

<p>66 Are nitric oxide and glutamate involved in orofacial hyperalgesia? LIU H.P.¹, YEO J.F. and *LEONG S.K. Department of Oral & Maxillofacial Surgery, ²Department of Anatomy, National University of Singapore.</p> <p>This study investigates the role of nitric oxide (NO) and glutamate in the transmission of orofacial hyperalgesia induced by subcutaneous injection of 0.5 ml of 4% formalin into the left lateral face of the rat. The pain induced c-fos expressing neurons in the caudal part of the trigeminal nucleus (cSTN) were investigated for the presence of NO and glutamate receptors, GluR2/3 and NMDAR1. To demonstrate NO in these neurons, nNOS immunofluorescence or NADPH-d histochemistry was applied. As preliminary study showed colocalization of the two chemicals, NADPH-d histochemistry was used to indicate the presence of nitric oxide synthase (NOS). Subsequently, colocalizations of NOS/NADPH-d and glutamate receptors, GluR2/3 and NMDAR1 were performed. C-fos labelled nuclei of neurons in the ipsilateral cSTN were located mainly in lamina I and outer layer of lamina II. NOS positive neurons were found mainly in lamina II-IV, around the central canal and in the ventral horn. Very few were observed in lamina I. NMDAR1 positive neurons were found in all layers of the cSTN, whereas GluR2/3 positive neurons were encountered mainly in the superficial laminae. Confocal laser scanning microscope revealed that all c-fos immunofluorescent nuclei were surrounded by NMDAR1 labelled cytoplasm, most of them by GluR2/3 and none by NOS. Some c-fos positive neurons were very close to NOS positive neurons. NADPH-d was colocalized with GluR2/3 or NMDAR1 in a small population of neurons in lamina II-IV. <u>The present study indicates that orofacial pain induced c-fos expressing neurons in the cSTN did not synthesize NO, but could be modulated by NO synthesized and diffused from adjacent NOS positive neurons. It is likely that some of the c-fos positive neurons are projection neurons and the NOS positive ones are local interneurons. Most of c-fos positive neurons and a small number of NOS positive neurons may respond to glutamate released from primary afferents through NMDA and AMPA receptors.</u> This study is supported by RP3960331 from NUS.</p>	<p>67 Applications of Cytologic Techniques in the Diagnosis of Oral Mucosal Lesions. TRAN K. CUC * (Faculty of Odonto-Stomatology- University of Health Sciences, HCM City, Vietnam).</p> <p>In order to assess the accuracy of cytologic diagnosis techniques compared to histopathological technique, a prospective study was carried on 224 patients consulting the Cancer Center in HoChiMinhcity for precancer/cancer lesions of the oral cavity. Fine Needle Aspiration technique (FNA) was performed on nodular and infiltrating lesions (102 cases), and Exfoliative Cytology technique on exophytic and ulcerative lesions (122 cases). All cytologic diagnoses were thereafter confirmed by conventional histopathological diagnosis technique using punch biopsy. The study issued the following results:</p> <ul style="list-style-type: none"> - The accuracy of cytologic diagnosis was respectively of 86,2% for FNA and 73,5% for Exfoliative Cytology. - No case with false-positive diagnosis was observed. - False-negative rate was respectively of 12% for FNA and 21,6% for Exfoliative Cytology. <p><u>Both techniques were found to be safe, simple to perform and accurate for the primary diagnosis of oral cancer and precancer lesions. Compared to excisional biopsy, they are less aggressive and more easily accepted by patients. FNA technique would be recommended for lesions growing in depth and Exfoliative Cytology for lesions growing more in surface.</u></p>
<p>68 Application of Natural Frequency Analysis in the Measurement of Periodontal Attachment Level. C-Y LIN^a, H-M HUANG^a, S-Y LEE^b (Graduate Institute of Oral Rehabilitation Sciences, and ^aInstrumentation Center, Taipei Medical College, Taipei, Taiwan, ROC.)</p> <p>The aim of this study was to develop a new method for detecting the attachment level around teeth, using a non-destructive, less time-consuming and more reliable device. Model Testing and natural frequency analysis were evaluated to achieve these goals. Upper central incisor was chosen and its finite element model was established first. Fifteen dental students of the same age with healthy periodontium were tested. The ICP-type Accelerometer (PCB Piezotronics, Inc., NY, USA) was attached onto the tested incisor. Impulses were triggered by ICP-type Impulse-Force Test Hammer (PCB Piezotronics, Inc.) and received by Accelerometer. The signals derived from Hammer and Accelerometer were then transferred to Dynamic Signal Analyzer (Provave Engineering Inc., Taiwan) and natural frequency values were obtained through Fast Fourier Transfer (FFT) by Signal Doctor software (Provave Engineering Co.). Each incisor was tested for five times. On the other way, fifteen extracted upper central incisors were used in <i>in vitro</i> experiment. The incisors were fixed by a clamp through a rubber contact. The attachment level was altered by lowering the clamping positions at 2mm, 4mm and 6 mm axially away from cemento-enamel junction (CEJ). Finite element method was then used to simulate and fulfill the <i>in vitro</i> experimental design. The results of <i>in vivo</i> study indicated that the natural frequency of human upper central incisors ranged from 710 Hz to 3360 Hz with an average of 1701 ± 679 Hz. Lower attachment level caused decreased natural frequency values. The finite element analysis showed a linear relationship ($Y = -188.27X + 2523.6$; $r = -0.99$; $p < 0.01$; $X =$ attachment level; $Y =$ value of natural frequency) between the value of tooth natural frequency and the attachment level. <u>In conclusion, the natural frequency of human teeth was detectable, sensitive, and reliable by Model Testing. Natural frequency analysis appears to be a useful auxiliary to predict the attachment conditions of teeth.</u></p>	<p>69 Do dry-heat cured dentures fit better? T.W. CHOW^a, Y.Y. CHENG^a, D.M.S. WONG and R.K.F. CLARK (Oral Rehabilitation, University of Hong Kong & UMDS, University of London)</p> <p>Acrylic resin dentures exhibit certain unavoidable dimensional changes. Processing shrinkage and expansion due to water uptake are two important aspects influencing their dimensional accuracy. To investigate linear dimensional changes of dentures processed by dry and wet heat with different rates of cooling, and at water saturation, fine crosses marked on tin-foil inserts were placed at the incisive papilla and tuberosity regions of edentulous maxillary casts and incorporated into the dentures during processing. A travelling microscope was used to measure the distances between the reference points. Water uptake and water content were determined by the mass changes of the dentures using an electronic balance. Results showed that dry heat cured and water bath cured acrylic resin dentures exhibited similar shrinkage of 0.42 to 0.58% at water saturation (95% CI). The amounts of water sorption of dentures processed by both methods (0.50 and 0.48 mass%) were similar (95% CI) and their associated expansion did not entirely compensate for the processing shrinkage. The initial water content of dry heat cured dentures (1.77 mass%) was unexpectedly higher than that of wet heat cured dentures (1.67 mass%). The rate at which the dentures cooled had no effect on their water uptake and initial water content (95% CI). <u>Water uptake of dry and wet heat cured acrylic resin dentures after deflasking was in both cases low and the shrinkage of the dentures at water saturation was similar. The dimensional accuracy of dentures cured by dry and wet heat is therefore similar.</u></p>
<p>70 Study of Obturator Prosthesis through Vibration Analysis. M. OKI^a, H. TANIGUCHI, T. INOUE and T. OHYAMA (Tokyo Medical and Dental University, Tokyo, Japan)</p> <p>Obturator has been used extensively in the functional and esthetic rehabilitation of maxillectomy patients. The purpose of this study was to evaluate the vibration movement of four types of obturator <i>in vitro</i>. Four bulbs were used in this study: a solid (S), an open hollow (O1), a lighter open hollow (O2), and a close hollow (H). The modal analysis of vibration was carried out in order to find the best form to protect the abutment teeth in the Aramany Class II of post surgical maxillectomy defects. The obturator was excited by the Vibration Generator while the LV-1300 Laser-Doppler Vibrometer measured vibration at various points. The CF-6400 FFT Analyzer was used for calculating the frequency response functions, modal shapes and the amplitudes at each measurement point and then analyzed on the PC-9821Xn personal computer with the Vibrant-Win modal analysis software. The results showed the modal shapes were almost the same for O1, O2, and H types, except for S type at 350-500Hz, while the amplitudes at the points of the clasps at the natural frequency (690Hz) for H type were the significantly smallest (means H: 0.172 ± 0.068, S: 1.660 ± 0.689, O1: 1.780 ± 0.745, O2: 0.789 ± 0.310 mm/Kg) with ANOVA and Fisher's PLSD ($p < 0.05$). <u>Based on these results, the H type obturator would be suggested in Aramany's Class II maxillary prosthesis from the point of view of vibration in modal analysis.</u></p>	<p>71 Clinical Investigation of an Experimental Glass Ionomer Restorative: Preliminary Findings. Y. LUO^a, S.H.Y. WEI, M.W. FAN^b (Faculty of Dentistry, University of Hong Kong, Hong Kong, ^aSchool of Stomatology, Hubei Medical University, Wuhan, China.)</p> <p>The purpose of this study was to determine the safety and efficacy of a new GIC (K-0086) and compare its clinical performance to Fuji IX GP when used in the ART technique for the restoration of posterior primary teeth and young permanent teeth. A clinical trial was conducted in December 1997 in Wuhan, China. The subjects who were aged between 6-14 years were chosen from 1 primary school and 1 secondary school and each subject had 1-2 bilateral matched pairs of carious posterior teeth that required either Class I or Class II restorations. A total of 1327 pupils were screened and 101 bilateral matched pairs of ART restorations were placed in 92 pupils. 55 pairs of restorations placed in permanent teeth were Class I restorations; 14 pairs of restorations placed in primary teeth were Class II restorations. None of the subject dropped out at the baseline evaluation (5-14 days after treatment). The examiners did not detect any signs or symptoms of hypersensitivity or nonvitality or any adverse effects. For the indirect evaluation of wear performance, impressions were taken of each restoration. There was no failure restoration according to the evaluation criteria (score 2,3,4,8). Four fillings had slight marginal defects of which three were for Fuji IX GP and one for K-0086, and they were all Class II restorations. At the 6 month recall, only one subject dropped out of the study. In primary teeth, 86.7% of K-0086 restorations and 93.3% Fuji IX GP restorations were classified as 'success'. The failure cases including two fillings having gross defects and a few being dislodged in both groups. Nearly all of the fillings in permanent teeth were present and sound. The 6 month success rates were 98.2% for K-0086 and 100% for Fuji IX GP. There was no statistically significant difference between the two groups in either the permanent teeth or primary teeth. Based on the preliminary finding, it is concluded that <u>K-0086 may provide a clinical performance comparable to that of Fuji IX GP which is specially manufactured for ART.</u> (This study was partially supported by Dentsply De Trey.)</p>
<p>72 Inhibition of Demineralization by Restorative Materials on Artificially Caries Challenged Enamel. H.K. YIP^a, W.T.C. LAM^b and R.J. SMALES^a (^aFaculty of Dentistry, The University of Hong Kong, ^bDepartment of Health, Hong Kong Government)</p> <p>The objective of this study was to assess effects of fluoride release of restorative materials on artificially demineralized enamel, using polarising microscopy. Thirty recently-extracted sound permanent premolars removed for orthodontic reasons were collected. Standardized coronal buccal cavities (4 mm x 2 mm x 1.5 mm) were prepared in these teeth with tungsten carbides #330 in an air turbine handpiece, with water spray. These cavities were restored with two resin-modified GICs (Fuji II and Photac-Fil), two conventional GICs (ChemFil Superior and Fuji IX), a compomer (Dyract) and a composite (Z100) according to manufacturers' instructions. The restored teeth were thermocycled and subsequently placed in demineralizing solution for four weeks. Fluoride release from specimens was also measured at the end of four weeks. Bucco-lingual planoparallel sections of 100µm were prepared and examined using a light polarising microscope, and measurements were taken using an image analysis software. One-way ANOVA and Tukey-Kramer post-tests were used for analyzing any differences in demineralization among the groups of materials near the cavity margins. Differences in the reduction of demineralization depths were significantly different between Z100 and all of the glass-ionomer cements. There was a trend showing that the glass-ionomer cements with less fluoride release, had smaller depths of demineralization inhibition, and those with higher release had larger values. <u>The findings in the coronal and cervical sections support the inhibition ability of the glass ionomer cements near cavity margins.</u> (Financial support from CRC Grant 337/252/0004, The University of Hong Kong.)</p>	<p>73 Effects of particle-reinforcement on flexural strength of RMGIC. S. MUDAMBI^a, A. YAP^b, M. LI^c, C.L. CHEW^b and J. NEO^d (^aNational University of Singapore, ^bInstitute of Materials Research and Engineering, Singapore)</p> <p>The aim of this study is to determine the effects of particle-reinforcement on the flexural strength of a resin-modified glass ionomer cement (RMGIC). Zirconia silicate microfiller complexes were introduced into a RMGIC (Fuji II LC) at 2% (Z2), 4% (Z4) and 6% (Z6) powder weight increase using an ultra-high speed dispersion technique. The manufacturer's recommended powder: liquid ratio of 3.2g: 1g (control), together with RMGIC mixed at 2% (G2), 4% (G4) and 6% (G6) powder weight increase were used for comparison. Five specimens (25mm x 2mm x 2mm) were made for each group based upon ISO4049 specifications. The specimens were cured using 20 secs over-lapping irradiations and stored in distilled water at 37°C for 24 hours. Flexural strength tests were then conducted with an Instron universal testing machine using a 1 kN load and a cross-head speed of 0.5 mm/min. Results were subjected to Kruskal-Wallis and Mann-Whitney tests at a significance level of 0.05. Ranking from lowest to highest flexural strengths was as follows: $G2 < G6 < Z6 < Z4 < control < Z2 < G4$. <u>A 2% addition of zirconia silicate microfiller complexes (Z2) and a 4% addition of glass ionomer powder (G4) resulted in significantly higher flexural strengths when compared to the control.</u></p>