Title	Surface characterization of noncarious cervical sclerotic dentin following treatment with different acidic conditioners
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25 Oral Health Status of Chinese with Down syndrome – A pilot study

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Down syndrome (DS) is one of the most common clinically recognizable categories of mental subnormality. However, studies on Chinese with DS are very limited. The purpose of this study was to conduct an oral health survey on Chinese with DS in Hong Kong. Eighty-five out of 380 members of the Hong Kong Down Syndrome Association participated in this survey. The participants were divided into 3 groups. Group 1 was 18 participants aged below 6 with primary teeth. Group 2 was 22 participants aged 6 to 12 with mixed dentition. Group 3 was 45 participants aged 13 to 34 with permanent teeth. The dmft and DMFT caries index was used to measure the caries experience and the Community Periodontal Index, CPI, was used to assess the periodontal condition. Twenty-five participants (29%) had congenital heart disease. Overall there was 59% of participants had no caries experience. The mean dmft and DMFT were 0.8±1.5 and 2.3±4.0. Twenty-six participants aged above 16 with no heart disease were examined for periodontal health. The percentage distribution of CPI score of 0 to 4 were 0%, 4%, 11%, 77% and 8%. To represent the results in terms of treatment needs, all of them require oral hygiene instruction. On top of it, 96% requires scaling as well. During the examination, some special oral features and dental anomalies of the participants were observed; macroglossia was seen in 29% of the participants, 12% of the participants had fissured tongue, 69% of the participants were found to have a deep palatal vault. 35% of the participants have an open mouth posture, 21% participants had peg-shaped lateral incisors and 27% of the subjects had missing lateral incisors. In summary, caries experience was low and prevalence of periodontal disease was high in this group of Chinese with DS. Special oral features and dental anomalies were also common in DS.

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Potential Use of ART Technique in the Management of Dental Caries in the school dental service in Indonesia. RR. Darwita*, A. Raharjo, A. Bahar, F. Setyawati and J. Wisnu (Dept. of Dental Public Health and Preventive Dentistry, Faculty of Dentistry University of Indonesia)

Extraction is the most common dental treatment provided for primary schoolchildren in Jakarta and other areas in Indonesia. In an effort to improve the situation, a simple treatment technique based on the concept of minimal intervention called the Atraumatic Restorative Treatment (ART) technique was introduced in the school dental health service. Previous studies had shown that ART is suitable in the management of both enamel and dentinal caries. This study describes the prevalence of dental caries which can be indicated for ART Technique. A random sample of 270 schoolchildren aged between 11 to 14 years from 6 primary schools in urban Jakarta and rural Tanggerang participated in the study. Oral examination was carried out in the schools under natural light and using mouth mirrors and explorers. The data collected was analyzed using a statistical package. Chi-square test was used for test of significance. Results showed that the proportion of caries free teeth is slightly higher in Tanggerang (53.4%) than Jakarta (46.6%). However, the difference is not significant. Of the 626 permanent teeth found to have caries, 63.1% were caries not reaching the pulp and suitable to be treated with ART technique. When comparing by location, there was no significant difference between the proportion of teeth with enamel caries in either Jakarta (50%) or Tanggerang (50%). However, more dentinal carious teeth were found in Jakarta schoolchildren (64.3%) as compared to the more rural Tanggerang (35.7%). The difference is found to be significant at p<001. The findings showed that ART technique has a potential in preventing the expansion of initial carious lesions in primary schoolchildren in Jakarta and Tanggerang.

27 TEM study on application of phosphoric acid and self-etching primer to sclerotic dentin.

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This study critically examined, with the use of transmission electron microscopy (TEM), surface features of sclerotic dentin after conditioning with: Group I, a self-etching primer, Clearfil Liner Bond 2V (CLBV; Kuraray) for 30s; Group II, a 32% phosphoric acid gel (Uni-Etch, Bisco) for 15s. The objectives were to clarify several unresolved issues: a) whether the surface zone of sclerotic dentin is hypermineralized and/or devoid of collagen; and b) characteristics of the corel-like projections within the surface zone from the deepest part of the wedge-shaped defect. Ten bicuspids with deep, noncarious, cervical sclerotic lesions were randomly divided into two groups. They were gently cleaned with a slurry of chlorhexidine and pumice. In Group I, CLBV adhesive resin was applied to the primed dentin surface. In Group II, CLBV primer was applied to the phosphoric acid-conditioned dentin, followed by CLBV adhesive resin. One half of each tooth was demineralized in EDTA while the other half was left undemineralized. Specimens were post-fixed, dehydrated and embedded in epoxy resin. Both undemineralized and demineralized ultrathin sections were prepared for TEM examination. Results: undemineralized, unstained sclerotic dentin from Group I showed a surface hypermineralized zone between 300-500 nm thick, within which elongated, electron-dense crystallites were uniformly arranged perpendicular to the dentin surface into rod-shaped structures. The surface zone was also evident in stained, demineralized sections, but appeared amorphous. Collagen was sparse and those immediately beneath this surface zone showed evidence of denaturation. Along the deepest part of the wedge-shaped defect, bacteria were trapped within the surface zone. In Group II, only a very thin electron-dense surface zone could occasionally be seen after phosphoric acid-conditioning. Areas exhibiting this zone in demineralized sections were devoid of intact, banded collagen. Resin infiltration into the underlying demineralized dentin, however, was not impeded and a hybrid layer of about 5 µm could be seen. It is hypothesized that the surface zone of sclerotic dentin is a layer of denatured collagen that has undergone remineralization. In the deepest part of the defect that is least assessable to cleaning, bacteria were trapped within this zone during the course of remineralization.

28 OCA Wear of Composite Resins: Influence of Contact Stress.

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Occlusal contact area (OCA) has been shown to exceed contact free area wear by three to five times in clinical studies. A reciprocal compression sliding wear device was used to investigate the influence of contact stress on OCA wear of four composite restoratives (Silux, Z100, Ariston and Surefil). An amalgam restorative (Dispersalloy) was used as control. The pattern and mechanisms of wear, and the relationship between wear and composite surface hardness were also studied. 30 wear specimens (8x4x2 mm) and 6 hardness specimens (3x4x2 mm) were made for each material. Wear specimens were tested at 20 to 60 MPa contact stresses against SS 304 counter-bodies with artificial saliva as lubricant up to 20, 000 cycles. Wear depth (µm; n = 6) was measured using profilometry. Hardness testing (KHN) was done with a digital microhardness tester (load = 500 gf, dwell time = 15 secs). Results were analyzed by ANOVA/Scheffe's ($p < 0.05$). At all contact stresses, the amalgam alloy had significantly better OCA wear resistance than the composites. Amalgam wear ranged from 5.9 to 11.8 µm for 20 to 60 MPa contact stress. The wear of Z100 (59.6 to 378 µm) was significantly greater than Silux (31.5 to 64 µm), Ariston (24.4 to 55.2 µm) and Surefil (24.8 to 81.4 µm) for the different contact stresses. Correlation between contact stress and wear was significant for all restoratives with correlation coefficient (r) ranging from 0.96 for Z100 to 0.88 for Ariston. The wear mechanisms for the different composites varied depending on the contact stress and their microstructure. The influence of contact stress on wear was material dependent. Increased contact stress resulted in increased OCA wear. There was no significant correlation between restorative hardness and wear.

29 Surface characterization of noncarious cervical sclerotic dentin following treatment with different acidic conditioners.

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There is concern that some acidic conditioners used in bonding may not be strong enough to adequately etch noncarious sclerotic dentin, a clinically relevant substrate. This study examined, with the use of scanning electron microscopy (SEM), morphological features of sclerotic dentin following conditioning with : Group I, a 32% phosphoric acid gel (Uni-Etch, Bisco, USA) for 15 s; Group II, a self-etching primer (Clearfil Liner Bond 2V, Kuraray, Japan) for 30 s. Twenty bicuspids with deep, buccal, noncarious, cervical wedge-shaped lesions were randomly divided into two groups. Another twenty sound bicuspids with artificial wedge-shaped defects prepared on buccal cervical dentin were used as a control for the two groups. They were gently cleaned with a slurry of chlorhexidine and pumice using a brush. After the conditioning treatment, each specimen was cryofractured into two halves through a pre-formed slit from the lingual surface. In Group II, the self-etching primer was dissolved in absolute ethanol to reveal the features of the conditioned dentin. Specimens were dehydrated in ascending grades of ethanol and further dried with hexamethyldisilazane (HMDS) to prevent collapse of the conditioned surface. They were prepared for SEM examination of the occlusal, cervical and deepest part of the wedge-shaped lesions. In Group I, exposed sclerotic casts protruded from the surface of the phosphoric acid-conditioned sclerotic dentin. Tubules devoid of sclerotic casts were rendered patent. A 5 µm thick layer of demineralized intertubular collagen could be identified, sometimes with granular surface remnants. In Group II, a surface granular zone remained along the entire surface of the sclerotic lesions. The underlying dentin beneath the surface zone was undemineralized and many tubules were blocked with sclerotic casts. Within the deepest part of the wedge-shaped sclerotic lesions in Group II, the surface zone was substantially thickened, and in addition, contained corel-like structures. This surface feature was also present discontinuously in the deepest part of the "wedge" in Group I. It was concluded that bonding strategies that rely on resin infiltration into demineralized dentin could be hampered by the reduced susceptibility to acid demineralization in sclerotic dentin, particularly when a self-etching primer was used.

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Adhesion of Dentin Bonding Systems to Endodontically Treated Teeth. T. NIKAIDO, N. NOZAKI, M. NAKANO, M. UMINO, and J. TAGAMI (Department of Operative Dentistry, Tokyo Medical and Dental University, Tokyo, Japan).

The purpose of this study was to evaluate the bond strengths of three different types of dentin bonding systems to teeth prepared for endodontic treatment. Access cavity preparation and removal of pulpal tissue were performed in bovine incisors. The root canals were treated with either saline (control), chemical irrigants of 5% sodium hypochlorite and 3% hydrogen peroxide (CI), or chemical irrigants and an antimicrobial agent, formalin tricresol (FC). After storage in water for 1 week, the dentin surface was ground to a flat surface with 600-grit SiC under water. The area for bonding was demarcated with a vinyl tape (4 mm-in-diameter hole), and bonded using either Clearfil Liner Bond 2V (LV2V; Kuraray, Japan), Single Bond (SB; 3M, USA), or Superbond D-Liner Dual (SD; Sun Medical, Japan). After storage in water for 1 d, tensile bond strengths were measured using a universal testing machine at a crosshead speed of 2 mm/min. Ten teeth were tested for each group. The tensile test results (MPa) were as follows:

	LB2V	SB	SD
control	16.5 (3.9)	14.8 (4.5)	8.8 (1.2)
CI	14.3 (3.1)	11.9 (3.7)	8.5 (3.3)
FC	13.1 (3.1)	9.8 (2.5)	9.7 (4.6)

Mean (SD), Vertical bars indicated no significant difference ($p<0.05$).

The chemical irrigants and the antimicrobial agent did not affect the bond strengths of three dentin bonding systems to dentin.

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Bond Strengths of Compomers Using Two Dentin Adhesive Systems
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The compomers have been developed in the 1990s,which combine the technology of the glass-ionomer cements and resin composites.These materials include simple-step bonding systems,which are simple to handle,but provide lower bond strengths to dentin. The purpose of this study was to improve the bond strengths of three commercially available compomers Xeno (Sankin Kogyo), Dyract AP (Detrey/Dentsply), and F2000 Compomer (3M) to dentin using two recent dentin adhesive systems.The dentin bonding systems were used Clearfil Liner Bond 2V (Kuraray) and Single Bond (3M), and the resin composites that were used as control were Clearfil AP-X (Kuraray) and Z100 (3M).Freshly extracted bovine teeth, stored frozen, were ground with # 600-grit silicon carbide paper under running water to form flat dentin surfaces.The bonding area was demarcated with a vinyl tape in which a 4 mm diameter hole was cut in the center.Surface treatment was performed following each manufacture's instruction and light-cured for 40 seconds.Stainless steel rods were cemented over the restorative materials using a resin cement (Panavia 21, Kuraray).The specimens were stored in 37°C water for one day. The tensile bond strength was then measured using a universal testing machine at crosshead speed of 2 mm/min.The data was statistically analyzed using one-way ANOVA and Fisher's PLSD test at the 5% level of significance.

Table. Tensile bond strengths of compomers and resin composites to dentin MPa ± SD, n=10

	Original		SB		LB 2V
Xeno	7.5 ± 3.1*	P<0.05	13.6 ± 5.6	P<0.05	18.5 ± 5.1
Dyract	9.6 ± 3.3	P<0.05	12.4 ± 4.6	P<0.05	16.8 ± 5.6
F2000	12.5±4.2*	NS	13.2 ± 4.2	P<0.05	17.8 ± 5.8
AP-X					17.3 ± 5.7
Z100			16.3 ± 4.4		

* Indicates statistically significant difference among figures by Fisher's PLSD Test ($p<0.05$).

Tensile bond strength of compomers to dentin was significantly increased when recent adhesive resin systems were used.

32 Compressive Strength Evaluation of PFM Crowns under Different Luting Cements.

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Porcelain-fused-to-metal restorations (PFMs) have been successfully used for decades. Metal substructure provides strength while veneering porcelain gives an esthetic appearance. The margin made of metal may show a dark line at the cervical area. In an esthetic zone, margin made of porcelain is recommended. This study was to evaluate the compressive strengths of PFM crowns having metal margin (MM) and porcelain margin (PM) cemented with different cements. 80 extracted of noncarious upper premolar teeth were prepared as a crown preparation, having 90° shoulder, 6° taper, 1.50 mm axial reduction and 2.00 mm occlusal reduction. Duplication were made and used to fabricated crowns having two margin designs: Part I, MM and Part II, PM. Ni-Cr alloy (Heraeus) was used to fabricate substructure and followed with porcelain application (Vita VMK95) according to their manufacturers' recommendations. Crowns were then cemented on their respective teeth under a constant load of 25 N using: Group 1) zinc phosphate cement (ZC, Shofu); Group 2) polycarboxylate cement (PC, Durelon, ESPE); Group 3) glass ionomer cement (GI, Fuji PLUS, GC); and Group 4) resin cement (RC, Super-Bond C&B, Sun Medical). There were 10 crowns/group. Specimens were tested on a universal testing instrument in a compression mode (crosshead speed of 0.5 mm/min). ANOVA and Tukey statistical analyses ($p<0.05$) were performed on a data. Mean compressive strengths (X±SD, MPa) are: Part I; Group 1) 2180±389; Group 2) 2025±279; Group 3) 2171±452; Group 4) 2305±235; Part II; Group 1) 1508±226; Group 2) 1860±247; Group 3) 2360±263; Group 4) 2312±443. There was no significant difference among PFM crowns (MM) cemented with all tested cements. PFM crowns (PM) cemented with ZC and PC showed less resistance to fracture ($p<0.05$). This study indicates that RC and GI are recommended for cementing PFM crowns (porcelain margin). Supported by the Government Research Budget 1991.