Departments

Abstracts

The editor wishes to thank the second-year Comprehensive Dentistry residents at the Naval Postgraduate Dental School, Bethesda, Maryland, for their assistance in preparing these abstracts.

Immediate dentin sealing improves bond strength of indirect restorations. Magne P, Kim TH, Cascione D & Donovan TE. *The Journal of Prosthetic Dentistry* (2005) 94(6) 511-519.

(Division of Primary Oral Health Care, University of Southern California, School of Dentistry, Los Angeles, CA, USA)

Immediate dentin sealing (IDS) is a new approach, in which dentin is sealed immediately following tooth preparation for an indirect bonded restoration, such as a porcelain or composite inlay, onlay, crown or veneer. In this technique, a dentin bonding agent (DBA) is applied and cured prior to making the impression. Compared to traditional delayed dentin sealing (DDS) procedures, IDS has been reported to have several advantages, including the opportunity to apply the DBA to freshly cut, uncontaminated dentin; the ability to prepolymerize the DBA without interfering with the fit of the restoration; and the ability to protect the dentin against bacterial leakage and sensitivity during the provisional phase of treatment. This study evaluated the microtensile bond strength of an indirect composite restoration using the IDS technique compared to the DDS technique.

Fifteen extracted human molars were divided into 3 groups of 5 samples for this study. The occlusal half of the crown was removed from each tooth, creating a flat midcoronal dentin surface. A 3-step bonding system (OptiBond FL, Kerr, Orange, CA, USA) was used according to the manufacturer's instructions for all restorations in their respective study groups. The teeth in the control group were bonded (etch-prime-adhesive, adhesive polymerized) and restored immediately with 1.5 mm-thick increments of Z100 composite (3M ESPE, St Paul, MN, USA), polymerized (Demetron LD, Kerr) for 20 seconds at 600 mW/cm^2. Teeth in the IDS group were bonded (etch-prime-adhesive-polymerized) and provisionalized with Tempfil Inlay (Kerr). The teeth in the DDS group were prepared and provisionalized using Temfil Inlay.

Following provisionalization, the teeth in the IDS and the DDS groups were stored in saline solution for 2 weeks. After this delay, the provisional restorations were removed, and the teeth were cleaned with air-borne-particle abrasion (RONDOflex, KaVo, Lake Zurich, IL, USA and CoJet, 3M ESPE). The teeth in the IDS group received one coat of adhesive resin followed by the indirect composite (Z100, 3M ESPE) restoration. The teeth in the DDS group received the DBA (etch-prime-bond), followed by the indirect restoration. Following all tooth preparations, the non-trimming technique of mictrotensile testing was employed, and each sample was analyzed using stereoscopic microscopy.

The microtensile bond strengths of the control and the IDS groups were 55.06 MPa and 58.25 MPa, respectively. Both were significantly higher than the bond strength of the DDS group, at 11.58 MPa. Most of the failures in the DDS group were interfacial—occurring between the dentin and the DBA. The failures in the Control and the IDS group were roughly equally divided between interfacial failures and cohesive dentin failures. This study indicates that dentin bond strength is greatly increased by sealing freshly cut dentin with a DBA, prior to making impressions for an indirect bonded restoration.

Effects of an intracanal glass ionomer barrier on coronal microleakage in teeth with post space. Mavec JC, McClanahan SB, Minah GE, Johnson JD & Blundell RE Jr. *Journal of Endodontics* (2006) 32(2) 120-122.

(Naval Postgraduate Dental School, National Naval Medical Center, Bethesda, Maryland, USA)

This study evaluated the bacterial microleakage of the remaining gutta-percha in teeth prepared for post space with and without the use of an intracanal glass ionomer cement barrier.

One canal in the distal root of 40 mandibular first and second molars was examined. Each root was instrumented and obturated with gutta-percha, and AH Plus sealer (Dentsply) and post spaces were created. The specimens were randomly divided into 4 experimental groups of 8 teeth, with varying amounts of apical gutta-percha remaining: Group I (3 mm of gutta-percha), Group II (4 mm of gutta-percha), Group III (2 mm of gutta-percha plus 1 mm of Vitrebond [3M Dental Products, St Paul, MN, USA]) and Group IV (3 mm of gutta-percha plus 1 mm Vitrebond [3M Dental

Products]). The specimens were suspended in vials with sterile Rogosa SL broth (Difco) that covered the root ends. An inoculum containing *Lactobacilli casei* was introduced into the vinyl tubing that led into the root canal from the occlusal aspect, and it was changed every 5 days. The number of days required for the samples to become turbid was recorded, and the experiment was terminated on day 92, when the broth of the last experimental tooth turned turbid. The mean number of days for the broth to turn turbid was as follows: Group I, 23.8; Group II, 43.0; Group III, 57.4 and Group IV, 70.5. Analysis of results revealed the following significant differences ($p<0.05$): Group I leaked faster than Groups III and IV, and Group II leaked faster than Group IV.

Glass ionomer proved an acceptable intracanal barrier material and should provide a superior secondary seal for the temporary coronal restoration. In addition, retreatment and ease of removal of the intracanal barrier was considered during selection of the barrier material. An ultrasonic tip can be used to easily remove the glass ionomer barrier. For teeth with a compromised crown:root ratio that requires a post and core, glass ionomer barrier over the gutta-percha could reduce the risk of recontamination of the apical gutta-percha.

The influence of ceramic surface treatment on the tensile bond strength of composite resin to all-ceramic coping materials. Kim BK, Bea HE, Shim JS & Lee KW. *The Journal of Prosthetic Dentistry* (2005) 94(4) 357-362.

(Department of Prosthodontics, College of Dentistry, Yonsei University, Seoul, Republic of Korea)

When all-ceramic restorations fail, the coping material is often exposed, thus requiring bonding to this material for repair. This study tested the tensile bond strength of composite to 4 all-ceramic coping materials that received different surface treatments. The coping materials tested were lithium disilicate ceramic (IPS Empress2, Ivoclar Vivadent, Schaan, Liechtenstein), alumina ceramic (In-Ceram Alumina, Vita Zahnfabrik, H Rauter GmbH & Co, Bad Säckingen, Germany), zirconia ceramic (Zi-Ceram, Dental Graphics Co) and feldspathic ceramic (Duceram Plus, Dentsply Ceramco, Burlington, NJ, USA), which served as the control. Thirty 10 x 2 x 2-mm blocks were made of each material. The different surface treatments were as follows:

1. Airborne-particle abrasion with 50 µm alumina (MicroEtcher, Danville Engineering, San Ramon, CA, USA) under 40 psi for 5 seconds.
2. Airborne-particle abrasion with 50 µm alumina under 40 psi for 5 seconds and etching with 4% hydrofluoric acid (BISCO Inc, Schaumburg, IL, USA) for 5 minutes.
3. Airborne-particle abrasion with 30 µm alumina particles modified with silica acid (Rocatec Soft; 3M ESPE, St Paul, MN, USA) under 40 psi for 5 seconds.

All samples were silanated (ESPE Sil, 3M ESPE), bonded (One-Step, BISCO Inc) and light cured (XL3000, 3M ESPE). Standardized 5-mm composite cylinders (Z100 Restorative, Shade A1, 3M ESPE) were bonded to the ceramic discs. To accommodate the tensile tests, an orthodontic wire was embedded into the composite prior to light polymerization. The samples were stored in saline at 37°C for 72 hours before being subjected to a tensile force at a speed of 2-mm/minute (universal testing machine, Model 6022; Instron Corp, Canton, MA, USA).

The highest mean bond strength (18.9 MPa) was achieved when bonding resin composite to feldspathic porcelain (control) treated with air-borne particle abrasion and acid etch. The alumina and zirconia groups abraded with the silica-modified alumina particles and the lithium-disilicate ceramic treated with air-borne particle abrasion and acid etch demonstrated mean bond strengths statistically equal to the control group. Significantly lower bond strengths were observed for all other test groups.

Effect of yogurt with Bifidobacterium DN-173 010 on salivary *mutans streptococci* and lactobacilli in young adults. Çaglar E, Sandalli N, et al. *Acta Odontologica Scandinavica* (2005) 63(6) 317-320.

(Department of Pediatric Dentistry, Dental School, Yeditepe University, Istanbul, Turkey; Department of Odontology, Pediatric Dentistry, Faculty of Medicine, Umeå University, Umeå, Sweden)

Probiotics are preparations of live bacterial species introduced as food supplements to help restore beneficial bacteria to the host. Various species of lactobacilli and bifidobacteria have been proposed as probiotics to help reduce levels of salivary *mutans streptococci*. This study examines the effect of short-term consumption of yogurt containing bifidobacteria on salivary levels of *mutans streptococci* and lactobacilli in a group of young adults.

Twenty-six healthy subjects between the ages of 21 and 24 were selected. The subjects were caries-free and not currently taking any systemic antibiotics. During the experiment, 5 subjects were dropped due to non-com-

pliance and use of systemic antibiotics, leaving 21 subjects who completed the study.

The experimental probiotic yogurt (Activa; Danone, Istanbul, Turkey) contained Bifidobacterium DN-173 010 (7×10^7 cfu/g). The control yogurt (Danone Natural; Danone, Istanbul, Turkey) contained no live bacteria. The study was designed in a randomized crossover, double blind fashion, so that each subject would consume experimental yogurt and control yogurt for a period of 2 weeks each. Subjects were given instructions to consume yogurt according to the following schedule:

Period 1 (1 week): "run-in" period, no yogurt consumption.

Period 2 (2 weeks): 200 g either experimental or control yogurt daily.

Period 3 (4 weeks): "washout" period, no yogurt consumption.

Period 4 (2 weeks): 200 g either experimental or control yogurt daily.

Immediately before and after periods 2 and 4, salivary bacterial testing was carried out to evaluate *mutans streptococci* and lactobacilli levels, using Dentocult SM (Strip Mutans) and Dentocult LB tests (Orion Diagnostica, Espoo, Finland).

Results showed a statistically significant reduction in salivary *mutans streptococci* following 2-week consumption of the experimental yogurt compared to the control yogurt. A similar reduction in lactobacilli was noted following probiotic yogurt consumption, but the results were not statistically significant. This study helps to illuminate the potential of probiotic bifidobacteria in yogurt as anti-cariogenic agents. Future studies using larger experimental groups, patients with varying degrees of caries risk and longer study periods will help to determine the clinical significance of these findings in regard to caries prevention.

Age-related changes in tooth enamel as measured by electron microscopy: implications for porcelain laminate veneers. Atsu S, Aka P, et al. *Journal of Prosthetic Dentistry* (2005) 94(4) 336-341.

(Department of Prosthodontics, Kirikale University, Kirikale, Turkey)

Enamel is the preferred substrate when bonding porcelain laminate veneer (PLV) restorations. Dentin exposure during tooth preparation can decrease bond reliability. The purpose of this investigation was to determine how enamel thickness changes as a patient ages and the significance of age in the placement of PLV restorations.

Forty human maxillary central incisors planned for extraction were used for this study. The donor subjects ranged from 30-69 years of age. The teeth were extracted, sectioned sagitally and polished in preparation for examination and measurements. Measurements of facial enamel thickness were made 1, 3 and 5 mm above the CEJ using scanning electron microscopy (SEM). Palatal enamel thickness was measured 5 mm above the CEJ. Facial and palatal enamel thickness at the incisal edge, maximum facial-palatal (MFP) width at the incisal edge, physiologic secondary dentin (PSD) height, facial-cervical enamel-pulp distance and the incisal edge enamel-pulp (IEP) distance were examined.

Results showed enamel thickness steadily decreases beginning at approximately age 50. Mean facial enamel thickness values for all teeth examined were 0.31 -/+ 0.01 mm, 0.54+/-0.01mm and 0.75+/-0.02 mm for 1, 3 and 5 mm above the CEJ. MFP, PSD, FCEP and IEP distance increased with age.

Conclusion: Facial enamel thickness above the CEJ decreases with increased patient age. The likelihood of dentin exposure during standard PLV tooth preparation is increased for older patients, especially in the cervical areas.

Restorative treatment of cervical lesions with resin composites: 4-year results. Belluz M, Pedrocca M & Gagliani M. *American Journal of Dentistry* (2005) 18(6) 307-310.

(Department of Medicine, Surgery and Dentistry, University of Milan, Milan, Italy)

Cervical lesions present peculiar restorative challenges. Even with improved techniques and materials, Class V restorations continue to have unpredictable long-term success. This *in vivo* study compared the quality and longevity of Class V restorations in carious and non-carious lesions.

A total of 116 restorations were performed and evaluated on 15 patients (4-10 restorations per patient). Two resin composite restorative materials were used: a flowable (Elite Flo) and a traditional microhybrid (Elite Fil). A wetting agent (Aqua-Prep) was applied to optimize the quality of the dental adhesion with the dental bonding agent (One Step).

For each restoration, USPHS data were collected at 3, 5, 12, 24, 36 and 48 months. In addition, post-operative sensitivity was recorded with a questionnaire distributed to patients using the following criteria: 1) absence of post-op sensitivity, 2) post-op sensitivity from the beginning up to resolution, 3) presence of post-op sensitivity. An electric vitality test was also performed on all

teeth restored before restoration and at the end of the study.

At 48 months, 66% of restorations placed with Elite Fil in carious and non-carious lesion were present. Retention rates for Elite Flo restorations were 65% and 47% for the carious and non-carious lesions, respectively. Post-operative sensitivity was absent in all patients. Vitality was maintained on all teeth treated at 48 months. A decrease in quality of the restorations was recorded with USPHS criteria, with no statistically significant difference between materials tested.

The 2 materials examined in this study performed poorly in the restorations of cervical lesions. Some have suggested that low elastic modulus materials are more compatible with cervical tooth flexure. Interestingly, Elite Flo, with a low modulus of elasticity, performed no better than a traditional resin-based hybrid composite. In addition, its rate of failure increased when used in non-carious cervical lesions where abfraction is often a factor.

Faculty Positions

For a complete list of faculty positions featured in *Operative Dentistry*, go to the Operative Dentistry Home Page: **http://www.jopdent.org/**, click on News, then Academic Positions.

University of Colorado School of Dentistry
Comprehensive Care Program
Department of Restorative Dentistry

The University of Colorado School of Dentistry is seeking applicants for two full-time clinical/teaching track or tenure track positions in the Comprehensive Care Program in the Department of Restorative Dentistry. Responsibilities will include teaching general dentistry, treatment planning and practice management in pre-doctoral, pre-clinical and clinical courses, and active participation in the CU Dental Faculty Practice. A DDS/DMD degree from an accredited US dental school, dental specialty or fellowship training through an accredited program are required. It is highly desirable that candidates for the position have clinical practice experience and be eligible for Colorado licensure. Salary and rank will be commensurate with credentials and experience. Deadline to apply: September 1, 2006 or until the positions are filled. Qualified applicants should send a letter of intent, curriculum vitae and 3 names of reference with contact information to:

Dr Brad Potter, Search Committee Chair
University of Colorado at Denver and Health Sciences Center
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The University of Colorado is committed to diversity and equality in education and employment.

Oregon Health & Science University
School of Dentistry

The School of Dentistry at the Oregon Health & Science University is seeking an energetic, motivated and qualified individual for a full-time position at the level of assistant/associate professor in the Department of Restorative Dentistry, Division of Operative Dentistry. Experience in teaching, research, service and patient care, and excellent interpersonal and communication skills, is preferred. Implant experience, especially teaching at the pre-doctoral level, is considered an additional asset but not a requirement. Specific teaching responsibilities will include participation at the pre-doctoral level in both the clinical and pre-clinical curriculum, with the opportunity to serve as course direction. Candidates should possess a DMD/DDS degree. One day per year (0.2 FTE) will be available for participation in the Faculty Dental Practice. Collaboration in research opportunities is available and encouraged. Salary will be determined by credentials and experience. OHSU is an Equal Employment Opportunity Institution. Interested candidates should submit a letter, curriculum vitae and references to:

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CORRECTION

In *Operative Dentistry* **31-3**, the article, "The Microtensile Bond Strength of Self-etching Adhesives to Ground Enamel," was incorrectly identified as DOI: 10.2341/0539. The correct DOI is: 10:2341-0538.