Radiographic condylar changes following vertical subsigmoid osteotomy in different setback magnitudes

PREM KUMAR S¹, CHOI WS²,

¹Department of Oral and Maxillofacial Surgery, Kulliyyah of Dentistry, International Islamic University Malaysia; ²Department of Oral and Maxillofacial Surgery, Prince Philip Dental Hospital, University of Hong Kong

Objectives: The objective of this retrospective study was to compare the effect of different mandibular setback amount by vertical subsigmoid osteotomy (VSSO) on the pattern of radiographic condylar remodeling in one year time span post-surgically. Methods: 200 patients diagnosed of mandibular prognathism and underwent VSSO surgery with various setback amounts from 2007 until 2012 at the Prince Philip Dental Hospital were included in this study. Pre-surgical and 1 year post-surgical Postero-Anterior Cephalogram, Lateral Cephalograms and Cone Beam Computed Tomography (CBCT) Scans were retrieved. Tracings of plain cephalometric radiographs were performed. CBCT data sets were used to measure the linear and condylar axis angle value in multiplanar view. Finally the pre- and post-surgical 3D condyle-ramus units were superimposed using stable registration point of the condylar neck and ramal area above the lingula to assess the condylar bone remodeling by topographic and multiplanar slide views. Result: Plain radiographic tracing shows significant differences in the changes of ramus inclination angle, intergonial width and total ramus angle between postoperative (T2) and preoperative (T1) phases between the setback groups. Changes in the CBCT multiplanar condylar axis angle as well as condylar head linear measurements between T2 to T1 were not significantly different between the setback groups. Superimposed multiplanar view analysis in the coronal and sagittal planes showed no significant relationship between the remodeling changes and the setback magnitude. However there was higher proportion of positive remodeling following higher setback amount at the mid-anterior and posteromedial zone in the axial plane. Conclusion: Condyle remodeling is noted to be positive and not destructive following VSSO. The positive remodeling effect remains stable regardless of the amount of VSSO setback.
**P- 02**

**The Effect Of Chewing Simulation On Surface Roughness Of Resin-composite When Opposed By Zirconia Ceramic**

TING KHEE H\(^1\), JULIAN S\(^2\), NICK S\(^2\)

\(^1\)Department of Prosthodontics, Universiti Kebangsaan Malaysia; \(^2\) School of Dentistry, The University of Manchester

Email: tingkhee.ho@ukm.edu.my, julian.satterthwaite@manchester.ac.uk, nick.silikas@manchester.ac.uk

**Objectives:** To assess the change in surface roughness of Tetric EvoCeram resin composites after simulated chewing test against zirconia ceramics using a three-dimensional (3D) profilometer. **Materials and methods:** A total of 40 Tetric EvoCeram\(^\text{TM}\) resin composite specimens against Lava\(^\text{TM}\) Plus zirconia antagonist (n=20) were prepared for the study. The chewing test was performed using chewing simulator CS-4.2 (SD Mechatronik GmbH, Feldkirchen-Westerham, Germany) at loading cycle of 250,000 with combination of horizontal and vertical movement of antagonist specimens. The resin composite specimens were mounted in the lower specimen holders and the zirconia specimens were mounted in customised holders provided by the manufacturer. The surface roughness profile of each resin composite before and after simulated chewing test were analysed by 3D profilometer (Talysurf CLI 1000, Taylor Hobson, Leicester, UK) by measuring two-dimensional (2D) parameters (Ra and Rt) and three-dimensional (3D) parameters (Sa, Sq, Ssk, and Sku). Data obtained were analysed using Talymap software. The paired t-test was used for statistical analysis. After the chewing testing, the surface profile of representative Tetric EvoCeram specimens were analysed using scanning electron microscopy. **Results:** The paired t-test has showed the post-chewing test Ra, Rt, Sa and Sq of Tetric EvoCeram were significantly higher compare to pre-chewing test (p < 0.05 indicates a significant difference). The baseline surface roughness measurements of Tetric EvoCeram, Ra, Rt, Sa and Ssk were 0.16(0.43)\(\mu\)m, 1.22(0.38)\(\mu\)m, 3.78(1.81)\(\mu\)m, 4.53(2.09)\(\mu\)m, -0.30(0.51)\(\mu\)m respectively. After the chewing simulation, the Ra, Rt, Sa, Sq and Ssk were 0.29(0.23)\(\mu\)m, 2.01(0.77)\(\mu\)m, 8.04(7.01)\(\mu\)m, 9.54(8.08)\(\mu\)m, -0.40(0.56)\(\mu\)m respectively. **Conclusion:** After simulated chewing test, the zirconia ceramics exhibited rougher surface when opposed with Tetric EvoCeram composites.
Differentiation of Periodontal Ligament Stem Cells into Acquiring Hepatic Features

PUNITHA VASANTHAN¹, NARESHWARAN GNANASEGARA², VIJAYENDRAN GOVINDASAMY³, SABRI MUSA¹, NOOR HAYATY ABU KASIM²

¹Department of Pediatric Dentistry and Orthodontics, Faculty of Dentistry, University of Malaya; ²Department of Restorative Dentistry, Faculty of Dentistry, University of Malaya; ³cGMP Compliance Stem Cells Laboratory, Hygieia Innovation Sdn. Bhd., Lot 1G-2G, Lanai Complex No.2, Persiaran Seri Perdana, Persint 10, Federal Territory of Putrajaya

Email: srinitha_37@yahoo.com.my; sabrim@um.edu.my; naresh_waran_28@hotmail.com; vijay07001@gmail.com; nhayaty@um.edu.my

Background: Human periodontal ligament stem cells has been introduced for as an easily accessible source of stem cells from dental origin. Although recent studies have revealed the ability of these stem cells in multi-potential attribute, their efficiency of hepatic lineage differentiation has not been addressed so far. Objective: The aim of this study is to investigate hepatic lineage fate competence of periodontal ligament stem cells through direct media induction. Methods: Differentiation of periodontal ligament stem cells into hepatocyte-like cells were conducted by the exposure of two phase media induction. First phase were performed in the presence of Hepatocyte growth factors and Nicotinamide to induce a definitive endoderm formation. In the subsequent phase, the cells were treated with Oncostatin M, Dexamethosone and Insulin Transferrin to generate hepatocyte-like cells. Hepatic-related characters of the generated hepatocyte-like cells were determined at both mRNA and protein level. Furthermore, functional assay were conducted to examine the functionality of the hepatocyte-like cells. Results: Foremost changes observed in the generation of hepatocyte-like cells were the morphological features in which these cells were transformed from fibroblastic shape to polygonal shape. Temporal expression of hepatic markers ranging from early endodermal up to late markers were detected in the hepatocyte-like cells. Differentiated periodontal ligament stem cells exhibited functional features of a hepatocyte during and at the end of the experiment duration. Crucial hepatic markers such as glycogen storage, albumin and urea secretion were also shown. Conclusions: These findings exhibited the ability of periodontal ligament stem cells of dental origin to be directed into hepatic lineage fate. These cells can be regarded as an alternative autologous source in the usage of stem cell based treatment for liver diseases.
Abstracts - Poster

P–04

Differentiating Layers of Dentine Caries Using Optical Coherence Tomography and Energy Dispersion Spectrometric Microanalysis

KHAN SA\textsuperscript{1}, ZAKIAN C \textsuperscript{2}, ABU KASIM NH \textsuperscript{1}, WALLS AW \textsuperscript{3}, CHEW HP \textsuperscript{1}

Department of Restorative Dentistry, Faculty of Dentistry, University of Malaya, Kuala Lumpur, Malaysia\textsuperscript{1}; Faculty of Dentistry, University of Manchester, UK\textsuperscript{2}; Edinburgh Dental Institute, University of Edinburgh, Edinburgh, UK\textsuperscript{3}

Email: saadkhan@um.edu.my, chewhp@um.edu.my

**Objectives:** To assess calcium (C) and phosphate (P) weight percentage (wt\%) content in infected (ID), affected (AD) and healthy dentine (HD) and its correlation with Optical-Coherence-Tomography (OCT) backscattered-intensity (BSI). **Methods:** Twenty-six carious molars with ICDAS code 4 and 5 were selected having soft wet yellow, light or dark brown caries and transversely sectioned. A 3.05mm copper grid with 85\(\mu\)m inter-bar distance was placed next to region of interest (ROI). 3-Dscans measuring 3x3.5x2mm were acquired of the ROI using a Swept-Source-OCT. A 2000X magnification images were captured from each inter-bar spaces using Field-Emission-Scanning-Electron-Microscope (SEM), followed by EDS microanalysis. The surface of the OCT volume data was aligned and an enface view was generated. The ID, AD and HD were selected using enface view from corresponding SEM images using Pugacha et al.'s, 2009 histological classification. Average wt\% of Ca and P were recorded. The mean-fractional-difference between surface and 15\(\mu\)m sub-surface were obtained from BSI depth profiles of ID, AD and HD. One-way ANOVA followed by Post hoc Tukey’s was undertaken to evaluate the differences of wt\% of Ca, P and BSI between the 3 groups. **Results:** The mean wt \% of Ca in ID, AD and HD was 6.51 ± 0.54 (Mean ± SE), 12.35 ± 0.82 and 20.0± 0.80 while for P it was reported 2.18 ± 0.21, 5.93 ± 0.42 and 9.97 ± 0.33 respectively. The mean BSI of the three layers were 0.06 ± 0.006, 0.08 ± 0.007 and 0.11 ± 0.004 respectively. The Leven test showed good homogeneity of variance for Ca, P and OCT backscatter (0.332, 0.209 and 0.184 respectively). One-way ANOVA yielded significant differences amongst the three groups (P < 0.05) for all three parameters. Post hoc comparison indicated mean of Ca, P and OCT BSI score of all three layers were significantly different amongst each other. **Conclusion:** The mean Ca and P wt \% contents supplements OCT BSI in differentiating infected, affected and healthy dentin.
Immunohistochemical Expression of P16 in Oral Squamous Cell Carcinoma

NYI MAS SITI PURWANINGSIH, AHMAD TARMIDI SAILAN1, SURAYA HANI MOHD SINON2

1Department of Clinical Oral Biology, 2Department of Oral Pathology and Oral Medicine
Faculty of Dentistry, Universiti Kebangsaan Malaysia (UKM)

Email: nyimas.dds@gmail.com, sailan_at@yahoo.com, suraya6179@yahoo.com

Introduction: Ninety-five percentage of oral cancer are classified as Oral Squamous Cell cancer (OSCC). The p16 or p16Ink4A is one of the protein in human cell cycle regulation that can play role as a tumor suppressor gene. Objectives: To detect p16 expressions in oral squamous cell carcinoma using immunohistochemistry (IHC). Materials and Methods: A total of 74 formalin-fixed paraffin embedded tissue were selected for test group, OSCC cases (n=46) and control group hyperplastic oral mucosa (n=28). The cases were retrieved from the archives of the Oral Pathology Laboratory, Faculty of Dentistry, UKM and Institute of Medical Research, Kuala Lumpur. The IHC staining was manually performed using p16 antibody (1:1000) (Abcam) following manufacturer’s instruction and assessed qualitatively (positivity and staining intensity) between test and control groups. Positive and negative controls were used to validate the IHC run. All data were then analysed using SPSS version 22.0 and p values < 0.05 were considered significant. Results: The p16 were found positive in OSCC (96.7%) and in control group (85.7%). There is significantly higher p16 positivity in OSCC compared to hyperplastic lesions (p<0.05). While for comparison between p16 staining intensity, there is no significant difference between OSCC and hyperplastic group (p>0.05). Conclusion: The p16 expression were detected in OSCC and hyperplastic lesions. This finding suggests that p16 can be used as a potential marker for oral malignancy detection.
In-vitro Study on Cariostatic Potential and Marginal Sealing Ability of Glass Ionomer-Based Restorative Materials As Interim Therapeutic Restoration

NURULNAZRA MA¹, S.NAGARAJAN S², ALIDA M²

¹Postgraduate, Department of Operative Dentistry, Universiti Kebangsaan Malaysia; ²Department of Operative Dentistry, Faculty of Dentistry, University Kebangsaan Malaysia.

Email: nareffin@gmail.com

Objectives: The aim of this comparative in-vitro study was to compare four types of conventional GIC based on amount of fluoride release, marginal integrity and ability to increase microhardness of underlying artificial dentinal caries via remineralization. Methods: Standardized cavities were prepared on buccal surface of 60 extracted sound human premolars and artificial caries were induced onto dentinal floor of each cavity. Specimens were randomized into 4 groups of equal numbers and restored with either Fuji VII, Riva Protect, Riva Self Cure or Fuji IX GP Extra. Measurement of fluoride release were done on day 1, 3, 7, 14, 30 and 60. After completion of fluoride measurement, specimens were retrieved and similar restorations were done on lingual surface for microleakage test. Protocols for marginal microleakage test were followed and each tooth were embedded in acrylic resin and vertically sectioned at two places to produce three sections. After sectioning, dentin underlying buccal restorations were subjected to microhardness test while lingual restorations were evaluated for marginal microleakage. Results: For each group, a total of 15 specimens were evaluated for fluoride release and dentin microhardness, whereas 45 specimens were tested for marginal microleakage. Significant differences were seen in fluoride release of different days and materials (p<0.05). The maximum fluoride release occurs on day 1-3 before declining and reaching a plateau. Highest fluoride release was related to Riva Protect, followed by Fuji VII, Riva SC and Fuji IX GP Extra. There was significant improvement of dentin microhardness underneath Riva Protect restorations, but only up to 10um in depth. For marginal microleakage, no significant difference was found between groups (p>0.05). Conclusions: All materials are able to exert cariostatic effects. However, Riva Protect is found to have greatest fluoride release and ability to improve microhardness of underlying dentin.
Low temperature degradation and flexural strength of nano zirconia

INTAN AZIMAH AZMAN\textsuperscript{1}, JASMINA QAMARUZ ZAMAN\textsuperscript{1}, YEW HSU ZENN\textsuperscript{1}, NORZIHA YAHAYA\textsuperscript{2}, ANDANASTUTI MUCHTAR\textsuperscript{3}.

\textsuperscript{1}Department of Operative Dentistry, Faculty of Dentistry, Universiti Kebangsaan Malaysia; \textsuperscript{2}Department of Prosthodontics, Faculty of Dentistry, Universiti Kebangsaan Malaysia; \textsuperscript{3}Department of Mechanical and Materials Engineering, Universiti Kebangsaan Malaysia.

Email: intanazimahazman@gmail.com

Objectives: The aim of this study is to determine the influence of hydrothermal ageing on the tetragonal to monoclinic phase transformation and on the flexural strength of nano zirconia with different grain size comparing to commercially available nano zirconia, Cercon\textsuperscript{®}. 

Methods: Sixty standardized discs specimen of 100nm nano zirconia, 170nm nano zirconia and Cercon\textsuperscript{®} were hydrothermally aged in an autoclave at 134°C and 2 bar for 0, 5, 25, 50 and 100h. The phase transformation was determined by x-ray diffraction (XRD) and microstructures analysis was done with atomic force microscopy. Flexural strength was investigated in a biaxial flexural test. Selected fractured discs undergone FESEM to measure depth of t-m transformation zone. Results: XRD revealed significant increase in the monoclinic phase content of group 100nm nano zirconia and 170nm nano zirconia with increase of ageing time. The Cercon\textsuperscript{®} group also revealed increase of monoclinic phase with ageing time, but it is not significant. The flexural strength of all groups was found to be heterogenous, but all group revealed decreasing of flexural strength after 50 hours of ageing, but gain in strength after 100 hour of ageing. Atomic force microscopy showed morphological changes of samples’ surface topography after ageing. There is a weak correlation between monoclinic phase and flexural strength of material in all groups. Conclusion: This study show evidence of low temperature degradation occurrence with evidence of increasing in monoclinic phase, but does not resulted in a significant deterioration of the mechanical properties.