



<b>Title</b>	<b>Technique sensitivity in bonding to acid-etched dentin</b>
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### 8 Microbial flora of pulp of human deciduous teeth with deep caries. WANG Jun\* and Z. LIU (The School of Stomatology, Shanghai Second Medical University, Shanghai, China)

The aim of the study was to investigate the bacterial composition of infected pulp of human deciduous teeth with deep caries. Twelve deciduous teeth with deep caries not exposing the pulp chamber were selected for the study. Three teeth were sensitive to cold or heat, while the others had no symptoms. The bacteria of the pulp were isolated and identified in 80%N<sub>2</sub>, 10%H<sub>2</sub>, 10%CO<sub>2</sub>, and in 90%N<sub>2</sub>, 10%CO<sub>2</sub>, respectively. The results showed that the CFU of the symptomatic teeth was higher than that of the symptomless teeth, but the difference was not significant ( $p > 0.05$ , *t*-test). In the two groups, the bacterial composition of pulp was similar, and similar to the composition of deep caries. The percent of *S. mutans* and *Lactobacillus* to the total cultivated bacteria were much higher than the other bacteria ( $p < 0.01$ , Kruskal-wallis test), and the frequency of *S. mutans* and *Lactobacillus* were much higher than the other bacteria ( $p < 0.05$ ,  $\chi^2$ -test). Obligate anaerobes such as *Peptostreptococcus*, *veillonella*, *Fusobacterium* and *Prevotella* were isolated, but the frequency and the percent to the total cultivated bacteria were very low. We inferred that the infection of the pulp in deciduous teeth due by caries was mainly caused by cariogenic microaerophilous bacteria. This study was supported by the Young Research Foundation from Shanghai educational committee. Microbial flora of pulp of human deciduous teeth with deep caries. Wangjun and Liuzheng (The school of stomatology, Shanghai second medical university, Shanghai, China)

### 9 Patient centered outcome measures in oral surgery: validity and sensitivity issues. MB COMFORT\*, C McGRATH, ECM LO and Y Luo (Faculty of Dentistry, University of Hong Kong, Hong Kong SAR, CHINA)

**OBJECTIVE:** The performance of a generic and two oral health specific patient centered outcome measures were evaluated in the oral surgery setting for validity and sensitivity. **METHODS:** One hundred patients undergoing third molar surgery were recruited in a prospective cohort study. Participants self-completed a questionnaire incorporating a generic health (SF-12) and two oral health specific outcome measures (OHIP-14, OHQoL-UK\*) prior to surgery, daily during the immediate postoperative period and at the review appointment (7-days later). **RESULTS:** Ninety-seven completed the study. History of 'taking time off' work/study because of pericoronitis during the past year was associated with preoperative OHIP-14 ( $P = 0.003$ ) and OHQoL-UK\* ( $P = 0.007$ ) scores. There were significant differences in SF-12 ( $P < 0.001$ ), OHIP-14 ( $P < 0.001$ ), OHQoL-UK\* ( $P < 0.001$ ) scores during the immediate postoperative period compared to preoperatively, when symptomatic sequelae of surgery were prevalent. At the review appointment, OHIP-14 ( $P = 0.05$ ) and OHQoL-UK\* ( $P = 0.05$ ) scores were associated with clinical findings. The measures demonstrated validity and sensitivity in the oral surgery setting. However, the oral health specific measures were more discerning. (Sponsored by a grant from URC, HKU.)

### 10 Patient Controlled Sedation (PCS) with Propofol in Minor Oral Surgery. C RODRIGO\*, M IRWIN (Department of Anaesthesiology, University of Hong Kong, Hong Kong SAR, CHINA)

The degree of sedation, necessary to tolerate surgery is best known to the patient him or herself. In order to find out the benefits of patient controlled sedation with Propofol, following instructions on how to conduct the technique, 38 healthy patients undergoing minor oral surgery under local anaesthesia were allowed to have 18 mg increments of Propofol at a lockout interval of one minute from a Graseby 3300 PCA pump, to sedate themselves to undergo the surgical procedure. The duration of surgery lasted 5 to 59 minutes, 20 were moderately and 14 were deeply sedated, 4 lost consciousness. Those who lost consciousness regained consciousness within 2 minutes. Vital signs were stable in all patients, 14 were talkative and 10 complained of pain along the vein. Operating conditions were good in 27, fair in 10 and poor in 1. The majority, 33 patients were relaxed and were willing to undergo the same procedure again. 7 had total, 14 had partial and 17 had no amnesia to the surgical events. Thus PCS with Propofol sedated and relaxed patients undergoing minor oral surgery. Though 4 lost consciousness they recovered within 2 minutes due the rapid metabolism of Propofol, indicating the safety of Propofol in PCS. Talkativeness stops with the start of oral surgery and pain along the vein can be eliminated by mixing Propofol with lignocaine. Amnesia produced with Propofol was not as profound with midazolam.

### 11 Expression of S-100 Protein in Rabbit TMJ after Disc Displacement. Z. GU\*, Y ZHANG, J HU, T SHIBATA, J FENG (Affiliated Hospital, Zhejiang University, PR CHINA)

A total of 34 Japanese white rabbits were used to study S-100 protein during remodeling of temporomandibular joint (TMJ) after disc displacement. Disc displacement of right TMJs of 21 rabbits were performed and 3 each sacrificed at 1,2,4,6,8,10 and 12 weeks post-surgery. Eight rabbits were used as sham controls and two each sacrificed at 1,2,4,8 weeks post-operatively. The remaining 5 rabbits were used as normal controls. Ultrasensitive Streptavidin-Peroxidase (S-P) method and Mouse anti-S-100 protein monoclonal antibody (NeoMarker, USA) were then used for immunohistochemical studies. All experimental animals tolerated the surgical procedures well. The microscopy of paraffin embedded specimens showed neither chondrocyte nor immunolabelled cells in the posterior attachment of normal TMJ. At 1 week following disc displacement, some fibroblasts weakly expressed S-100 protein and at 2 weeks, some degree of immunostaining of isolated chondrocytes was observed. At 10 weeks, foci of chondroid metaplasia were noted where the chondrocytes and fibroblasts nearby or within the focus strongly expressed S-100 protein. Still later, at 12 weeks, immunoreactive chondrocytes were noted in the synovial membrane. We conclude that the "disc-like" changes were found in the posterior attachment of the TMJ following disc displacement and S-100 protein might be involved in this process.

### 12 Noise Level and Validation of a Digital Subtraction Radiography System Using Digora Images. KY ZEE\* and MS WOO (Faculty of Dentistry, University of HK)

The aims of this study were to determine the noise level and to validate a digital subtraction radiography (DSR) system using Digora images for quantification of alveolar bone changes by means of computer assisted densitometric image analysis (CADIA) *in vitro*. Noise levels were determined using 10 standardized periapical radiographs of the same lower molar region in a human dry skull. For validation of the system, radiographs were taken before and after bovine bone particles in measures with increments of 2mg weighing from 2mg to 20mg were added into each socket of 3 dry skulls. Radiographs were taken using Digora imaging plates with a piece of 1-cm thick perspex placed in the path of the X-ray beam adjacent to the skull to simulate soft tissue effects. Digora\* for Windows\* Version 1.5 was used to process the image plates after the scanner had been calibrated in accordance with the manufacturer's instructions. The images were then exported to an 8-bit 'BMP' file for image processing and subjected to alignment, normalization and subtraction. Appropriate regions of interest (ROIs) were selected and their CADIA values were calculated for the determination of noise levels, and correlations between the CADIA values and the actual bone mass were performed. When the threshold value was  $\geq 7$ , the percentage of pixels deviating from the set threshold value was small (0% - 9.1%). There were statistically significant correlations between the actual bone mass and the CADIA value for the sockets ( $p < 0.001$ ,  $r^2 = 0.86$ ). An acceptable noise level and a high and statistically significant correlation between the actual bone mass and CADIA value in Digora images was obtained by using the present DSR system. This suggests that the system could be suitable for the detection of alveolar bone changes using Digora radiographic images. (This study was supported by HKU CRCG Grant No. 10201964)

### 13 Effect of resin hydrophilicity on tracer penetration. \*CKY YIU<sup>1</sup>, FR TAY<sup>1</sup>, DI PASHLEY<sup>2</sup>, NM KING<sup>1</sup>, BI SUI<sup>3</sup>, A ITTHAGARUN<sup>1</sup> (Univ of Hong Kong, China; <sup>2</sup>Medical College of Georgia, USA; <sup>3</sup>Bisco, Inc., USA)

This transmission electron microscopy (TEM) study examined the extent of silver nitrate penetration into four polymerized resin blends with increasing degree of hydrophilicity after a period of 24 h. The four resin blends were polymerized in an experimental composite inlay processing chamber under pressurized nitrogen maintained at 55.16 KPa and light-activated for one complete cycle at 125°C for 10 min. The resin blocks were sectioned occluso-gingivally into multiple 0.9 x 0.9 x 5 mm resin beams, and immersed in 50% basic, ammoniacal silver nitrate for 24 h, then exposed to a photodeveloping solution and prepared for TEM. The percentage distributions of silver deposits were compared using Kruskal-Wallis one-way analysis of variance (ANOVA) on ranks and Dunn's multiple comparison tests. No silver uptake occurred in the two most hydrophobic resins (Groups I & II). The percentage distributions of silver deposits in the more hydrophilic Group III (6.2,3,1.35%) and IV (5.08+1.09%) resins were significantly higher ( $p < 0.05$ ) than were found in the more hydrophobic resins but Groups III and IV were not significantly different from each other. The intensity of silver uptake increased with hydrophilicity of the resin blends. TEM examination revealed two types of silver deposits: fine spotted-type silver grains and islands of interconnecting electron-dense clusters of silver grains (water trees). The former represented regions of increased hydrophilicity within the resins. The latter represented water-filled channels that were initiated by surface microcracks. It is concluded that resin blends that contain increased concentration of hydrophilic and ionic resin monomers such as those utilized in composites or dentin adhesives are liable to water sorption, expediting the degradation of the polymerized resin matrices through leaching of these resin components.

### 14 Technique sensitivity in bonding to vital acid-etched dentin. <sup>1</sup>A ITTHAGARUN\*, <sup>2</sup>M FERRARI and <sup>1</sup>FR TAY (University of Hong Kong, China, <sup>2</sup>University of Siena, Italy)

Despite numerous *in vitro* studies on the efficacy of the moist bonding technique, the necessity to avoid collapse of the collagen matrix after acid-etching of clinically relevant, vital human dentin has not been substantiated *in vivo*. The objective of this study was to examine, with the use of transmission electron microscopy (TEM), the ultrastructure and extent of tracer penetration in resin-dentin interfaces created in deep, vital acid-etched dentin under different degrees of hydration of the demineralized collagen matrices. Tooth preparation was performed on the labial surface of anterior teeth located occlusally in enamel and cervically beyond the cementodentinal junction. Cavities were etched with a 37% phosphoric acid gel for 20 sec. Bonding was performed with Excite DSC (Vivadent). Four groups, 4 teeth/group, were elected to represent different conditions of the acid-etched dentin prior to adhesive application: *in vitro* control group (moist bonding), *in vivo* control group (moist bonding), *in vivo* excessively dry group and *in vivo* excessively wet group. Each bonded cavity was restored with Tetric Flow (Vivadent), a light-cured flowable resin composite. Specimens were either completely demineralized in EDTA and examined after staining, or immersed in an ammoniacal silver nitrate tracer before TEM processing and examined undemineralized and unstained. The morphology of the resin-dentin interfaces and the patterns of silver deposition were similar within adhesive and hybrid layers created *in vitro* or *in vivo*. No hybrid layer was observed *in vivo* after excessive drying. Excessive wetting *in vivo* resulted in more extensive nanoleakage and water tree formation along resin-dentin interfaces. It is concluded that technique sensitivity previously reported *in vitro* with the use of a moist bonding technique on acid-etched dentin is applicable *in vivo* when bonding to vital dentin.