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Think Aesculap – Think Quality

Professional Tools for Today's Dentists

Aesculap Dental

• Think Competence
• Think Economy
• Think Partnership

Instruments for the Future...
Building on from the success of the previous postgraduate scientific conferences conducted by the Faculty of Dentistry University of Malaya, the 8th postgraduate dental scientific conference of 2015 will be changed to the *1st International Conference on Innovative Dentistry (ICID 2015)*.

This year’s conference is organized with the aimed to make the conference a future major forum for research theory and clinical development related to oral health science and innovation in the area of oral health and dentistry.

Held over 2 days, this exciting and stimulating scientific conference will encompass a combination of keynote lectures, plenary sessions, symposium, oral and poster sessions to enhance and ensure the participants are kept up to date with the current research and scientific development in oral health field.

**OBJECTIVES**

- To advance research and enhance knowledge for better delivery of oral health related services
- To facilitate sharing and exchange of ideas and knowledge amongst oral health clinicians and researchers
- To be the platform for advancement of new and innovative research findings globally
Messages

VICE CHANCELLOR
"Without a doubt, innovation is an important element in life generally and in academic particularly, as it is often the catalyst for new findings and technologies. It is hoped that through this Conference, participants and speakers alike can use this as a platform to exchange ideas, enlarge networks and enhance knowledge. All in the hope of creating new innovations."

- Prof. Dato' Dr. Mohd Amin Bin Jalaludin

DEAN, FACULTY OF DENTISTRY
"The beginning of this inaugural International Conference on Innovative Dentistry started from our previous experience in organizing seven annual series of postgraduate conferences at internal level. Building from these successes and as a Research University, I personally feel that it is about time that the Faculty of Dentistry, University of Malaya to step up to a global level to change the conference concept and hopefully, become one of the main annual major platforms for scientists and clinicians to exchange ideas on the fundamental aspects and new innovation in oral health science."

- Prof. Dato' Dr. Zainal Ariff Bin Abdul Rahman

#ICID2015 CHAIRPERSON
"I hope this event will be a successful platform not just this year, but also for many years to come for researchers from all over Malaysia and abroad to exchange ideas and building global network."

- Dr. Firdaus Bin Hariri
Invited Speakers

**Professor Colman McGrath**
The University of Hong Kong - Hong Kong SAR
/ Community Dentistry /

**Professor K. Ranganathan**
Professor and Head of Oral & Maxillofacial Pathology - Ragas Dental College and Hospital
/ Pathology /

**Professor Dr. Adam Husein**
Dean for School of Dental Sciences, University Science Malaysia
/ Clinical Dentistry /

**Professor Kim Jin**
Director, Oral Cancer Research Institute - Yonsei University College of Dentistry
/ Oral Pathology /
Tentative Program

Day 1 (Monday, 3rd August 2015)

8.00am - 9.00am : Registration

9.00 - 9.10am : Negaraku
: UM Song
: Doa Recital

9.10 - 10.05am : Opening Speech & Opening Ceremony
: Dr. Firdaus Hariri – Chairman, ICID 2015
: Prof. Dato’ Dr. Zainal Ariff – Dean, Faculty of Dentistry
: Prof. Dato’ Dr. Mohd Amin – Vice Chancellor, UM

10.05 - 10.20am : Tea break

10.20 - 11.20am : Lecture 1 – “The Role of Patient Reported Outcomes Measures in Clinical Practice and Research” by Professor Colman McGrath.

11.20 - 1.00pm : Session 1
: 5 Oral : DA01-DA05
: 4 Poster : DB01-DB04

1.00 - 2.00pm : Lunch

2.00 - 3.00pm : Lecture 2 – “Publishing Case Report” by Professor Dr. Adam Husein.

3.00 - 4.40pm : Session 2
: 5 Oral : DA11-DA15
: 2 Poster : DB05-DB06

4.40 - 5.30pm : Tea break & adjourned
Day 2 (Tuesday, 4th August 2015)

8.30am - 9.00am : Registration

9.00 - 10.20am : **Session 3 (a)**
- 4 Oral : DA06-DA09
- 4 Poster : DB07-DB10

10.20 - 10.35am : Tea break

10.35 - 11.35am : Lecture 3 – “Molecular mechanism of DNA damage in oral keratinocytes by Areca nut exposed gingival fibroblasts” by Prof Kim Jin

11.35 - 11.50am : Short break (Faculty video presentation)

11.50 - 12.50pm : **Session 3 (b)**
- 3 Oral : DA10, DA16, DA17
- 2 Poster : DB11-DB12

12.50 - 2.00pm : Lunch

2.00 - 3.00pm : Lecture 4: “Stem cells in Dentistry” by Prof. K. Ranganathan

3.00 - 4.00pm : **Session 4**
- 2 Oral : DA18-DA19

4.00 - 4.15pm : Tea break

4.15 - 4.30pm : Short break (Faculty video presentation)

4.30 - 5.30pm : Award presentation & Closing Ceremony

* Any changes will be informed later
# Presentation Schedule - Oral

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<th>Session / Time</th>
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<td>DA11</td>
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<td>Bone Remodelling Molecules in Ameloblastoma</td>
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<tr>
<td>1 (11.20am-1.00pm)</td>
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<td>Potential Role of Nitric Oxide in Relation to Odontoblast</td>
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<td>Synergism Between Bakuchiol and Pseudolaric Acid B on Oral Microbes</td>
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<td>DB04</td>
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<td>Effect of Capsaicin on Oral Squamous Cell Carcinoma Cell Line (ORL-48)</td>
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<td><strong>4-Aug-2015 (Tuesday)</strong></td>
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<td>DB08</td>
<td>Effectiveness of a Novel Toothbrush in Children- A Preliminary Study</td>
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<td>DB09</td>
<td>The Lingual Nerve Location and Its Varied Insertion into the Tongue</td>
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<td>DB10</td>
<td>Detection of Bifid Mandibular Canals in Malaysians Using Enhanced CBCT Images</td>
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<td>3 (11.50-12.50am)</td>
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<td>DB12</td>
<td>Novel Injectable Polymer-Based on Gelatin Microparticles for Bone Tissue Engineering</td>
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<td>DA04</td>
<td>Dr Nik Seridaiyana Nik Omar Al-Haded</td>
<td>Identification of the Genetic Aberrations of Non-Syndromic Supernumerary Teeth in a Family</td>
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Tissue Expansion in Ovine Model Using Self-Inflating Anisotropic Tissue Expander

N.E. NAZREE¹, M.R. RAHMAN¹, Z. RADZI¹, F. HARIRI², M.T. RAHMAN³, N.A. YAHYA⁴, N.H. ABU KASSIM⁴, J.T. CZERNUSZKA⁵.

¹Department of Paediatric Dentistry & Orthodontics, Faculty of Dentistry, University of Malaya, 50603 Kuala Lumpur, Malaysia
²Department of Oro-Maxillofacial Surgical & Medical Sciences, Faculty of Dentistry, University of Malaya, 50603 Kuala Lumpur, Malaysia
³Department of Biotechnology, Faculty of Science, International Islamic University Malaysia, 25200 Kuantan, Malaysia
⁴Department of Restorative, Faculty of Dentistry, University of Malaya
⁵Department of Materials, University of Oxford, Parks Road, Oxford OXI 3PH, United Kingdom

Objectives: The aim of this study was to evaluate the quality of expanded ovine limb tissues using the self-inflating hydrogel expander. Methods: Self-inflating hydrogel expander was implanted beneath the skin on the dorsal aspect of the sheep’s right forelimb (n=5), while the left forelimbs were used as control. The swelling characteristics were monitored for 4 weeks. At euthanasia, the expander was explanted, both the control and expanded tissue were harvested, and evaluated histologically. The samples were stained with H&E and picrosirius red. Results: The devices were expanded by 300%, 80% and 200% in terms of height, surface area and volume respectively. Macroscopic evaluation showed satisfactory wound healing of the incision area and the underlying skin tissue appeared thick, fibrous and highly vascularised. In comparison to control group, histological evaluation in the expanded group showed a marked increase of fibroblast proliferation. However, the result was not statistically significant. Collagen appeared more compacted and elongated in the dermal layer of the expanded tissue. Conclusion: The tissue expanders expand to approximately three times of its original height, resulting in additional skin tissue. The quality of harvested expanded skin was found to be comparable to the control skin.
Tissue Expansion Using Anisotropic Self-Inflating Hydrogel: An In Vivo Study


1 Department of Paediatric Dentistry & Orthodontics, Faculty of Dentistry, University of Malaya, 50603 Kuala Lumpur, Malaysia
2 Faculty of Veterinary Medicine, University Putra Malaysia, 43400 Serdang, Malaysia.
3 Department of Biotechnology, Faculty of Science, International Islamic University Malaysia, 25200 Kuantan, Malaysia
4 Department of Restorative, Faculty of Dentistry, University of Malaya, 50603 Kuala Lumpur, Malaysia
5 Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH, United Kingdom

Objectives: This in vivo study examined the usage of an innovative self-inflating anisotropic hydrogel tissue expander in the scalp region. Methods: A total of ten Dorper sheep were used in this study. In the experimental group (n=5), the self-inflating tissue expander was implanted subperiosteally at the frontal region of the cranium while another group of sheep serves as the control (n=5). The device was left in situ for 30 days prior to removal and the expanded tissue was harvested to be examined histologically. Results: The height, volume and surface area of the expanded tissue recorded can reach up to 199%, 116% and 106% at post-operative day 20. The average net gain of the surface area of expanded tissue calculated is 82.6 mm². There was a significant difference in fibroblast count between normal and expanded group. The expanded group has significantly higher median compared to normal group. Other variables such as epidermis thickness, dermis thickness and inflammatory cells count did not show any significant difference between both groups. Conclusion: The expansion using anisotropic self-inflating hydrogel tissue expander has produced expanded scalp skin with similar qualities of the control scalp skin tissue.
Palatal Mucoperiosteal Expansion Using A Novel Anisotropic Self-Inflating Osmotic Expander


1Department of Paediatric Dentistry & Orthodontics, Faculty of Dentistry, University of Malaya, 50603 Kuala Lumpur, Malaysia
2Department of Oro-Maxillofacial Surgical & Medical Sciences, Faculty of Dentistry, University of Malaya, 50603 Kuala Lumpur, Malaysia
3Department of Biotechnology, Faculty of Science, International Islamic University Malaysia, 25200 Kuantan, Malaysia
4Department of Restorative, Faculty of Dentistry, University of Malaya 50603 Kuala Lumpur, Malaysia
5Department of Materials, University of Oxford, Parks Road, Oxford OXI 3PH, United Kingdom

Objective: To evaluate the expansion properties and the quality of expanded palatal tissues inflated with anisotropic self-inflating tissue expander in ovine model. Methods: Ten Dorper sheep were used in the study where five of them were implanted with controlled rate anisotropic osmotic expanders under submucoperiosteal pocket on the palate. The other five samples were used as controls. Expansion measurement and palatal study cast were carried out weekly for four weeks post-implantation. At euthanasia, the soft tissue was harvested, analysed histologically and the expander was weighed. Micro computed tomography (µct) was used to assess bone quality. Results: The surface area and volume swelling ratio at week-3 post-implantation were 231.58% and 76.83% respectively. The incision wound healed without any complication at the implant site. Thickness of the expanded tissue was comparable with control tissue. Combination of thin and thick, loosely packed, and parallel oriented collagen fibers were also observed. Fibroblast proliferation was apparent in the expanded tissues. Minor bone resorption was noted. Conclusions: This study has shown that the use of osmotic tissue expander is capable of expanding palatal tissue with good tissue quality. The use of anisotropic osmotic tissue expander could be useful in various application in maxillofacial surgery, in particular cleft palate tissue reconstruction.
Identification of the Genetic Aberrations of Non-Syndromic Supernumerary Teeth in a Family

N.S. NIK OMAR AL HADED, S.C. CHEONG, R.P. ANTHONAPPA, M.C. WEY

Faculty of Dentistry, University of Malaya, Kuala Lumpur

Objectives: To detect the genetic variants in a family with members having supernumerary teeth and to identify mutations responsible for supernumerary teeth using whole exome sequencing (WES). Methods: This is a hospital-based case control study of a family with non-syndromic members diagnosed with supernumerary teeth in the Faculty of Dentistry, University of Malaya. Ethical approval was obtained from the University of Malaya Institutional Ethics Committee (DF CD1304/0018(P)). A family of five comprising the affected father, eldest daughter, and youngest son was chosen. The unaffected individuals in the family (mother and the middle daughter) served as controls. Genomic DNA was isolated from 5 ml of venous blood for whole exome sequencing (WES). WES data were further analysed with advanced genome-wide data analysis. Results: 246 common mutations which were found in all three diseased samples, but absent in the two control samples could potentially be associated with the disease. Among the 49 exonic variants, RBP2 (retinol binding protein 2) which is involved in Vitamin A uptake and/or metabolism that could be related to formation of supernumerary teeth was found. The remaining 48 common exonic variants were not found to be related with tooth morphogenesis. Further comparison between the affected father and affected daughter showed 35 common exonic variants which included a novel mutation of BMP7 (bone morphogenetic protein 7) gene. BMP7 had been shown to be present in dental epithelium during the dental lamina, bud, and cap stages of rodents’ teeth. Conclusion: The usage of whole exome sequencing in analysing an affected family may identify familiar genetic mutations that could play a role in supernumerary teeth. Mutations found in RBP2 and BMP7 warrants further validation using other methods and in other families with supernumerary.
Comparison of Conventional Models with Digital and 3D Reconstructed Models

Y. YUSOFF, N.A. MARDI AND W.N. WAN HASSAN

Faculty of Dentistry, University of Malaya

Objectives: To compare the accuracy of conventional stone study models with digital and 3D reconstructed models. Methods: Samples comprised of eighty two pairs of conventional stone study models and their corresponding digital models (Maestro 3D, Age Solutions, Inc, Italy), and thirty pairs (ten per each category of crowding: mild, moderate and severe) of reconstructed models (printed using ZPrinter®450). All models were assessed for linear measurements of the upper and lower arches. The conventional stone study models were measured using hand-held caliper whereas digital models were measured using the analysis software tool. Intra- and inter-examiner reliability were assessed using Intraclass Correlation Coefficient (ICC). Parametric and non-parametric tests were applied based on data normality. Statistical and clinical significant levels were set at p< 0.05 and <0.5 mm, respectively. Results: ICCs for intra- and inter-examiner reliability were above good agreement (>0.75). Generally, measurements made on stone models were higher than digital models (mean difference = 0.1496 mm). Measurements made on stone models were smaller than reconstructed models (mean difference = -0.0157). Reproducibility of linear measurements between stone versus digital models and stone versus reconstructed models were generally high at 0.998 and 0.999 respectively. For intra-group comparison in general, slightly smaller median was observed in all degrees of crowding of digital models. Whereas for inter-group comparison in general, slightly smaller median in all degrees of crowding of digital model as compared to stone models. Conclusions: Digital models scanned using Maestro 3D scanner seemed to be clinically acceptable alternative to conventional stone models. Reconstructed models produced by ZPrinter®450 can potentially replace stone models if study models kept in digital form need to be reproduced as hard copies. Different degrees of crowding did not significantly affect accuracy and reproducibility of linear measurements on digital and reconstructed models.
Bone Remodelling Molecules in Ameloblastoma

N. MAT HUSSIN, H.S. CHONG

Faculty of Dentistry, University of Malaya, Kuala Lumpur

Objectives: This study aims to compare bone remodeling activities in solid/multicystic ameloblastoma (SMA) with unicystic ameloblastoma (UA) and to relate findings with their biological behaviours. Methods: Forty paraffin-embedded ameloblastoma cases comprising SMA (n=24) and UA (n=16) were examined immunohistochemically for the expression of bone remodelling molecules, receptor activator of nuclear factor κ-B (RANK), RANK ligand (RANKL) and its decoy receptor, Osteoprotegerin (OPG). Semiquantitative analysis was performed on digitized images to determine immunoexpression according to their cellular distribution [pre-ameloblast-like(PA) versus stellate reticulum-like cells(SR)] and tissue compartments (tumoural epithelium versus stroma) [Ethics DF OP1201/0001(L)]. Results: All three bone remodelling molecules (RANK, RANKL and OPG) were significantly overexpressed in SMA compared to UA (P<.05) Subcellular localization was predominantly cytoplasmic and membranous for RANK and RANKL and mainly cytoplasmic for OPG. Expression of RANK/RANKL/OPG was statistically significant in PA-like cells (P=.000) and stromal cells of SMA (P=.000) whereas in UA, it was significantly different only in stromal cells (P=.001). Predominant overexpression of RANKL with underexpression of OPG was observed in SMA, while most cellular localization of UA showed localized overexpression of OPG. In correlation with clinical parameters, the immunoreactivity of OPG was significantly associated with tumor location (P=.028). Conclusions: Present findings showing significant RANKL overexpression and OPG underexpression in SMA compared to UA suggests that the rigorous local bone remodelling activity in SMA contributes to its local aggressiveness.
Cytology and DNA Image Cytometry of Oral Potentially Malignant Disorders

ZARINAAK1, IBRAHIM H2, PUTHUCHIRA EJ1, GHANI WMN2, RAMANATHANA1, ISMAIL SM1, ZAIN RB1, 2 & AN INTERNATIONAL COLLABORATING GROUP3

1Faculty of Dentistry, University of Malaya, Kuala Lumpur, Malaysia
2Oral Cancer Research & Coordinating Centre (OCRCC), University of Malaya, Kuala Lumpur, Malaysia
3Trisakti University, Jakarta, Indonesia/JSS Dental College & Hospital, JSS University, Mysore, India/Hospital Tunku Ampuan Rahimah, Ministry of Health Malaysia/Penang International Dental College, Penang Malaysia.

Objectives: This study was conducted to evaluate conventional oral examination (COE), liquid based cytology (LBC) and DNA image cytometry (DIC) in predicting oral epithelial dysplasia (OED) in oral potentially malignant disorders (OPMDs).

Methods: A descriptive, comparative study of COE, LBC and DIC in predicting oral epithelial dysplasia (OED). This is part of an international study involving Malaysia, India and Indonesia. Following informed consent, a total of 174 patients underwent COE followed by brush biopsies and scalpel biopsies. Brush-biopsy samples were analyzed for LBC and DIC at Dental Faculty, University of Malaya. Histopathological findings of presence / absence of OED were used as the reference standard. Chi-square analysis and calculations for sensitivity (Sn), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV) and accuracy (A) were done. The study was approved by the relevant Medical Ethics Committees of the different research locations.

Results: Using COE, all cases diagnosed as ‘Normal’ had no OED, while 9.7% diagnosed as ‘Benign Lesions’ had OED and 31.5% diagnosed as OPMD had OED. The Sn, Sp, PPV, NPV and A for COE were 100%(Sn), 61.1%(Sp), 31.5%(PPV), 100%(NPV) and 67%(A); LBC were 23.8%(Sn), 99.3%(Sp), 83.3%(PPV), 90%(NPV) and 89.8%(A) and DIC were 45.5%(Sn), 87.6%(Sp), 27.8%(PPV), 93.9%(NPV) and 83.6%(A) respectively.

Conclusions: All 3 methods have high NPV for predicting presence of OED. COE having high Sn and low Sp, while both LBC and DIC having low Sn and high Sp, would make the COE to be a suitable first level test with LBC or DIC as a second level test to predict presence of OED. This would allow for most of the false positives from the first level test to be correctly identified as true negative using the second level test. In addition the LBC and DIC as a test, each has a much higher accuracy compared to COE.
Monobloc Le Fort III Distraction Osteogenesis in Paediatric Crouzon Syndrome

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**Objectives:** A case series of Monobloc Le Fort III distraction osteogenesis (DO). The objectives are to evaluate the total amount of distraction rates achieved and to discuss complications after surgery. **Methods:** From 2012 to 2014, a total of 4 pediatric patients with Crouzon Syndrome successfully underwent the surgical procedure of monobloc Le Fort III DO to treat their chronic functional problems which include increased intracranial pressure (ICP), severe orbital proptosis and severe obstructive sleep apnea secondary to the obstructed nasopharyngeal airway which necessitated tracheostomy. Multidisciplinary pre-surgical preparation includes computed tomography (CT) scan, airway analysis, stereolitography (STL) model simulation surgery and pre-bending of distraction plates to achieve precision. All monobloc Le Fort III DO procedures were performed using a combination of external midface and internal craniofacial distractors to decompress the intracranial cavity and advancing the orbital rims and midface components. **Results:** The total segmental advancement ranged between 11 mm and 28 mm (mean = 18mm). Post-surgical follow-up which include clinical and imaging assessment ranged between 11 months to 30 months (mean = 21.5 months). Complications of segmental impingement of lateral rectus muscle and cerebrospinal fluid (CSF) leak occurred in 1 patient and was treated accordingly. The recent post-operative assessment showed favorable outcomes in 3 out of 4 patients. The functional rehabilitation includes reduced ICP, adequate eye protection and patent nasopharyngeal airway confirmed with nasoendoscopy prior to decannulation. **Conclusion:** This technique can be considered as one of the surgical alternatives to treat patient with severe Crouzon Syndrome in pediatric patient.
Cancer Stem Cells in Benign and Malignant Salivary Gland Tumours

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Objective: Recent evidence suggests that cancer stem cells (CSC) contribute to the aggressiveness in many tumour types but much less is known about their role in salivary gland neoplasms. The aim here was to compare CSC expression levels between benign and malignant salivary gland tumours and to relate to their biological behaviors. Methods: Fifteen pleomorphic adenoma, fourteen mucoepidermoid carcinoma, eleven adenoid cystic carcinoma and five normal salivary glands were subjected to immunohistochemistry for expression of CSC markers: ALDH1, Bmi1, CD44 and ABCG2. Descriptive and semiquantitative analysis were performed to assess staining intensity levels according to tissue compartments (tumour versus stroma) and by location (periphery versus centre). Results: CD44 expression level was significantly higher in tumoral epithelium of MEC ($p = .005$), and stromal component of ACC ($p = .009$) than PA. Protein distribution was cytoplasmic and membranous for ALDH1, CD44 and ABCG2 and nuclear for Bmi1. All four CSC markers were significantly upregulated in tumoral epithelium compared to stroma in both benign and malignant tumours ($p < .05$). Expression levels were not significantly different between tumour periphery and center. No significant association was seen with clinical parameters. Conclusions: Significant CD44 overexpression in MEC and ACC suggests that CD44 may help identify salivary gland cancers with a more aggressive biological behaviour.
Occult Lymph Node Metastasis in Pn0 Oral Squamous Cell Carcinoma

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Objectives: To study the incidence of micrometastasis and isolated tumour cells in pathologically staged N0 squamous cell carcinoma of the tongue and buccal mucosa and its correlation with the clinicopathological parameters. Methods: 34 cases of N0 oral squamous cell carcinoma comprising of 17 cases each from tongue and buccal mucosa were included in the study. The corresponding lymph nodes from levels I & II which are ≥ 1.0cm were examined by immunohistochemistry with Desmoglein 3 for presence of micrometastasis and isolated tumour cells (ITCs). Results: The incidence of micrometastasis and ITCs in oral squamous cell carcinoma of the tongue and buccal mucosa were 23.5% and 17.6% respectively. A total of 7 out of 151 lymph nodes contained micrometastatic tumour foci and isolated tumour cells. None of the clinicopathological parameters significantly correlated with the incidence of micrometastasis. Conclusion: Small foci of tumour cells can be easily missed on routine histopathological examination. The incidence of micrometastasis should not be overlooked as it may be related to a poor patient prognosis and survival.
Biofuntionalization of Titanium Surfaces with SBF

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Introduction: One of the fundamental factors of dental implant therapy is the occurrence of osseointegration. The surface of the implant plays a key role in its success. There has been a shifting paradigm in implant surface technology in recent times. Objectives: This study interrogates the viability of coating commercially pure titanium surfaces (CPTi) with a thin hydroxyapatite coating using a simulated body fluid (SBF) solution. The possibility of achieving the required hydroxyapatite coating and roughness in a short period of time is also investigated. Methodology: A thorough analysis was undertaken to investigate the consequence of the time of coating, 3, 4, 5, 6 and 7 days respectively, on the morphology and the chemistry of the hydroxyapatite coatings. Prior to immersion in SBF, the samples were sandblasted and acid etched to mimic the morphology and roughness of commercially available dental implants. Analysis of the surfaces and their coatings was performed with Alicona, Scanning Electron Microscope, X-Ray Diffraction and Fourier Transform Infrared Spectroscopy. With sandblasting and acid etching, it was possible to achieve an average roughness (Sa) of 1.684 ± 0.101 µm for CPTi. Results: The SBF aided in the formation of a crystalline hydroxyapatite coating on all the samples. The coatings were uniform and had roughness values higher than the underlying substrate. The highest roughness values for coatings on CPTi were obtained at 7 days of immersion in SBF with Sa values of 2.880 ± 0.248 µm. Discussion & Conclusion: This study illustrates that it is possible to obtain a hydroxyapatite coating on CPTi substrates in shorter periods of time, with roughness values that favour the ultimate goal of implants therapy, that is, osseointegration.
Evaluating of Newly Formulated Osteoprotegerin-Chitosan Gel:  
An *in vitro* Study

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**Objectives:** Are to formulate of different forms of OPG-chitosan gels, to evaluate the gels biodegradation, to determine amount of OPG protein release from gels and to evaluate the cytotoxicity of gels by Alamar Blue assay and scanning electron microscope.  
**Methods:** OPG-chitosan gels were formulated from different molecular weights of water-soluble chitosan (10, 25, 50 kDa) and Peprotech recombinant human OPG. These gels were evaluated for their sustained release ability and biodegradation properties for up to 28 days. *In vitro* cytotoxicity test was carried out on normal human periodontal ligament (NHPL) fibroblast and normal human (NH) osteoblast using the Alamar Blue assay. The morphology of fabricated OPG-chitosan gels and cells cultured on gels were compared to each other using scanning electron microscopy (SEM).  
**Results:** The gels are biodegradable and exhibits sustained release property. All gels are non-toxic as the viability are almost more than 90% over extended period. SEM photographs of NHPL fibroblast and NH osteoblast cells cultured on the specimen surfaces show no deleterious or cytotoxic responses and the cells were well spread and had many extended cytoplasmic processes.  
**Conclusion:** we have proven that OPG-chitosan gel is evidently viable to be used locally for potential bone defect application. The OPG-chitosan gels are considered as a new promising biomaterials for bone tissue engineering applications.
Patients’ Satisfaction with Mandibular Two-Implant Overdenture Therapy

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Objective: To investigate patients’ rating of denture satisfaction (DS) when provided with unsplinted two-implant mandibular overdentures and to determine if mandibular bone height and bone volume affect change in satisfaction with implants. Methods: Thirty-four complete denture patients (mean age 60.7, SD 8.7; 9 male and 25 females) were consecutively enrolled to receive 2 inter-foramina mandibular implants and rated satisfaction with their prosthesis at baseline (T₀), 3 months (T₁) and 3 years (T₂) after mandibular overdenture conversion. The questionnaires had a Likert response format, based on 4 point rating from 0= very satisfied to 3= not at all satisfied. The score was calculated by adding upon response option, which consisted of items concerning aesthetics, satisfaction, stability, comfort and chewing ability. Lower score indicated greater satisfaction. The mandibular bone height at mental foramen was determined using iCAT classic and the bone volume around mental foramen using Mimics (Materialise, ver.16) software, of images obtained from cone beam computerized tomography. Multivariate linear regression models were used to determine if mandibular bone height and bone volume were related to changes in denture satisfaction at T₀, T₁ and T₂. Results: Denture satisfaction scores showed significant improvement 3 months and 3 years after implants compared to baseline (p< 0.05). Multivariate linear regression analysis showed that mandibular bone height and volume has no affect on the change in DS scores with implant treatment, (p >0.05), after controlling for gender, marital status, age, baseline and 3 months DS scores. However, the change in DS score from T₀-T₁ (p<0.01) and from T₀-T₂ (p<0.001) was dependent on the baseline DS score. Conclusion: Patient rated improved satisfaction with mandibular implant overdenture therapy. Satisfaction with implant prosthesis was dependent on the baseline score, but not with mandibular bone height and volume.
Palatal Rugae as Stable Biometric Guide for Anterior Teeth Positions

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Objectives: To propose a new method to determine the three-dimensional tooth position in natural and artificial dentition based on the stable anatomical landmarks of the maxillary dental arch. Methods: 92 maxillary dental casts were obtained from fully dentate (third molars excluded) adults (age between 20-30 years) with well aligned (class I normal occlusion) teeth, and minimal attrition, no history of orthodontic treatment. The casts were digitized using 3D scanner. The 3D models were standardized and polar position measurements representing each anterior tooth distance from the third rugae line points were made. Statistical analysis of variables measured on 70 subjects using multiple linear regression and simple linear functional relationship model for circular variables were carried out. The data from new 22 subjects were used on the proposed statistical models to estimate positions of the anterior teeth. Statistical test (paired t-test) was carried to evaluate the difference between the real and the estimated data fitted by the proposed statistical models. Results: The average polar coordinates of the six anterior teeth in relation to rugae point were: right canine (27.614±2, 143.085±5.3, 36.946±4.4), right lateral incisor (27.223±2.2, 122.602±3.6, 35.599±4.9), right central incisor (27.548±2.4, 100.867±1.8, 36.188±5.2), left central incisor (27.502±2.5, 78.813±1.9, 36.117±5.3), left lateral incisor (27.213±2.3, 56.715±3.8, 35.323±5), and left canine (27.628±2, 36.523±5.5, 36.388±4.6). From the statistical test carried out, it is shown that there are no significant differences between the real data and the estimated data fitted by the proposed statistical models where p>0.05. Conclusions: teeth positions in relation to the third rugae lines were describable geometrically and mathematically and the relationships used to estimate the positions were strong and significant. This approach may have the potential to serve as guides to position teeth for edentulous arches.
Anti-biofilm Effects of Polyphenolic Compounds from Pomegranate Fruit on Oral Bacteria

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Background: Adhesion of enteric, oral and respiratory bacteria is necessary for colonization and subsequent development of diseases. Phenolic compounds from plants have been reported to exhibit direct effect on cell growth and also possess anti-adherence properties that disrupts the formation of biofilm.

Objectives: To determine the antibacterial and anti-biofilm activity of ellagic acid (EA) and punicalagin (PUG), compounds derived from pomegranate fruit against early colonizers of the oral biofilm, Streptococcus sanguinis (ATCC BAA-1455), Streptococcus mitis (ATCC 49456) and Actinomyces viscosus (ATCC 15987). Methods: The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined by microdilution method. Qualitative anti-biofilm activity of EA and PUG on biofilm of mixed-bacteria suspension formed on 96-well plate was evaluated using crystal violet assay. For quantitative analysis, the mixed-bacteria biofilm was developed using the Nordini’s Artificial Mouth (NAM) model. Sterile saliva was used to form experimental pellicle on hard substratum glass beads. The experimental pellicle was then treated with ½ MIC concentrations of EA and PUG for 1 minute before the mixed-bacteria suspension (10⁸ cell/ml) was introduced and allowed to run for 24 hours. Bacteria in the formed biofilm were analysed and enumerated based on colony forming units (CFU’s).

Results: EA and PUG showed significant growth inhibitory activity towards S. sanguinis, S. mitis and A. viscosus with MIC’s ranging from 625-1250 µg/ml and MBC’s ranging from 1250-2500 µg/ml. Both compounds significantly reduced the mixed- species biofilm formed on saliva coated well during 24 hours incubation (p<0.05). Prior treatment of experimental pellicle with EA and PUG significantly reduced the adherence of the bacteria in the mixed suspension by 59% (Streptococcus) and 36% (Actinomyces) for EA and 61% (Streptococcus) and 15% (Actinomyces) for PUG, respectively. Conclusions: Data collected from this study suggested a prospective role of EA and PUG as therapeutic agents in controlling formation of oral biofilm.
Neurogenesis Potential of Dental Pulp Stem Cells from Carious Tooth

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Objective: To investigate the neurogenesis potential of human dental pulp stem cells from carious tooth (DPSCs-CT) in particular towards dopaminergic (DA-ergic)-like cells via direct differentiation method as compared to those from healthy pulps (DPSCs). Methods: Cells from both tissues (n=5) were cultured and differentiated towards DA-ergic-like cells at passage three using a pre-defined cocktail of growth factors. Assessments were carried out in terms of morphology, gene expression via PCR techniques as well as functional assays including ELISA and also spike detection via multielectrode array (MEA). Results: DPSCs-CT exhibited reduced fibre outgrowth (neurite) formation as compared to DPSCs. The phenotype changes were reflected at both gene and protein level whereby markers such as NES, PAX6, GFAP, MSI, TUBB3, NCAM, NURR1 as well as TH and DAT were not significantly expressed (p>0.05) in DPSCs-CT as compared to DPSCs. Moreover, the level of DA in differentiated DPSCs-CT was observed to be significantly lower as compared to DPSCs (p<0.05). Correspondingly, intracellular Ca²⁺ detection also presented similar observation whereby Ca²⁺ release was significantly lower in differentiated DPSCs-CT as compared to differentiated DPSCs. Perhaps these attributed to overall spike reduction in DPSCs-CT (-2.06 ± 0.62 μV) than that of DPSCs (-36.03 ± 9.03 μV) (p<0.05). Conclusions: DPSCs-CT are not suitable to be employed for in vitro works especially in those pertaining to neurogenesis.
Maxillofacial Trauma in Mild TBI: Neurocognitive and White Matter Changes

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Objectives: The aim of the study was to establish the incidence of maxillofacial (MF) injury accompanying mild head trauma (mTBI) and the associated neurocognitive deficits and white matter changes. Methods: A prospective review of 61 patients with mTBI (with/without maxillofacial injury) due to motor vehicle accidents (MVA) who have completed their admission CT, neurocognitive evaluation, and quantitative diffusion tensor imaging protocol [admission and 6 month follow up] was performed. Descriptive statistics were used for demographics, while a paired t-test and repeated measure MANOVA were used to establish the intergroup differences and susceptibility. Results: The patients in the study were relatively young adults, with a mean age of 28.01 (SD= 9.5) and 11.8 (SD=1.7) years of education. 67.2 % (n= 41) of these patients had maxillofacial injuries (soft tissue = 32.8 %, facial fractures =34.4%) accompanied with 68.3 % (n= 28) of them having intracranial abnormalities based on admission CT. The executive function and attention were significantly altered across the time points, with patients who had both MF injury and intracranial lesion doing poorly at baseline and improves 6 months later, whereas patients with no visible intracranial lesion but have had MF injuries remains impaired, with signs of slowed recovery. The fractional anisotropy (FA) of genu of corpus callosum, anterior limb of internal capsule and cingulum for patients with MF injuries but without intracranial lesion showed trends of reduced integrity over time. Conclusion: The risk of altered executive function and attention is significant in patients with MF injury with accompanying mTBI. Further prospective study is needed to distinguish the trend of FA reduction in patients with MF injuries but without intracranial lesion.
Facial Soft Tissue Analysis of the Adult Malaysian with 3D Stereophotogrammetric Imaging

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**Objectives:** To establish the facial soft tissue morphologic values for the Malaysian Malay, Chinese and Indian populations and to determine the morphologic differences within and between the three ethnics using a non-invasive stereo-photogrammetry 3D camera. **Materials & Method:** Cross sectional study with total of 327 samples, this comprised of 110 Malays (55 males and 55 females), 110 Chineses (55 males and 55 females) and 107 Indians (52 male and 55 female). Age was 20-30 years old with normal BMI and Class 1 malocclusion with no adverse skeletal deviation. 3D images were captured. Two angular, 2 ratios and 16 linear measurements were analysed. Statistical analyses performed with SPSS version 12.0.1 with the initial level of significant was set at $p<0.05$. Independent- T test was carried out to investigate differences between genders in an ethnic group. One way ANOVA was performed to determine inter-ethnic differences. **Results:** Sexual dimorphisms exist between gender for all ethnics for biocular width, face height and lower face height with men predominates in all three parameters. For comparison between male Malay, Chinese and Indian, the intercanthal distance in the eye region was the significant parameter with Chinese demonstrated eyes width furthest apart. The Indian male demonstrated shortest facial height and lower face height. Ethnic dimorphisms were also noted in the female group. The intercanthal distance was the significant parameter with Chinese demonstrated eyes width furthest apart. Indian female had the longest nasal tip protrusion. The female Malay demonstrated shorter smallest nose as demonstrated in the reduced nose height and nasal bridge length. Longest face and lower face height demonstrated in Chinese female while Indian had the shortest. **Conclusions:** Gender dimorphism was noted across all ethnics with men predominates in most parameters. Ethnics’ differences were noted especially in the intercanthal distance, face height and lower face height.
Facial Analysis of Chinese Children with Repaired Unilateral Cleft Lip and Palate

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Objectives: This study is aimed to analyse the three-dimensional (3D) facial features of Chinese children with repaired unilateral cleft lip and palate (UCLP) and to compare them with a control group who did not have cleft using a commercially available 3D stereophotogrammetry camera. Methods: This cross-sectional study analysed 3D measurements of the facial surfaces of 20 Chinese children with repaired UCLP and 40 unaffected Chinese children aged 8 to 12 years old. They were voluntarily recruited from the Combined Cleft Lip and Palate Clinic and Paediatric Dentistry treatment waiting list of Faculty of Dentistry, University of Malaya. 3D facial images were captured using five-pod 3D VECTRA M5 photosystem (Canfield Scientific Inc, Fairfield, NJ, USA). Landmarks identification and a range of facial measurements were analysed using Mirror software (Canfield, Fairfield, NJ, USA). Twenty five variables and two ratios were compared between both groups using independent t-test. Statistical analyses were performed using SPSS Version 12.0.1 (SPSS for Windows, SPSS Inc., Chicago, IL, USA) with the level of significant set at $p < 0.05$. Results: Statistically significant differences ($p < 0.05$) were found between the cleft group and the control group, mainly in the nasolabial regions. Cleft group exhibited significant nasolabial deformity in the horizontal dimension, illustrated by a wider alar base root width, flattened nose and broader nostril floor width on the cleft side. With regards to the mouth and lip region, cleft subjects tended to have shorter upper lip length and thinner upper vermilion thickness. Conclusions: Significant and clinically relevant differences exist between facial morphology of Chinese children with repaired UCLP and control subjects, especially at the nasolabial regions.
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Preparation of an Antioxidant Mouthwash from *Nicotiana Tabacum* Extract

**F.D. SAMSUDIN, H. MISBAH, N. SHAMSUDDIN, M.M. KANAKAL, F.S. BAKRIN**

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**Objectives:** To determine the presence of nicotine, antioxidant activity, total phenolic and flavonoid contents of *Nicotiana tabacum* (NT) extracts. And to prepare a formulation of mouthwash using NT extract(s) without nicotine. **Methods:** Raw NT leaves were received from Malaysian National Kenaf and Tobacco Board. Raw leaves were washed using distilled water and dried at room temperature. Leaves were cut into small pieces and dried under hot air oven at 40°C for 48 hours. Soxhlet extraction of dried NT leaves was carried out using different solvents (n-hexane, chloroform, methanol and distilled water) followed by solvent removal using rotavapor. The extracts were tested for presence of nicotine using Thin Layer Chromatogrhaphy (TLC). Phenolic and flavonoid contents were determined colorimetrically for methanol and aqueous extracts. Whereas n-hexane and chloroform extracts were not screened for phenolic and flavonoid content due to their inability to extract polar component. Antioxidant activity of the extracts were assessed using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay and ferric reducing antioxidant power (FRAP) assay. A simple mixing technique was used to formulate mouthwash using NT extract with the highest antioxidant activity without nicotine content. **Results:** Methanol extract exhibited the highest DPPH free radical inhibition (IC50 = 434.90 ± 6.83) and FRAP value (0.45±0.34). The total phenolic (0.07±0.01 mg of GAE/g extract) and flavonoid contents (15.95±1.24 mg of QE/g extract) in the methanol extract were higher than aqueous extract. Nicotine was absent in the methanol extract and present in chloroform and n-hexane extracts. Antioxidant methanol NT extract without nicotine is further developed into mouthwash preparation. **Conclusion:** Anti-oxidant activity of methanol extract is due to high phenolic and flavonoid content with no presence of nicotine compared to chloroform and hexane extracts. These values are promising to prepare the extract further into many antioxidant formulation preparations and provide alternative use of tobacco to contribute for our national economy in future.
Potential Role of Nitric Oxide in Relation to Odontoblast

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Objective: To localize the distribution of NOS within a healthy pulp and to extrapolate the potential cell signalling system between COX-1, EP-2, NaKATPase and NOS. Methods: Maxillary and mandibular incisors were extracted from 7 guinea pigs weighing between 300-500 gm and used as demineralized and freshly extirpated pulp tissue. Demineralization was performed using 17% EDTA, pH of 7.4 for 8 weeks. Tissue samples were then mounted on O.C.T and “snap frozen”. Frozen tissues were mounted on a chuck piece and sectioned at 7µm thickness prior to placing on a polysine coated slide. Various primary antibodies were then applied and immunohistochemical investigations were carried out. Slides were then observed under a fluorescence microscope to determine presence of COX-1, EP-2, NaKATPase and NOS. Results: COX-1, EP-2 and NOS were observed in the odontoblast and subodontoblast layer in varying degree of intensity in the demineralized and freshly extirpated pulp tissue. The distribution of COX-1, EP-2 and NOS were also different between the incisal, middle and apical region of the pulp. All three markers were expressed in close proximity within the odontoblast and subodontoblast layer. Nerve fibres within the apical region of the pulp stained for NOS, while intense NaKATPase staining was noted in the sudodontoblast layer. Conclusion: The localization of NOS in a healthy pulp suggests a physiological role of NO, while the detection of COX-1 and EP-2 in the vicinity of NOS may indicate a potential cell signaling mechanism within the pulp. NaKATPase may act as a mediator in the COX-1, EP-2 and NOS pathway.
Synergism Between Bakuchiol and Pseudolaric Acid B on Oral Microbes

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Objective: The study investigated the antimicrobial activity of bakuchiol (BK) and pseudolaric acid B (PAB) compounds, alone and in combination on Candida albicans and Streptococcus mutans by different methods. Methods: A chequerboard format was used to determine the fractional inhibitory concentration indices (FICI) of combined compounds. The efficacy of combinations of compounds on planktonic and biofilm growth was respectively analysed using crystal violet and XTT-reduction assays. Real-time reverse transcriptase polymerase chain reaction was used to amplify and quantify cell wall adhesins-associated genes while, effect on biofilm structure was examined using light microscopy. Results: Comparatively, planktonic growth of C. albicans was highly susceptible to PAB (MIC = 6.25 µg/ml) while S. mutans was more susceptible to BK (MIC = 50 µg/ml). The BK:PAB combination showed indifference against C. albicans (1.0 ≤ ΣFIC < 4.0), but indicated synergism against S. mutans (ΣFIC ≤ 0.5). The BK:PAB combination significantly reduced >80% of C. albicans (26.7 x 10^6 to 2.43 x 10^6 cfu/ml) and >50% of S. mutans (34.7 x 10^5 to 15.13 x 10^5 cfu/ml). Treatment regimens against planktonics showed significant decreases in biofilm formation (P < 0.01). Cell viability in biofilms showed reduction by >50% (P < 0.01). The disruption in biofilm structure and the down-regulated expression of the adhesin-related genes were suggested to be involved in the mechanism of action of both compounds on C. albicans and S. mutans. Conclusion: PAB alone was determined highly effective against C. albicans, while BK was mildly effective against S. mutans. The combination resulted in different outcomes, and mediated synergism against S. mutans. This suggest the potential application of combinatorial compounds as a therapeutic strategy to minimise candidal-streptococcal attachment in the early stage of biofilm formation.
Susceptibility of an Aqueous Plant Extract Formulation on Plaque Bacteria

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Objectives: The aim of this study was to determine the susceptibility of an aqueous extract formulation of Psidium sp. and Averrhoa sp. on selected bacterial plaque suspension and to access the stability of the formulation upon storage. Methods: The susceptibility of plaque microbes which include Strep.sanguinis, Strep.mitis and Strep.mutans towards Psidium sp. and Averrhoa sp. formulation was carried out at four different concentrations (20, 15, 10 and 5 mgmL⁻¹) using the disc diffusion method. The minimal inhibition concentration (MIC), minimal bactericidal inhibition (MBC) and aggregative property of the extract combination on the bacterial suspension was determined with 0.12% w/v chlorhexidine gluconate (CHX) used as a positive control. The stability of the extract combination over a period of 90 days storage at 4°C was recorded based on parameters such as microbial activity, density, color, brightness, odor and flavor. Results: Strep.sanguinis, Strep.mitis and Strep.mutans suspension was found susceptible to the extract formulation producing zones of growth inhibition of 0.8, 0.7 and 0.6cm diameter at 20, 15 and 10mgmL⁻¹ respectively. The growth inhibitory activity was determined at MIC and MBC values of 10mgmL⁻¹ and 20mgmL⁻¹ respectively. The extract formulation also display uniform increased in aggregative activity from 5mgmL⁻¹ to 14mgmL⁻¹. Conclusion: The aqueous extract formulation of Psidium sp. and Averrhoa sp. demonstrated antibacterial activities on plaque microbes by the inhibition of growth and aggregation of plaque bacteria.
Vitamin E Exhibits Antitumour Activity on Oral Squamous Carcinoma Cells

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Introduction: As an antioxidant alpha tocopherol may have potential role in the prevention of cancers. A plant-derived agent, alpha-tocopherol is the most abundant form of vitamin E. Objective: To investigate the antitumour activity of alpha-tocopherol on cells of oral squamous cell carcinoma (OSCC), ORL-48 comparative to a known anticancer agent cisplatin. Methods: The neutral red staining procedure was performed to determine the concentration of alpha-tocopherol and cisplatin producing 50% inhibition (IC50) of proliferating ORL-48. Morphological changes upon treatment with the agents were monitored and periodically examined using a Juli Br-Live cell movie analyzer (40x). Assessment on the mode of cell attrition was evaluated using gel electrophoresis and TUNEL assay was used to determine the percentage of apoptotic cells due to cisplatin and alpha-tocopherol treatments. Results: Alpha-tocopherol and cisplatin exhibited significant antiproliferative activity on ORL-48 at IC50 of 2.46 ± 0.42 µg/mL and 0.97± 0.15 µg/mL, respectively (p<0.05). Comparative to alpha-tocopherol, cisplatin was however found toxic on keratinocytes at an effective concentration of < 0.1 µg/mL. The effective concentration of alpha-tocopherol on keratinocytes was 4.08 ± 1.87 µg/mL. Cell shrinkage and the appearance of apoptotic bodies were observed on ORL-48 treated with alpha-tocopherol while none was observed following treatment with cisplatin. The ladder band pattern of defragmented DNA obtained from cells treated with both agents indicated their apoptotic activity. TUNEL assay showed 37.9 % and 24.0 % of apoptotic cells were obtained at 2.5 µg/mL cisplatin and alpha-tocopherol, respectively. Conclusion: Alpha-tocopherol exhibited positive antitumour activity on ORL 48 cells at concentration that are non-toxic to normal Keratinocytes and results suggested apoptosis as its mode of action.
Effect of Capsaicin on Oral Squamous Cell Carcinoma Cell Line (ORL-48)

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Objectives: Capsaicin has been reported to have anti-cancer effects on various cancer cell lines, however, its effect on ORL-48 (a cancer cell line recently established from oral cancers of Asian population) has not been evaluated. The objective of this study is to understand the effect of capsaicin on ORL-48 in vitro.

Methods: ORL-48 cell lines were cultured and treated with capsaicin at 24, 48 and 72 hours to obtain the IC50 (half maximal inhibitory concentration) value using MTT Cell Viability Assay. Morphological changes of the cells were detected by phase contrast and time lapse microscopy and the mode of cell death determined by fluorescence dyes (DAPI) and Propidium-Iodide). Annexin V-FITC/PI Apoptosis Assay was used to quantitate the apoptotic cells. The mechanism of apoptosis was investigated using caspase-3/7, 8 and 9 assays. Results: Capsaicin inhibited the proliferation of ORL-48 cells in a dose dependent manner giving different IC50 values for different treatment hours respectively. The untreated cells preserved their original morphology, the capsaicin-treated cells were found to have shrunk, loosing contacts with neighboring cells, displayed apoptotic features and demonstrated a reduction in the number of cells. With fluorescence staining, the untreated cells presented as round cells with uniform nuclei whereas the treated cells showed apoptotic blebs with nuclear condensation. Treated cells showed positive signs for apoptosis when stained with DAPI. The percentage of apoptotic cells was shown to increase while the numbers of viable cells were decreased when analysed using Annexin V-FITC/PI. Compared to the control, an increase in the activity of caspase-3/7 and caspase-9 was observed. Conclusion: Capsaicin exhibited cytotoxicity and anti-proliferative activity on oral cancer cells ORL-48. The mechanism of cell death may probably involve the intrinsic apoptotic pathway suggesting capsaicin as anti-cancerous agent on the cancer cell line of Asian population.
Histopathological Evaluation of Oral Candidiasis Model Exposed to Alcohol

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Objectives: To determine the invasive characteristics of Candida albicans on oral keratinocyte 3D cell culture model under the influence of ethanol. Methods: The effect of ethanol 1% v/v on oral keratinocyte-3D cell culture model infected by C. albicans was investigated. Human oral keratinocytes-3D cell culture model was developed by using magnetic levitation technique. The fungal infected tissue were treated with ethanol and then examined histologically at 12, 24 and 48 hours. Invasion of tissue by C. albicans was visualized by periodic acid-Schiff (PAS) staining and quantitatively evaluated as percentage of total invasive area, using a computerized image analysis system (IAS). The observations obtained were compared to that observed on an infected tissue without ethanol treatment. Results: Ethanol treatment was found to have enhanced the invasion of the infected tissue by C. albicans causing extensive presence of hyphae at the periphery of the tissue model. Conclusion: Alcohol exposure may enhance the damage on fungal-infected oral keratinocytes.
**Effectiveness of a Novel Toothbrush in Children - A Preliminary Study**

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**Objectives:** To evaluate the effectiveness of a T-shaped toothbrush in plaque removal and gingival health among children and to obtain feedback regarding its use. **Methods:** Nineteen participants aged 8-10 years from 1 primary school in a Petaling Jaya district who fulfilled the inclusion and exclusion criteria were invited to participate in this study. The children were explained the technique of using the toothbrush and were asked to use the brush for a period of 2 weeks. The subjects were clinically examined for dft/DMFX status, plaque scores and gingival scores at baseline and at the end of 2 weeks. They were asked to complete a questionnaire at the end of 2 weeks regarding the use of the toothbrush. Data was analysed using t-test in SPSS version 22. **Results:** A mean dft (SD) score of 3.32 (3.90) and a mean DMFX (SD) score of 0.32 (0.82) were recorded. There was a statistically significant (p < 0.001) reduction in plaque from baseline with mean (SD) of 1.92 (2.40) to mean (SD) of 1.51 (2.02) at 2 weeks and also for gingival score with mean (SD) of 0.20 (0.72) to mean (SD) of 0.08 (0.58) at 2 weeks. About 50% children reported having difficulties to handle the T-shaped toothbrush initially, especially in the posterior region. However, they were able to adapt to the T-shaped toothbrush after about one week. **Conclusions:** The T-shaped toothbrush can improve the oral hygiene of children with better plaque removal and improving the gingival health in children.
The Lingual Nerve Location and Its Varied Insertion into the Tongue

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Objectives: To determine the relationship of the lingual nerve with mandibular posterior teeth and to study the patterns of nervous insertion into the tongue in Mongoloid cadavers. Method: Twelve hemi-mandibles from six cadavers were dissected sagittally. The vertical distances from the alveolar ridge and the inferior border of the mandible to the lingual nerve were measured at predetermined posterior teeth sites using a customized ruler. The nerve was then traced to determine the type of insertion into the ventral surface of the tongue. Results: The mean distance between the lingual nerve and the alveolar ridge at the 3rd molar, 2nd molar and 1st molar region was 12.25 (3.56) mm, 11.65 (3.2) mm and 14.4 (4.3) mm respectively. The mean distance from the lingual nerve to the inferior border of the mandible was 12.5 mm. The distance between the lingual nerve and the inferior border of mandible at the third molar region was the least, i.e. at 10.5 (3.71) mm before it increases gradually to be 12 (4.2) mm at the second molar and 15 (2.16) at the first molar region. In 41.7% of cases the lingual nerve insert into the tongue as two terminal branches, while in 33.3% of cases there were three terminal branches. Only in one case, it was found that the nerve inserts as a single trunk. Conclusion: Anatomical variations occur with regards to the location of the lingual nerve between and within the cadavers studied. Between the third molar region towards the first molar region, the lingual nerve deviates vertically and medially to insert into the ventral surface of the tongue.
Detection of Bifid Mandibular Canals in Malaysians Using Enhanced CBCT Images

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Background: Bifid mandibular canal is an anatomical variation that can be of considerable interest to a dental practitioner. The purpose of this study is to identify and classify specific anatomic variations of bifid canals among the Malaysian population. Materials and Methods: The courses of the mandibular canal in 146 CT images of Malaysians aged 11-80 years were evaluated carefully and the bifid mandibular canal was identified and recorded. Results: The results revealed that 16.5% of the total sample was with duplication of the mandibular canal. Conclusion: The course and configuration of the mandibular canal should be carefully observed because it does possess variations. Bifid mandibular canals are rarely noticed with panoramic radiographs but definitely detected with enhanced CBCT images to avoid unwanted clinical complications.
Case Series: Suture Granuloma Associated with Triclosan Coated Polyglactin 910 Sutures

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Introduction: The question of whether suture materials play a role in the development of wound infection has always been the subject of debate ever since it was first introduced into the market. Objectives: To report a series of cases presenting with suture induced granuloma. To elicit the possible patient related factors that could attribute to the occurrence of suture induced granuloma. Methods: A retrospective cohort study was carried out from March 2014 to December 2014 involving patients sustaining laceration injuries in the maxillofacial region. All patients were initially managed with toilet and suturing using triclosan coated polyglactan 910 sutures. Patients who presented with suture granulomas were treated and subsequently followed up until complete wound healing occurred. Histolopathology examination was carried out for patients presenting with exaggerated wound reaction. Results: This series reports 10 patients presenting with suture granulomas. Surgical excision of the granulation tissue with infected suture materials were required for 9 cases whereas suture extrusion occurred in the remaining 1 case. All wounds healed uneventfully after the secondary procedure. Their diagnosis was confirmed with clinical and histopathological examination. Apart from contaminated wounds, no other patient related factors could be seen attributing to the incidence of suture granulomas in this case series. Conclusion: The role of triclosan coated suture material as a potential irritant should to be explored further as suture granulomas may be a preventable by using the appropriate suture material.
Novel Injectable Polymer-Based on Gelatin Microparticles for Bone Tissue Engineering

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Objectives: To analyse the characteristic, compatibility and osteoconductive ability of the new developed injected form of bone substitute called poly(caprolactone-trifumarate) (PCLTF) based on gelatin microparticles porogen (GMPs) and to compare it with the original form, which was fabricated using salt leaching technique (PCLTF containing salt). Methods: A detailed characterization of the modified scaffold was done by analyzing the scaffold surface, the thermal, physical and mechanical properties, and the in vitro cell compatibility. In vivo behaviour of PCLTF-GMPs was evaluated in a critical-size defect drilled in the cranial bone of New Zealand white rabbits. Results: The modified 3D porous injectable PCLTF-GMPs scaffolds showed no significant difference (p > 0.05) in the mechanical properties before and after gelatin leaching as compared to the one produced using salt as the porogens (p < 0.05). It has a higher biodegradability rate of 16 weeks. The alamar blue assay result showed that the PCLTF-GMPs has no critical cytotoxic effect and a clear cell layer covering the entire outermost surface of scaffolds was observed in scanning electron microscopy at 3 days of incubation. PCLTF-GMPs demonstrated improved biocompatibility in vivo, while the original PCLTF was associated with local inflammation and necrosis at the site of implantation during the first two weeks post-surgery. Polyfluorochrome tracers detected bone growth occurring in the PCLTF-GMPs filled defects during the entire period of the tracers’ activity with the mean values statistically significant higher than that of the control defects (p< 0.05). Conclusions: The new fabrication technique produced a biocompatible candidate material with reliable properties that has potential use as a bone filler to treat critical bone defect, periodontal bone defect and alveolar bone augmentation.
The Use of Customized Headgear for RED Device Fixation in Crouzon Syndrome

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Introduction: Rigid external distraction device is often indicated for superior midfacial advancement in pediatric syndromic craniosynostosis patients. Even though the technique is proven reliable to treat the functional issues related to the craniofacial deformity, major complications associated with its fixation such as intracranial pin perforation and migration have been reported. Case report: We report a novel technique of using a customized headgear to prevent intracranial pin perforation over a very thin temporal bone region in an 8-month-old infant with Crouzon syndrome who underwent monobloc Le Fort III distraction osteogenesis using a combination of bilateral internal and a rigid external distraction device. Conclusion: The customized headgear provides a protective platform at the temporal region thus preventing intracranial pin perforation and allow stable fixation during the early phase of consolidation period to prevent central component relapse. The headgear can be used short term when rigid external distractor is indicated in infant patient but requires close monitoring due to risks of skin necrosis and temporal region indentation.
Optimizing Stability of Segmental Le Fort 1 Osteotomy Using Co-Cr Palatal Bar

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Introduction: Le Fort 1 osteotomy is a common procedure in cleft orthognathic surgery. However, the stability of the segmentalized maxillary bone components remains a major issue as it contributes to the long term successful surgical outcome. Based on the literature, the unilateral cleft anterior segment has the tendency to relapse back due to the high soft tissue tension and lack of rigidity of the device used i.e. acrylic splint or an archbar to maintain the surgically corrected maxillary arch position and alignment. Case Report: 18 year old Malay male presented with a repaired left unilateral cleft lip and palate came complaining of anterior open bite on the left cleft side (10mm). On 19/10/14, he underwent segmental Le Fort 1 osteotomy on the cleft segments and the arch was secured with our Co-Cr customized palatal bar and stainless steel wire. Post-operative 6 months shows that the segment was firm with no relapse. Conclusion: Our novel technique of using Co-Cr palatal bar provide adequate support post-operative and can be applied by surgeons in cleft orthognathic surgeries.
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