Editorial

The Impact of Study Clubs on Our Patients
Michael A Cochran

Laboratory Research

Effectiveness of Composite Cure Associated with Different Light-curing Regimes
BJ Neo • MS Soh • JW Teo • AUJ Yap

Clinical Relevance:
Soft-start and turbo cure regimens may be more effective than the standard continuous cure mode.

SUMMARY:
This study investigated the use of various light-curing regimens with standardized light energy density on the effectiveness of cure of a visible light activated resin composite (Z100, 3M-ESPE). A light-cure unit (Variable Intensity Polymerizer (VIP), BISCO Inc) which permitted individual control over time and intensity, was used. The five light-curing modes investigated include Pulse Delay (PD), Pulse Cure (PC), Soft-start (SS), Turbo (T) and Control (C). Effectiveness of cure was established by measuring the top and bottom Knoop hardness of 2-mm thick composite specimens using a digital microhardness tester (n=5, load=500g; dwell time=15 seconds) immediately and at one-day post-polymerization. Data obtained was analyzed using one-way ANOVA/Scheffe’s post hoc test and Independent Samples t-tests (p<0.05). Top KHN observed immediately after polymerization with C was significantly lower than PD. At one day post-polymerization, the top KHN obtained with C was significantly lower than PD, SS and T. No significant difference in bottom KHN was observed among the different curing modes immediately after curing. At one day post-polymerization, the bottom KHN obtained with C was significantly lower than SS and T. Regardless of curing regimens, top and bottom values at one day were significantly higher than those observed immediately after light polymerization. No significant difference in mean hardness ratio was observed among the different curing regimens immediately and one day later. Effectiveness of the cure at the bottom surfaces of composites may be increased by soft-start and turbo polymerization regimens.

Salivary Contamination and Bond Strength of Glass-ionomers to Dentin
Clinical Relevance:
Salivary contamination did not affect the mean shear bond strength of highly viscous glass ionomers to conditioned dentin; instead, it increased the probability of failure at low stresses.

SUMMARY:
This study evaluated the effect of salivary contamination on the shear bond strength of two highly viscous glass ionomer cements (Fuji IX GP Fast and Ketac-Molar Maxicap) to conditioned dentin and assessed the effect of cleaning the contaminated field prior to bonding.

The buccal surfaces of 90 human molars and premolars were ground to expose dentin and the teeth were then set in resin. The specimens were divided into two groups for each material, then further subdivided into three groups of 15 teeth each: Group 1– uncontaminated (control), Group 2– dentin contaminated with saliva, Group 3– dentin contaminated, washed and air dried. The specimens were made by bonding the test material to dentin using a 4-mm diameter gelatin capsule. All specimens were protected with varnish and placed in distilled water at 37°C for seven days prior to measuring bond strength in shear. Fractured surfaces were examined visually and by using SEM to assess mode of failure.

There were no significant differences in mean shear bond strength among the three test groups for either material (ANOVA). However, shear bond strength of Fuji IX to dentin was significantly greater than Ketac-Molar (p=0.019) for all groups. Weibull analysis showed that contaminated (Group 2) specimens had a greater probability of failure at low stresses. Modes of failure were mostly cohesive for Fuji IX and adhesive/cohesive for Ketac-Molar.

In conclusion, salivary contamination did not affect the mean shear bond strength of Fuji IX GP Fast and Ketac-Molar Maxicap to conditioned dentin; however, it increased the probability of failure at low stresses.

Effect of LED Curing Modes on Cusp Deflection and Hardness of Composite Restorations

Clinical Relevance:
Using pulse or stepped curing modes with LED to cure MOD resin composite restorations decreased the polymerization-induced cusp deflection.

SUMMARY:
This in vitro study measured cusp deflection associated with MOD resin composite restorations in maxillary premolars with different curing light modes. Soft-start polymerization may reduce cusp deflection by reducing polymerization shrinkage stress. Forty maxillary premolars were mounted in stone and slot MOD cavities were prepared. The teeth were randomized into four groups: Group A–cavities were etched, bonded and restored with two increments of Z-100 composite. Each increment was cured with an LED curing light (fast curing mode). Group B– similar to Group A except that the LED curing light with pulse curing mode was used. Group C– similar to Group A except that the LED curing light with stepped curing mode was used. Group D– a visible curing light was used for curing the composite. The distance between the indexed cusp tips was measured before the restorations were completed and five minutes after, 24 hours after and two weeks after completion of the restorations. The mean contraction of the cusps in µm at five minutes, 24 hours and two weeks, respectively, for each group was A: 25.4, 16.2 and 8.2, B: 6.4, 3.4 and 2.2, C: 11.6, 7.0 and 4.4, D: 33.0, 21.6 and 15.8. Group D resulted in the highest deflection, Group A was intermediate and Groups B and C were the lowest. Ten samples of the composite for each group with 2-mm thickness were prepared for the Vickers hardness test. No difference among the samples was found.
Fluoride Release/Recharge from Restorative Materials—Effect of Fluoride Gels and Time

ACB Delbem • D Pedrini • JGM França • TM Machado

Clinical Relevance:
A four-minute APF gel application led to a higher fluoride recharge by the tested materials; the resin-modified glass ionomers were the most influenced by this procedure.

SUMMARY:
This study examined the differences in fluoride release and recharge among four restorative materials following treatment with APF or neutral fluoride gel for one or four minutes. Specimens were immersed in 2 mL of deionized water, while fluoride release was measured at 24-hour intervals for 15 days using an ion-selective electrode and analyzer. The materials were then treated with the fluoride gels. The fluoride release was measured for 15 days. ANOVA (p<0.05) showed higher fluoride release for Ketac-Fil before fluoride application and for Vitremer and Fuji II LC after application of APF gel. APF gel yielded higher fluoride release when compared to neutral gel, regardless of the material. Fluoride recharge and release was greater after the four-minute APF gel application, with no difference between the times of application for the neutral gel (p>0.05), except for Ketac-Fil. The pattern of release before and after application of the gels was similar and was higher at day 16 compared to day one for the APF gel for resin materials, with higher release at day 15 compared to the initial for Fuji II LC and Vitremer. It was concluded that RM-GICs were the most effective materials with regards to fluoride release after application of APF gel for four minutes.

Volumetric Polymerization Shrinkage of Resin Composites Under Simulated Intraoral Temperature and Humidity Conditions

A Tiba • DG Charlton • KS Vandewalle • ME Cohen

Clinical Relevance:
Resin composites that polymerize under the warm temperature and high humidity conditions of the oral cavity shrink more than those that polymerize under room temperature and humidity conditions. Using a rubber dam lowers the temperature and humidity in treatment areas and, therefore, may help reduce resin composite shrinkage.

SUMMARY:
This study measured the volumetric shrinkage of resin composites polymerized under temperature and humidity conditions simulating the oral cavity and compared them to those occurring under ambient room conditions. Small, semi-spherical specimens of a microhybrid (Z100), microfill (Filtek A110) and flowable microhybrid (4 Seasons Flow) resin composite were manually formed and light activated for 40 seconds using a halogen light-curing unit (Spectrum Curing Light). The volumetric polymerization shrinkage of 10 specimens of each brand of resin composite was measured using a drop shape analysis unit (Drop Shape Analysis System, model DSA10 Mk2) under each of two temperature/relative humidity conditions: room conditions (22 ± 2°C and 60 ± 5%) and those simulating intraoral conditions (35°C and 92 ± 5%). Mean volumetric shrinkage values were calculated for each resin composite and the data were analyzed using two-way analysis of variance and t-test (a=0.05) to determine if significant differences existed between the amount of volumetric polymerization shrinkage that occurred under ambient room conditions and that which occurred under simulated intraoral conditions. Mean volumetric shrinkage values measured for the resin composites were: 2.26 ± 0.04% (ambient) and 2.61 ± 0.04% (intraoral) for Z100; 1.96 ± 0.04% (ambient) and 2.28 ± 0.04% (intraoral) for Filtek A110 and 4.53 ± 0.06% (ambient) and 5.34 ± 0.05% (intraoral) for 4 Seasons Flow. For each resin composite, statistical analysis indicated that the amount of volumetric shrinkage measured under simulated intraoral conditions was significantly greater than what was measured under ambient room conditions (p<0.0001).
Clinical Relevance:
An experimentally developed adhesive resin system induced exposed pulp to produce reparative dentin formation earlier than commercially available adhesive resin systems. More research is required to determine the CO2 laser conditions that can be used successfully for direct pulp capping.

SUMMARY:
This study examined the wound healing process of rat pulp directly capped with various experimentally developed adhesive resin systems and treated with CO2 laser irradiation. The experimental adhesive resins used in this study were made from Clearfil Mega Bond (MB). The adhesive resin groups were capped with a combination of the following primers and bonding agents: commercially available MB primer (MBP), experimental MB primer containing 2wt% N-methacryloyl 5-aminosalicylic acid (5-NMSA: MP3) and 5wt% 12-methacryloyloxydodecylpyridinium bromide (MDPB: ABP); and commercially available MB bonding agent (MBB), experimental MB bonding agent containing 5wt% and 10wt% hydroxyl-calcium phosphate (hydroxyapatite: MB1, MB2) and 5wt% dicalcium phosphate dihydrate (brushite: MB3) as a reparative dentin-promoter. The combination of the three primers and four bonding agents yielded the 12 adhesive resin groups used in this study. The CO2 laser group was irradiated with a laser and directly capped with MB. The CO2 laser used was an Opelaser 03S II SP, and irradiation conditions were as follows: a power output of 0.5 W, superpulse mode 1, repeat pulse mode (a cycle of 10 msec irradiation and 10 msec interval), defocused beam (approximately distance 20 mm from pulp exposure surface) and an irradiation time of three seconds, with air cooling. The control group was capped with Dycal (DY) and MB. After the direct pulp capping procedures were undertaken, all cavities were restored with Clearfil AP-X resin composite. The rats were sacrificed on the 14th post-operative day. The specimens were alternately stained with Mayer’s H & E, Hucker-Conn bacterial stain and the ABC method on TGF-beta1. These stained sections were observed using light microscopy and the following parameters were evaluated: pulp tissue disorganization, inflammatory cell infiltration, reparative dentin formation and bacterial penetration. The results of this study include the following: all experimentally developed bonding agent groups showed reparative dentin formation; whereas, the MBB-capped groups showed very little reparative dentin formation. The descending order regarding the amount of reparative dentin formation was MB2 > MB3 > MB1 >>> MBB, which tended to be dependent on the concentration of the blended reparative dentin-promoter. In terms of the quality of the formed dentin, it was observed that MB1-capped teeth tended to form tubular dentin; whereas, MB2- and MB3-capped teeth formed irregular and osteodentin types of dentin. Among the primers used, the descending order regarding the amount of reparative dentin and tubular type dentin formation was MP3 > MBB > ABP. The descending order of migration of macrophages and leukocytes was ABP > MBB > MP3. The CO2 laser group showed a very irregular fibrous dentin matrix in the vicinity of the denatured and carbonized tissue but definite reparative dentin formation was not observed. The control group showed reparative dentin, which was very thick, compared with the other groups. In all the groups, pulp tissue showed almost normal morphology. Positive staining of TGF-beta1 was only observed slightly in some specimens of all groups. There was no difference in the staining of each group. Based on the results of this study, it was concluded that the combination of MP3 (containing 2wt% 5-NMSA) and MB1 (containing 5wt% hydroxyapatite) was effective in initiating an early repair process after direct pulp capping. CO2 laser irradiation is effective for field control, but a longer observation time will be required to determine findings concerning dentin bridge formation.

Radiographic Versus Clinical Extension of Class II Carious Lesions Using An F-speed Film
S Kooistra • JB Dennison • P Yaman • BA Burt • GW Taylor
Clinical Relevance:
When using F-speed film (Insight–Kodak), the radiographic extent of Class II carious
lesions underestimated the true clinical extent for both “aggressive” and “conservative”
diagnoses.

SUMMARY:
This study investigated the difference in the apparent radiographic and true clinical extension of
Class II carious lesions. Sixty-two lesions in both maxillary and mandibular premolars and molars
were radiographed using Insight bitewing film. Class II lesions were scored independently by two
masked examiners using an 8-point lesion severity scale. During the restoration process the lesions
were dissected in a stepwise fashion from the occlusal aspect. Intraoperative photographs (2x) of
the lesions were made, utilizing a novel measurement device in the field as a point of reference.
Subsequently, the lesions were all given clinical scores using the same 8-point scale. Statistical
analysis showed a significant difference between the true clinical extension of the lesions compared
to the radiographic score. “Aggressive” and “Conservative” radiographic diagnoses underestimated
the true clinical extent by 0.66 mm and 0.91 mm, respectively. No statistical difference was found
between premolars and molars or maxillary and mandibular arches. The results of this study help to
define the parameters for making restorative treatment decisions involving Class II carious lesions.

Occlusal Loading Evaluation in the Cervical Integrity of Class II Cavities Filled with
Composite
PEGA Campos • HR Sampaio Filho • MO Barceleiro

Clinical Relevance:
The periodical supervision of condensable composite proximal restorations is essential with
respect to the clinical success of such restorations, as the microleakage quality greatly
increases after axial mechanical load incidence.

SUMMARY:
There are many doubts about the clinical behavior of condensable composite restorations in Class II
cavities, particularly when they are submitted to axial mechanical loads. This study evaluated
cervical microleakage in Class II direct fillings in composite, whether or not they were submitted to
an occlusal load cycling. Twenty-three human molars with standardized cavities (proximal vertical
“slot”) were treated with enamel and cement endings. After completion of the filling process with
condensable composite (Surefil), they were separated into two groups: control (without occlusal
loading) and test, where 4,000 one-second cycles of 150 N occlusal loading were applied. Twenty
teeth were submitted to a microleakage test and then evaluated according to dye penetration.
Significant statistical differences (Wilcoxon test, p=0.005<0.05) of leakage degree in enamel and
cement were found in the control group. Significant statistical differences at <0.05 were also found
in the test group, with p=0.045.

After paired comparison of the control and test groups, a significant statistical difference was found
at the enamel level (Mann-Whitney test, p=0.03). However, no significant statistical differences
were found at the cement level (p=0.28). Therefore, it could be concluded that there was greater
microleakage in cement compared to enamel, and occlusal loading has a decisive influence, as it
increases the rate of microleakage.

Microtensile Dentin Bond Strength of Self-Etching Resins: Effect of a Hydrophobic Layer
WW Brackett • S Ito • FR Tay • LD Haisch • DH Pashley

Clinical Relevance:
In resin composite restorations where maximum dentin adhesion is desirable, bonding of
single component self-etching adhesives would likely be improved through the addition of a
layer of a more hydrophobic adhesive.
SUMMARY:
In this study, the microtensile bond strength of resin composites to dentin was determined when hydrophilic self-etching resins were used with and without an additional layer of a more hydrophobic adhesive. Included were three single-step self-etching adhesives, Adper Prompt L-Pop (3M ESPE), iBond GI (Heraeus Kulzer, Inc) and Xeno III (Caulk/Dentsply), and as a negative control, UniFil Bond (GC America), a self-etching primer with a separate adhesive. Each product was evaluated using a hybrid resin composite from its respective manufacturer, and each was used as directed and then used with an added layer of a more hydrophobic resin from its respective manufacturer. Testing was performed after 72 hours using a “non-trimming” microtensile test at a crosshead speed of 0.6 mm/minute. When the products were used according to manufacturers’ directions, iBond had a significantly higher bond strength to dentin than the other three products (p<0.001), which were not significantly different from each other. For the three self-etching adhesive systems, the addition of a layer of a more hydrophobic resin produced significantly higher bond strengths to dentin (p<0.001), while no significant effect was found for the self-etching primer (p=0.40). A significant interaction was found between the variables product and adhesive treatment. The TEM evaluation of Prompt L-Pop and iBond demonstrated reduced nanoleakage with the additional resin layer.

Assessing the Tooth-Restoration Interface Wear Resistance of Two Cementation Techniques: Effect of a Surface Sealant

A Prakki • IWJ Ribeiro • R Cilli • RFL Mondelli

Clinical Relevance:
The “resin coating” technique did not provide an increase in tooth-restoration interface width or wear after the toothbrushing abrasion test when compared to the conventional cementation technique. The application of a restoration surface sealant improved interface wear resistance for both cementation techniques.

SUMMARY:
This study compared (1) the tooth-restoration interface width of conventional and “resin coating” cementation techniques, (2) the tooth-brushing wear resistance of the two interfaces and (3) this study evaluated the influence of a restoration surface sealing on toothbrush wear resistance on both cementation technique interfaces. Mid-coronal buccal surfaces of 40 bovine teeth were ground to obtain a flat enamel surface. For each specimen, a 3 mm x 4 mm x 3 mm dimension rectangular cavity was prepared. The teeth were divided into four groups. Two groups (RC) received a “resin coating” (ED Primer + Tetric Flow) prior to cementation. The remaining two groups (NC) served as non-coated groups. All teeth were restored with composite inlays (Z250) fabricated by the indirect method and were cemented with dual cure resin cement (Panavia F). After finishing the margins, one group from each of the cementation techniques (RC+S and NC+S) had the tooth-restoration interface protected with a restoration surface sealant (Biscover). The specimens were subjected to 100,000 brushing abrasion cycles. The tooth-restoration width was obtained using a Hommel Tester T 1000—basic profilometer and Turbo Datawin NT 1.34 Software (µm). The interface wear (vertical loss/µm and area/µm2) was calculated with Image Tool 3.0 Software. Data were analyzed with Student t-test, one-way analysis of variance and Tukey test (α=0.05). Mean interface width for the NC group was 67 µm and 72 µm for the RC group. The student t-test showed no significant differences between groups (p=0.53). ANOVA showed significant differences (p<0.01) in vertical loss among groups (NC: 49.30 µm; NC+S: 7.90 µm; RC: 27.15 µm; RC+S: 4.74 µm). Also, ANOVA showed significant differences (p<0.01) in worn areas among groups (NC: 2,088 µm2; NC+S: 128 µm2; RC: 1,580 µm2 and RC+S: 88 µm2). No differences were found in tooth-restoration interface width and worn area between conventional and “resin coating” techniques. “Resin coating” interface presented reduced vertical loss. Restoration surface sealing provided reduced wear in tooth-restoration interface for both techniques.
Immediate Dentin Sealing of Onlay Preparations: Thickness of Pre-cured Dentin Bonding Agent and Effect of Surface Cleaning

MM Stavridakis • I Krejci • P Magne

Clinical Relevance:
The film thickness of the Dentin Bonding Agent (DBA) used for the “immediate dentin sealing” of onlay preparations prior to the final impression for indirect restorations presents a vast range of values, depending on both the type of DBA and the topography of the tooth preparation. Curing the DBA in the absence of oxygen (air blocking) is mandatory to maintain a minimum DBA thickness. The filled DBA presented a more uniform thickness compared to the unfilled one. Air abrasion and polishing used for cleaning the pre-cured DBA prior to final cementation reduces the thickness of the DBA in a non-uniform manner.

SUMMARY:
This study evaluated the thickness of Dentin Bonding Agent (DBA) used for “immediate dentin sealing” of onlay preparations prior to final impression making for indirect restorations. In addition, the amount of DBA that is removed when the adhesive surface is cleaned with polishing or air abrasion prior to final cementation was evaluated. For this purpose, a standardized onlay preparation was prepared in 12 extracted molars, and either OptiBond FL (Kerr) or Syntac Classic (Vivadent) was applied to half of the teeth and cured in the absence of oxygen (air blocking). Each tooth was bisected in a bucco-lingual direction into two sections, and the thickness of the DBA was measured under SEM on gold sputtered epoxy resin replicas at 11 positions. The DBA layer of each half tooth was treated with either air abrasion or polishing. The thickness of the DBAs was then re-measured on the replicas at the same positions. The results were statistically analyzed with non-parametric statistics (Mann-Whitney U test and Kruskal-Wallis test) at a confidence level of 95% (p=0.05).

The film thickness of the DBA was not uniform across the adhesive interface (121.13 ± 107.64 µm), and a great range of values was recorded (0 to 500 µm). Statistically significant differences (p<0.05) were noted, which were both material (OptiBond FL or Syntac Classic) and position (1 to 11) dependent. Syntac Classic presented a higher thickness of DBA (142.34 ± 125.10 µm) than OptiBond FL (87.99 ± 73.76 µm). The higher film thickness of both DBAs was at the deepest part of the isthmus (the most concave part of the preparation), while the lowest was at the line angles of the dentinal crest (the most convex part of the preparation). OptiBond FL presented a more uniform thickness around the dentinal crest of preparation; Syntac Classic pooled at the lower parts of the preparation.

The amount of DBA that was removed with air abrasion or polishing was not uniform (11.94 ± 16.46 µm), and a great range of values was recorded (0 to 145 µm). No statistically significant differences (p<0.05) were found either between different DBAs (OptiBond FL or Syntac Classic) or between different treatments (air abrasion or polishing). As far as the effect of different treatments at different positions, polishing removed more DBA from the top of the dentinal crest, but the difference was not statistically significant. Air abrasion removed less DBA from the corners of the dentinal crest (Positions 4 and 6) than the outer buccal part of the preparation (Positions 1 and 2). Neither air abrasion nor polishing removed the entire layer thickness of the DBA in the majority of the cases.

Curing Efficacy of a New Generation High-power LED Lamp

AUJ Yap • MS Soh

Clinical Relevance:
New generation high-power LED lamps may cure composites as effectively as conventional LED/halogen in half the time.
SUMMARY:
This study investigated the curing efficacy of a new generation high-power LED lamp (Elipar Freelight 2 [N] 3M-ESPE). The effectiveness of composite cure with this new lamp was compared to conventional LED/halogen (Elipar Freelight [F], 3M-ESPE; Max [M], Dentsply-Caulk) and high-power halogen (Elipar Trilight [T], 3M-ESPE; Astralis 10 [A], Ivoclar Vivadent) lamps. Standard continuous (NS, FS, TS; MS), turbo (AT) and exponential (NE, FE, TE) curing modes of the various lights were examined. Curing efficacy of the various lights and modes were determined by measuring the top and bottom surface hardness of 2-mm thick composite specimens (Z100, 3M-ESPE) using a digital microhardness tester (n=5; load=500 g; dwell time=15 seconds) one hour after light polymerization. The hardness ratio was computed by dividing HK (Knoops Hardness) of the bottom surface by HK of the top surface. The data was analyzed using one-way ANOVA/Scheffe’s test and Independent Samples t-test at significance level 0.05. Results of the statistical analysis were as follows: HK top—E, FE, NE > NS and NE > AT, TS, FS; HK bottom—TE, NE > NS; Hardness ratio—NS > FE and FS, TS > NE. No significant difference in HK bottom and hardness ratio was observed between the two modes of Freelight 2 and Max. Freelight 2 cured composites as effectively as conventional LED/halogen and high-power halogen lamps, even with a 50% reduction in cure time. The exponential modes of Freelight 2, Freelight and Trilight appear to be more effective than their respective standard modes.

Curing of Pit & Fissure Sealants Using Light Emitting Diode Curing Units

JA Platt • H Clark • BK Moore

Clinical Relevance:
Adequate polymerization of opaque light-activated sealants should not be assumed and is dependent upon the material and light-curing unit.

SUMMARY:
Light Emitting Diode (LED) curing units are attractive to clinicians, because most are cordless and should create less heat within tooth structure. However, questions about polymerization efficacy have surrounded this technology. This research evaluated the adequacy of the depth of cure of pit & fissure sealants provided by LED curing units. Optilux (OP) and Elipar Highlight (HL) high intensity halogen and Astralis 5 (A5) conventional halogen lights were used for comparison. The Light Emitting Diode (LED) curing units were Allegro (AL), LE Demetron I (DM), FreeLight (FL), UltraLume 2(UL), UltraLume 5 (UL5) and VersaLux (VX). Sealants used in the study were UltraSeal XT plus Clear (Uclr), Opaque (Uopq) and Teethmate F-1 Natural (Kclr) and Opaque (Kopq). Specimens were fabricated in a brass mold (2 mm thick x 6 mm diameter) and placed between two glass slides (n=5). Each specimen was cured from the top surface only. One hour after curing, four Knoop Hardness readings were made for each top and bottom surface at least 1 mm from the edge. The bottom to top (B/T) KHN ratio was calculated. Groups were fabricated with 20 and 40-second exposure times. In addition, a group using a 1 mm-thick mold was fabricated using an exposure time of 20 seconds. Differences between lights for each material at each testing condition were determined using one-way ANOVA and Student-Newman-Keuls Post-hoc test (a=0.05). There was no statistical difference between light curing units for Uclr cured in a 1-mm thickness for 20 seconds or cured in a 2 mm-thickness for 40 seconds. All other materials and conditions showed differences between light curing units. Both opaque materials showed significant variations in B/T KHN ratios dependent upon the light-curing unit.

Awards
American Academy of Gold Foil Operators
Clinician of the Year Award
Dr Barry O Evans

This year’s recipient of the Outstanding Clinician Award is Dr Barry Evans. Barry is a past president of our academy, serving on the Executive Council starting in 1990 and culminating with his presidency in 1996. As a presenter to our academy, who could forget Barry’s intriguing program featuring Dr Hollenbeck’s direct gold restorations that were placed in the late Katherine Hepburn. How Barry obtained those pictures is an interesting story of its own. Barry has been an active operator at our annual meetings, never missing an opportunity to transport his instruments to distant clinics. I am convinced it is his love of the “art” of direct gold that has motivated him to operate so willingly.

Barry and his wife, Yvonne, have two children. His daughter, Brianna, and her husband have recently elevated Barry and Yvonne to grandparent status. Their son, Bryce, is a recent graduate of Oregon Health Sciences University School of Dentistry. He has a dental practice in Seaside, Oregon and has recently married.

I first came to know Barry in the fall of 1977. Since that chance meeting, our paths have crossed many times and, occasionally, in unusual ways. In fact, I actually owe a great deal of gratitude to him for a few of my own accomplishments. You see, in 1977, I was a first-year dental student. Barry was helping me pay for my school and living expenses. Now, before you heap on the praise, let me explain. At that time I was married to Barry’s hygienist, Martha Bibb. Unfortunately, the employment opportunity was short lived, but the little I knew about dentistry told me that Barry was anything but ordinary.

About 10 years later, Barry helped me more than he will ever know. It was about then that Dr Louis Schoel retired from practice. A lovely patient of Louis transferred to Barry’s office at the advice of a friend. After her first visit with him, she was so overwhelmed by his thorough treatment recommendations that she decided to seek another opinion. She called the local component of the Multnomah Dental Society and was given the names of three dentists willing to accept new patients. Lucky for me, I was the first name on the list. Twelve years later I would marry this lovely woman, and to this day, I have Barry to thank for this chance meeting. Barry is passionate about dentistry. He is a member of several operating study clubs spanning all disciplines of dentistry. He mentors three cast gold inlay clubs. He started a gold study club for “new” graduates, feeling that starting the graduates out with a good foundation would help them to experience what he likes to call “Excellence.” As a former member of one of his cast gold clubs, I have fond memories of his dedication as a mentor. I will always remember his tedious use of an explorer. After what seemed like an eternity, he would look up and proclaim, “It’s a good start.” You can imagine my surprise, since I thought I had completed the operation. I am still puzzled by the meaning of “there are no straight lines in nature,” when he describes how a preparation should flow from one area to the next. From time to time, I try to find those straight lines and think of him.

All of us are involved in continuing education. I calculated that the average dental graduate experiences about 5700 hours of instruction. About half of those hours are clinical. In 35 years of private practice, I estimate that Barry has participated in well over 8000 hours of continuing education. This is a real testament to his dedication to the profession and to those people who trust themselves to his care.

In my opinion, everyone in this academy is deserving of this award, but we only honor one member each year. Barry Evans has been chosen to receive the Outstanding Clinician Award this year not just because he places a fine direct gold restoration, but more importantly, because of his dedication to his profession and his love of dentistry has influenced the lives of so many people. He represents all that is good about our profession. He is willing to learn, is excited to share and, when necessary, is open to change. Dr Barry Evans continues in his own way to make our profession better for all of
American Academy of Gold Foil Operators  
Distinguished Member Award  

Dr Michael A Cochran

It is my honor and pleasure to present our Distinguished Member Award to Dr Michael Cochran. Hopefully, these remarks will provide evidence of his merit as a recipient of this award.

We first catch sight of Michael in the Upper Peninsula of Michigan in the 5th grade. His family is one of the few year-round residents in the area, and the size of his class is just 30 students, so he obviously did not have much competition. Transportation to school was by bus, and the walk to the bus stop from his home on Lake Michigan was about 3/4 of a mile…reportedly uphill both ways. Now, Michigan winters are long, cold and snowy, but schools rarely close due to weather. One morning in near blizzard conditions, Michael is on his way to the bus stop and sees a fuzzy outline standing in his usual spot, which he hopes might be a new classmate. As he gets closer, however, he sees that the outline isn’t fuzzy because of the falling snow but because it is a large bear. This discovery prompted a hasty retreat home…an example of the good judgment that Mike has shown throughout his life. He is not sure whether or not the school bus picked up the bear.

After graduating high school, Michael earned his BS degree from Northern Michigan University, majoring in Biology, with minors in Chemistry and Art, the latter avocation serving him well in his dental career. He then attended the University of Michigan School of Dentistry as a member of the class of 1969. He was the cartoonist for the dental school newsletter, and one might wonder as to the impact this may have had on the faculty and administration, since Mike is not known for his lack of opinions.

Upon graduation from dental school, Mike joined the US Navy Dental Corps and served at Great Lakes, Illinois; San Juan and Roosevelt Roads, Puerto Rico; Norfolk, Virginia and on the USS Forrestal aircraft carrier. Between assignments in Puerto Rico and Virginia, the Navy sent Mike to the Graduate Operative Dentistry program at Indiana University School of Dentistry for two years, where he earned his Master’s degree. Among the hurdles of his graduate studies was an event known as the oral and written examination. After handling numerous questions on Dental Materials, Statistics and Preventive Dentistry, Mike suddenly drew a blank on his first question on Operative Dentistry, which was to describe the different preparation designs for Class III direct gold restorations. Can anyone imagine Mike speechless? Aware of his artistic ability, I made the suggestion that he go to the board and draw the preparations. This shattered his mental block and the exam continued. After his tours at Norfolk and on the Forrestal, Michael left the Navy and joined the faculty at Indiana University.

At this point Michael began a career that has led him to this recognition. Academically, he progressed from director of the Operative Dentistry Clinic to chair of the Department of Operative Dentistry to his current position as director of the Graduate Operative Dentistry Program. During this time, he has taught the techniques and materials of Operative Dentistry to approximately 2,700 dental students, as well as more than 130 Graduate Operative students. He has been recognized by his students with numerous awards as outstanding lecturer and teacher. His illustrations and writing have appeared in seven editions of four different textbooks, and Lloyd Baum and I have especially appreciated his art activity in our Operative Dentistry texts. He has presented more than 180
continuing education programs around the world, many involving direct gold. His association with
the Navy Dental Corps has continued over the years, with numerous presentations at Bethesda and
San Diego and a long-term commitment as consultant on Operative Dentistry to the Naval Post-
Graduate Dental School. His service was recognized in 1992 when he received the “Civism” award
from the National Naval Dental Center.

Michael has been an author or co-author on more than 35 abstracts and 70 articles, many as a result
of his research activity with his graduate students. He is a strong supporter of organized dentistry
and holds membership in 11 professional organizations including Omicron Kappa Upsilon, the
American Dental Association, the International Association for Dental Research, the Academy of
Operative Dentistry and this group, the American Academy of Gold Foil Operators, where he
served as President in 1991 and received the Clinician of the Year Award in 1992. His most recent
membership is with the American Association of Dental Editors.

Since 1999, Mike has been editor of Operative Dentistry and, of all the activities that support
tonight’s award, the editorship of our journal is one of the most prominent. During his tenure, the
journal has increased in size, content and recognition. This does not, however, diminish the activity
of prior editors.

Obviously, his professional career has been extensive and time consuming, but his family is of even
greater importance to Mike. His lovely wife, Christianne, who is also a full-time faculty member at
our School of Dentistry, has been a tremendous influence and support. His two daughters, Holly and
Shannon, his son Sean (a 6 ft 6 in basketball player at age 14) and his five grandchildren by his
daughter Holly (Brandon, Josh, Jake, Kylie and Brady) are all the joy and foundation of his life.

As a result of all this supporting data and my longstanding knowledge of and friendship with Mike
Cochran, it is my pleasure to present to him the Distinguished Member Award of the American
Academy of Gold Foil Operators.

Melvin R Lund

Abstracts

The effect of the distance between post and residual gutta-percha on the clinical outcome of
endodontic treatment. Moshonov J, Slutzky-Goldberg I, Gottleib A & Peretz B Journal of
Endodontics (2005) 31(3) 177-179.
(Department of Endodontics, Hadassah School of Dental Medicine, Jerusalem, Israel)

After endodontic therapy, teeth are often restored with a post and core. In many cases after post
cementation, there is a gap between the apical end of the post and the remaining gutta percha. This
study evaluated in vivo the outcome of endodontic therapy in teeth with varying amounts of space
between cemented post and gutta percha.

A total of 94 patients, who had previously undergone endodontic therapy followed by post and core
restoration, were selected. The group consisted of 26 males and 68 females, 23 to 88 years of age.

The endodontically treated teeth fit the following criteria:

1. periapical tissue of normal appearance before treatment
2. irreversible pulpitis before treatment
3. pulp exposure during caries removal
4. elective root canal treatment before prosthetic treatment
All teeth had been cleaned and shaped under rubber dam isolation and obturated within 1 mm of the radiographic apex, using laterally condensed gutta percha with AH-26 sealer. Cases with complicating factors (separated files, over or underextension of root canal filling, root fracture, residual root canal fill <3 mm) were excluded.

The selected cases were divided into three groups, based on measurements from post-treatment radiographs:

- Group I: no gap between gutta-percha and post.
- Group II: a gap of >0 to 2 mm between gutta-percha and post.
- Group III: a gap >2 mm between gutta-percha and post.

Follow-up radiographs, taken between one and five years post-treatment, were evaluated according to the following criteria:

- Normal: no periapical radiolucency, intact PDL.
- Disease: periapical radiolucency or widening of the PDL space.

Radiographs were “masked” coronally with cardboard to reduce bias. Clinical outcomes related only to the roots in which posts were placed. The results were as follows:

- Group I: 16.7% disease, 83.3% normal.
- Group II: 46.4% disease, 53.6% normal.
- Group III: 70.6% disease, 29.4% normal.

This study illustrates the need to exhibit care when cementing posts in endodontically treated teeth, seating the post properly to eliminate space between the post and residual gutta percha.

**Five-year follow-up with Procera all-ceramic crowns. Fradeani M, D’Amelio M, Redemangi M & Corrado M (2005) Quintessence International 36(2) 105-113.**

(University of Milan; private practices in Milan, Mestre, Lomazzo and Monselice, Italy)

This study evaluated the clinical performance of Procera AllCeram crowns placed over a five-year period at three different private dental practices.

Two-hundred and five Procera AllCeram crowns placed in 106 patients were evaluated over a period ranging from a minimum of six months to a maximum of 60 months, with a mean of 23.52 months. The clinical procedures were performed by three dentists in their private practices. The crowns were fabricated by three dental technicians following manufacturers’ instructions. One hundred and fifty-one crowns were cemented with Panavia 21 TC (Kuraray), 40 with Fuji Plus (GC) and 14 with RelyX Luting (3M). Patients were reexamined by the authors one month after cementation and at three or six-month intervals for the following period. A restoration was considered a failure when it impaired esthetic quality or function, thus necessitating remake of the crown. Patients with severe parafunction, periodontitis, serious gingival inflammation, or poor oral hygiene or caries were excluded from the study.

The survival rate was determined with the use of the Kaplan-Meier method, which gave an overall survival rate of 96.7% (100% for the anterior crowns and 95.15% for the posterior crowns). Of the 50 anterior crowns, there were no failures. Of the 155 posterior crowns, there were four failures. All four failures were molars. Two involved fracture of the veneer and alumina coping. One involved fracture of the veneering porcelain only, and one involved de-lamination of the veneering porcelain. The results of this study match results reported in other similar studies on Procera AllCeram crowns. Within the limits of this study, it was concluded that the Procera AllCeram system seems to have a good prognosis for the posterior teeth and an excellent prognosis for the anterior teeth.
This study compared the microhardness of resin composite cured in simulated root canals using light-transmitting plastic posts (LTTP), glass-fiber-reinforced composite posts (GFRCP) and conventional light curing methods (control group).

Thirty black plastic cylinders, measuring 15 mm in length and 4 mm in internal diameter, were divided into three groups of 10 specimens each. Tetric Ceram (Ivoclar Vivadent) composite was firmly packed into the simulated canals. The LTTP (No 4, Luminex, Dentatus) and GFRCP (No 1, Postec, Ivoclar Vivodent) with the same diameters (1.5 mm) were inserted into the simulated canals using a parallelometer. All samples were then light cured (Hilux Dental Curing Light, Model No 200, Benlioglu Dental, Inc) with a constant-type exposure at 460 mW/cm² for 90 seconds. After 24 hours, the plastic cylinders were removed from the samples and a microhardness test was performed using a Micromet Microhardness Tester (MMT-3 Digital Microhardness Tester, Buehler Ltd) with a load of 100 g for 10 seconds. Three test indentations of each sample were made at randomly selected areas of the polymerized resin composite samples at depths of 2, 4, 6, 8, 10, 12 and 14 mm from the light exposed surface. All microhardness measurements were recorded as a Knoop Hardness Number (KHN), and the results were evaluated statistically using a one-way analysis of variance and the Tukey post hoc test between groups. Paired t-tests and repeated measure analysis were used to compare KHN within groups.

There was a significant increase in microhardness of the resin composite for both LTTP and GFRCP compared with the control group (p<0.01). The microhardness test could not be performed on the control group due to the lack of polymerization below 4 mm. There were no significant differences in microhardness between LTTP and GFRCP until 10 mm (p>0.01). At 10 mm, the microhardness of resin composite was significantly higher with LTTP than GFRCP (p<0.01). After 10 mm, the microhardness of GFRCP could not be performed because of the lack of polymerization. With increasing distance from the curing tip, the measurement of resin composite microhardness was decreased in all groups.

Conclusions

The depth of cure of resin composite in a simulated root canal is significantly increased with LTTP and GFRCP. After 10 mm, the polymerization of resin composite could not be achieved by GFRCP.
dentin walls of the preparation were treated either with a self-etching dentin/enamel primer (SE Primer, Kuraray America) for 20 seconds or were etched with 34% phosphoric acid (Caulk Etchant, Dentsply Caulk) for 15 seconds. While the self-etching primer was not rinsed, the phosphoric acid was washed for 10 seconds and the dentin was left visibly moist or was remoistened to an acceptable level prior to application of Prime & Bond NT (Dentsply Caulk). The flowable composite Filtek Flow (3M ESPE) was inserted as the first increment in the cervical area of each box for half of the restorations receiving each adhesive. The composite restorative SureFil (Dentsply Caulk) was then inserted in one increment (when the flowable material was used as the cervical increment) or two increments (when no flowable material was used). Each increment was polymerized for 40 seconds with a light source as recommended by manufacturer. Finishing and polishing were performed on each restoration.

The authors evaluated the restorations clinically for the following characteristics: a) marginal discoloration; b) post-operative sensitivity to air and cold and c) postoperative sensitivity to masticatory forces. The results were that all restorations had no discoloration at the post-operative period; change from baseline to two weeks in sensitivity for cold or air stimulus was not significant; there were no cases of post-operative sensitivity due to masticatory forces.

The authors found that there were no differences in post-operative sensitivity between a self-etch adhesive and a total-etch adhesive at two weeks. A flowable composite did not decrease post-operative sensitivity.


(University of Minnesota, Minneapolis, MN, USA; University of Mogi das Cruzes, SP, Brazil)

The investigators designed a project to determine if one type of x-ray film (D, E or F-speed category) or digital sensor provided a significant advantage over the others in detecting approximal caries. Forty molars and premolars were imaged using the same settings on the x-ray machine; 70kVp, 8mA and 16-inch focal spot-film distance. They varied the time of exposure to comply with manufacturers’ recommendations. The images were randomized and viewed under subdued lighting without the use of magnification or post-processing manipulation. Three clinicians graded the lesions using a five-point rating system. The teeth were then sectioned mesiodistally for microscopic evaluation to determine the true extent of caries.

There was no significant difference among the four diagnostic modalities in the ability to detect interproximal caries lesions. The dental professional has an obligation to produce radiographs of the highest diagnostic quality using the least amount of radiation. Insight film and RVG produced diagnostic images comparable to Ultraspeed and Ektaspeed Plus film utilizing reduced radiation exposure times.