Diffractometer (XRD) with Cu Kα radiation at a scan rate of 0.05° 2θ s^{-1}.

Result: XRD analysis of zirconia stabilised by CaO derived from cockle shells had the highest peaks in all temperature when compared with other samples containing commercial CaO. The samples containing CaO derived from cockle shells sintered at 1400°C showed the highest peaks as opposed to other samples. Particles were found to be partially stabilised in the tetragonal and cubic phase. The crystalline structure of CaO particles appears spherical and well dispersed when visualised by the scanning electron microscope (SEM).

Conclusion: Synthesis of cockle shells powder in the current study showed a high-quality of calcium oxide under aragonite phase and these results could improve the mechanical properties of dental zirconia.

Keywords: Calcium oxide, Cockle shell, sintering, Zirconia

PBM05

Kenaf and Oil Palm Nanocellulose as a Filler in Composite Brick to Reduce Radon Emanation

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Introduction: Radon is a radioactive gas that exists since the formation of the earth. Soil, stone, sand and water is the main source of radon that high Uranium-238. Since stone, sand, cement and water are used to fabricate concrete brick, it produces a product with high radon concentration level. Therefore, the purpose of this research is to reduce the level concentration of radon in concrete brick by fabricating composite brick with kenaf and oil palm nanocellulose as a filler which will minimize the use of sand, cement and stone.

Objectives: To fabricate composite brick by using kenaf and oil palm nanocellulose as a filler that can reduce radon-222 emanation.

Methodology: Fabricated kenaf and oil palm composite brick were mixed with a different amount of nanocellulose by reducing each stone, sand and cement. Composite brick was fabricated from each of 5 kenaf nanocellulose and 5 oil palm nanocellulose. Each composite brick was tested using radon sentinel monitor 1030 to collect data of radon gas emanation.

Results: Surface morphology of kenaf and oil palm nanocellulose shown that nanocellulose structure formed a needle-like shape structure. Nanocellulose composite brick had lower radon concentration in comparison to concrete brick. Moreover, compression test showed that nanocellulose composite brick had higher strength than the concrete brick.

Conclusion: Nanocellulose acts as a filler in composite brick which may be used as an alternative to the current bricks available in the market for building and housing application.

Keywords: Kenaf, Nanocellulose, Oil palm, radon, Uranium-238

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