Are We Under-Curing Our Composites?

Comparison of Manufacturer-Recommended Exposure Durations With Those Determined Using Biaxial Flexure Strength and Scraped Composite Thickness Among a Variety of Light-Curing Units.

Rueggegerg FA, Cole MA, et al:

J Esthet Restor Dent 2009; 21 (February): 43-61

Manufacturer's recommended cure times are too low for optimal composite performance.

**Objective:** To determine the reliability of the manufacturer's recommended cure times of 3 different curing lights.

**Methods:** A flexural test and scrape test were used to determine the depth of cure for 3 lights at various cure times. The curing lights used in the study were: (1) Optilux 501; (2) LE Demetron 1; and (3) DEMI light (halogen, conventional LED, and a high-intensity LED, respectively). Six Teflon molds, separated by Mylar, were stacked using a sophisticated laboratory apparatus to fabricate theoretical composite cylinders. At a fixed distance of 2 mm, the cylinder specimens were cured for various exposure times, and the flexural strength was measured on each section of the cylinders. For the scrape test, cylinders were simply fabricated by curing composite compules and scraping away the uncured portion. Depth of cure was plotted against time, and the optimal cure times were correlated with the flexural times.

**Results:** Depth of cure as a function of flexural strength increased as curing time increased for all curing lights tested, and the simple scrape test correlated well with the flexural strength test. The manufacturer's recommended cure times were lower than optimal for all lights in the range of 5 to 15 seconds, with the high-intensity LED light falling on the high end of the range.

**Conclusions:** It can be concluded from these results that the manufacturers' recommended cure times are too low for optimal composite performance, and a simple composite scrape test is a reliable method for determining optimal cure times.

**Reviewer's Comments:** This is a very important study that should prompt us to pay very close attention to how long we cure our composites. It is interesting to note that the recommended cure time for high-intensity LED light is 5 seconds, while the optimal cure time was determined to be 20 seconds. The bottom line is that optimal curing times are variable, and we should not rely on the manufacturer's recommended time. The use a simple chair-side composite scrape test may be the simplest method for determining the optimal cure time for your curing light. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Light-Curing Units/Exposure Times

Print Tag: Refer to original journal article
Maternal Anxiety May Be Risk Factor for ECC

Case-Control Study of Early Childhood Caries in Australia.

Seow WK, Clifford H, et al:


There are common risk factors for ECC and risk factors that vary according to SES, including maternal anxiety. Visible plaque, frequent sugar ingestion, and the presence of S. mutans are significant across all SES groups.

Background: Early childhood caries (ECC) is associated with high oral streptococci counts, frequent sugar intake, lack of toothbrushing, and immigrant status. Most ECC studies have been conducted in disadvantaged populations because of their higher prevalence of ECC. Despite aggressive treatment, ECC is difficult to control. Maternal psychological factors and parenting behaviors may contribute to the risk of ECC. A better understanding of all risk indicators for ECC will lead to better prevention.

Objective: To investigate risk indicators of ECC in a non-fluoridated community in Australia.

Methods: Case-control study of 617 children aged 0 to 4 years (156 cases and 461 controls) recruited from childcare facilities (middle socioeconomic sites [SES]), public hospitals (low SES), and private clinics (high SES). Cases were defined as children with at least 1 cavity. Caries, visible plaque, enamel hypoplasia, and the presence of Streptococcus mutans were recorded. Mothers completed questionnaires for the child about dental history, toothbrushing, bottle feeding/breastfeeding, frequency of eating and drinking, and fluoride use. Mothers of all subjects were interviewed and examined. They then completed validated questionnaires to determine social, medical, and dental histories, dental caries experience, presence or absence of plaque, gingival inflammation, and the presence of S. mutans. ECC cases from middle SES and low SES sites were compared to the ECC-free controls using a multinomial logistic regression model. Middle SES and lower SES ECC cases were separately compared with ECC-free controls to test whether risk indicators were associated with a higher risk of having ECC.

Results: Previously identified common risk indicators for all children with ECC were confirmed: visible plaque, frequent sugar ingestion, and the presence of S. mutans. Disparities in risk indicators according to SES were also identified: enamel hypoplasia and maternal S. mutans were dominant in high SES; enamel hypoplasia, difficulty brushing the teeth, adding sweeteners to drinks, and maternal anxiety were dominant in middle SES; and immigrant status/ethnicity and mother’s access to a pension or health care card were dominant in low SES.

Conclusions: There are common risk factors for ECC, and risk factors differ according to SES. Prevention of ECC should be directed at reducing the cariogenic bacteria by providing early dental examinations and interventions in young children, as well as dental care and behavioral interventions for their mothers.

Reviewer’s Comments: This was a very well-designed case-control study, and the first to comprehensively investigate multiple potential risk indicators in children with ECC from different SES backgrounds. Because of the cross-sectional, observational nature of this study, we cannot conclude that the identified risk indicators are predictive or causal of ECC. The results may not be generalizable to populations with different cultures and health care systems. Both maternal and child factors should be considered in future interventional studies of ECC. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Early Childhood Caries

Print Tag: Refer to original journal article
Can Osteoporosis Predict Tooth Loss in Perimenopause?

Tooth Loss and Osteoporosis: The Osteodent Study.
Nicopoulou-Karayianni K, Tzoutzoukos P, et al:
J Clin Periodontol 2009; 36 (March): 190-197

In the OSTEODENT study, osteoporosis was associated with tooth loss in perimenopausal and postmenopausal Caucasian females. The effect was dependent on age.

**Background:** Osteoporosis and periodontal disease (common chronic diseases of bone) have many common risk factors. The relationship between osteoporosis and the risk of periodontal bone loss, residual alveolar ridge resorption, and implant success rates is not known. The OSTEODENT study assessed the value of dental radiographic and clinical variables to detect osteoporosis in women. Data were also used to determine if osteoporosis status could be used to predict tooth loss in perimenopausal and postmenopausal women.

**Objective:** To determine if osteoporosis status can predict the number of teeth in perimenopausal and postmenopausal women, independent of age or smoking.

**Design/Participants:** Multicenter cross-sectional study of 665 mostly Caucasian women aged 45 to 70 years from 4 European cities from 2003 to 2005.

**Methods:** Osteoporosis status was determined using dual energy x-ray absorptiometry (DXA) of the total hip, lumbar spine, and femoral head. The test was positive if at least 1 site met the criteria for osteoporosis. Smoking status was positive if the subject had ever smoked. Panoramic radiographs were taken, and teeth were counted by an examiner blinded to the subject's osteoporosis status. Residual roots, impacted teeth, dental implants, and teeth with <3 mm of crown height were not counted. Multiple regression models were used to explore the relationship between osteoporosis status, age, smoking, and tooth number. No single regression model fit all the data. Different regression models were fitted to the number of teeth (dependent variable) with subsets of age, smoking, and osteoporosis as explanatory variables, to provide insight into hidden subgroups (clusters) within the data.

**Results:** 651 subjects had complete data, and 140 of these subjects had osteoporosis. The relationship between osteoporosis and having few teeth (<6 teeth; \( P = 0.016 \) or many teeth (>28 teeth; \( P = 0.011 \) was significant after adjusting for age, smoking, and study center. Subjects with osteoporosis had lower average tooth counts than normal subjects. Smoking was not associated with osteoporosis or tooth loss. Age was associated with osteoporosis, so this was adjusted for in the mixture of regression analyses. Three clusters of subjects were identified according to different degrees of tooth loss. The overall effect of osteoporosis was -1.8 teeth before and after adjusting for smoking, -1.2 teeth after adjusting for age, and -1.1 teeth after adjusting for both age and smoking.

**Conclusions:** Osteoporosis is a risk factor for tooth loss in perimenopausal and postmenopausal women. The effect of osteoporosis was estimated at 1 to 2 teeth lost, depending on age.

**Reviewer's Comments:** The reason for tooth loss was not recorded, so it cannot be attributed to periodontal disease. Only Caucasian women were included, and the effects of smoking on osteoporosis and tooth loss were likely underestimated by including "ever smoked" as smokers. To determine a causal relationship, a longitudinal interventional study is needed. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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**Keywords:** Osteoporosis

**Print Tag:** Refer to original journal article
Conservative Aesthetic Alternative Can Treat Enamel Defects


Ardu S, Benbachir N, et al:

Br Dent J 2009; 206 (February 28): 205-208

Minor superficial enamel defects such as medium to medium/severe fluorosis can be treated with enamel recontouring, microabrasion, and bleaching as opposed to a more invasive prosthetic procedure.

Due to a number of possible factors, the incidence of dental fluorosis seems to be increasing in the European community. Alternatives such as porcelain veneers and freehand bonding may not be economically indicated for some patients. Medium to medium/severe fluorosis and some demineralizations associated with orthodontic bracket placement can be managed by a combined chemo-mechanical protocol. This 3-stage approach begins with mechanical removal of affected enamel with rotary diamonds to a depth of 200 to 400 μm if necessary. This is followed by restoration of the macro- and micromorphology of healthy tooth structure using medium to fine abrasive discs or silicone point polishers. The second stage is microabrasion of the remaining defects with an abrasive paste containing silicon carbamide microparticles and 6.6% hydrochloric acid. The third stage is power bleaching or home bleaching as indicated. The power bleaching is done with photo polymerisable rubber dam isolation and consists of application of proprietary bleaching material used according to the manufacturer's instructions and repeated if necessary. This is followed by a 10-minute treatment with a proprietary desensitizing agent for 10 minutes. A home-bleaching alternative is also described. After complete rehydration, the aesthetic result is evaluated and the process can be repeated if necessary. In addition to producing pleasing aesthetic results, this approach may also offer a possible cost reduction to the patient.

Reviewer's Comments: This is not a new technique. Microabrasion has been around since the late 1970s. The previously underemphasized and important step described in this technique is the restoration of the macro- and micromorphology of the tooth structure between the macro- and microabrasion steps. This is critical for successful light reflectance and perception of tooth size and shape. The procedure described is somewhat time intensive and, if repetition is required, may not be as cost-effective as it would first appear.

(Reviewer-Charles R. Hoopingarner, DDS).

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Keywords: Enamel Defects

Print Tag: Refer to original journal article
Both the filled and unfilled resin adhesives tested provided similar and adequate clinical performance over an 8-year period.

**Background:** Dental adhesives have progressed from a 3-step, etch/prime/bond technique to the newer single-step, all-in-1 adhesives. Few long-term clinical trials have been done to verify laboratory-based results. **Objective:** To evaluate the performance of both a filled and unfilled 1-bottle adhesive system. It was hypothesized that both systems would produce similar results. **Design/Participants:** 33 subjects were approved by the University of North Carolina Institutional Review Board and displayed a "normal" dental health status. Participants had at least 20 teeth and desired treatment of noncarious cervical lesions (NCCLs). Ninety-nine restorations were placed using a stratified randomization for the assignment of restorations. Detailed evaluations of subject, tooth location, occlusal status, lesion size, volume, and shape were obtained at baseline to ensure sample equivalence. In the final analysis, logistic regression was used to control for these factors. Restorations were evaluated at 6, 12, 18, 36, and 96 months using modified U.S. Public Health Service direct evaluation criteria. Both image evaluation and clinical evaluation were used with forced consensus required if the 2 evaluations did not agree. Absolute and cumulative failure rates were assessed. Statistical analysis tested the hypothesis that both restorative systems would yield similar results. **Methods:** No bevels or mechanical retention were placed in the preparation form. All materials were used according to the manufacturer's instructions. OptiBond Solo (filled, ethanol based) and Prime & Bond 2.1 (unfilled, acetone based) were the adhesive systems used in the evaluations. Each lesion was restored with a manufacturer-matched restorative material. The dentin surface was lightly roughened with a rotary diamond, and restorations were placed in a field isolated by cotton rolls and cord rather than rubber dam. Increments of <2 mm were placed and cured for 40 seconds using a halogen light with an output of >500 mw. Restorations were shaped and polished. **Results:** 56 restorations were evaluated after 8 years. The retention rates for OptiBond Solo (69%) and Prime & Bond 2.1 (59%) did not differ in a statistically significant manner. There were no statistically significant effects due to subject or lesion characteristics. Using the American Dental Association Council on Dental Materials, Instruments, and Equipment's revised Acceptance program criteria, there was no statistically significant difference in retention, marginal discoloration, anatomical form, or marginal adaptation. **Conclusions:** While the incidence of marginal discoloration and adaptation was relatively high, both materials performed well and produced clinically acceptable restorations in >80% of the restorations evaluated at 96 months. **Reviewer's Comments:** This is a very elaborate study done over an extended period of time. More trials of this nature and design are needed to observe long-term acceptability of dental materials. (Reviewer-Charles R. Hoopingarner, DDS).
The use of gutta-percha for obturating canals achieves the lowest percentage of voids and gaps.

**Objective:** To compare different obturation materials in order to evaluate their relative ability to provide a seal in the root canal space. The measurement of the percent of volume of voids and gaps was measured using microcomputed tomography (micro-CT). **Design/Materials:** The study consisted of in vitro testing of 48 teeth, divided into 4 groups. **Methods:** The coronal portion was removed, and the cold lateral condensation technique was used to obturate the canal spaces. All teeth were instrumented, cleaned, shaped, and dried. The canals were obturated with 1 of the following: gutta-percha and Tubliseal sealer (zinc oxide-eugenol based sealer); EndoRez points and EndoRez sealer (resin-based sealer); RealSeal points and RealSeal sealer (resin-based sealer); and a gutta-percha cone and GuttaFlow sealer. Some of these obturation materials are relatively new (within the past 5 years). Their sealing properties were evaluated to compare them with the traditional gutta-percha technique. After obturation and a waiting period of 72 hours to allow setting, a high-resolution micro-CT scanner took 2-dimensional and 3-dimensional scans. The percentage of gaps and voids was calculated. **Results:** The canals obturated with gutta-percha had a significantly lower number of voids and gaps than did those restored with the other filling materials. The coronal and middle one-thirds of the canals obturated with gutta-percha had the lowest percentage volume of voids and gaps. Only in the apical third did the canals obturated with GuttaFlow have the lowest percentage volume of voids and gaps. The canals obturated with RealSeal had the highest percentage. **Conclusions:** Gutta-percha has been the most used material for root canal obturation for many years. However, it does not chemically bond to the root canal wall. The introduction of resins into the filling material in the cones and the sealers represents a new method to minimize voids and gaps. The use of micro-CT in this study provides a definitive technique to measure these deficiencies. None of the tested materials provided a void and gap-free filling, but those teeth obturated with gutta-percha and Tubliseal showed the lowest percentage of voids and gaps. **Reviewer’s Comments:** There are several concerns with this study. The time frame was limited, so there are no data to correlate the relationship of voids and gaps with the long-term durability of these materials. Also, statistics from a study conducted in an in vivo setting would be significant. The ability to chemically bond to the root canal, exhibited by RealSeal and EndoRez provides a seal that will minimize microleakage and prevent the penetration of bacteria into the canal, which is a property that would enhance the success of the treatment. Different obturation systems should be compared that may enhance the use of these newer materials. (Reviewer: Edward N. Friedman, DDS).
Dental Amalgam Restorations Have Lower Risk of Replacement

An Evaluation of Replacement Rates for Posterior Resin-Based Composite and Amalgam Restorations in U.S. Navy and Marine Corps Recruits.

Simecek JW, Diefenderfer KE, Cohen ME:

J Am Dent Assoc 2009; 140 (February): 200-209

There is a higher risk of replacement for resin-based composite restorations than for dental amalgam restorations.

**Objective:** To compare the replacement rates of amalgam and resin-based composite restorations in order to assist in the treatment planning of military personnel. Restoration longevity is of the utmost importance to the military.

**Methods:** This article reviews 12 studies that evaluated the difference in the longevity of posterior restorations on young, healthy U.S. adults using 2 commonly accepted restorative materials. Amalgam and resin-based composite restorations were placed in subjects with 5 year and longer follow up studies. Survival rate, risk of fracture and risk of secondary caries were compared. Both endodontically treated teeth and multiple surface restorations were included in the study. The median age for the amalgam and resin-based composite restorations was calculated to statistically compare them. Deficiencies in the materials lead to the possibility of failure of the restoration. This has been a problem during deployment of the military personnel in all branches of the service. Review of the dental records, radiographs, clinical examinations, and standardized clinical charting was used to evaluate all posterior teeth with amalgam or resin-based composites. Teeth evaluated all included at least an occlusal (1 surface) restoration, and others had multi-surface restorations. Replacements were performed for reasons of new primary caries, secondary caries, defective restorations, and for endodontic therapy.

**Results/Conclusions:** The proportion of amalgam to resin-based restorations is decreasing. Many patients now request the more aesthetic, resin-based composite “white” fillings even though dental amalgams have a lower risk of replacement. The leading cause of failure of posterior restorations is secondary caries. The additional cost, a more technique-sensitive procedure, and frequency of replacement must be considered before placing resin-based composite restorations in these high-risk patients.

**Reviewer's Comments:** This study demonstrates a dilemma for the clinical dentist. Patients now have an alternative to dental amalgam for their restorations. However, there is no "one size fits all" type of material. As the resin-based composite materials and bonding systems improve, the longevity of those restorations should increase. There is a large increase in their use, as many offices today are "amalgam free." However, at the present time, the studies presented in this article statistically conclude that the dental amalgam restorations have a lower risk of replacement. (Reviewer-Edward N. Friedman, DDS).

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Keywords: Restorative

Print Tag: Refer to original journal article
The first, large institutional study of the association between oral bisphosphonates and ONJ indicates that even short-term use of oral agents in certain dental patients may lead to ONJ.

**Background:** Previous retrospective studies of osteonecrosis of the jaw (ONJ) associated with dental conditions in patients who take or previously took bisphosphonate drugs indicated that the highest risk of ONJ occurred in association with IV forms of these drugs and was rare among patients taking oral forms.

**Design/Objective:** The authors conducted a contemporaneous study of a large dental school patient population to identify active patients who had used an oral bisphosphonate (alendronate, Fosamax®) and to characterize those with active ONJ and associated risk factors and comorbidities.

**Methods:** Patients-of-record in a large U.S. dental school, with a history of using oral alendronate and currently on treatment for active ONJ, were identified through query of an electronic patient record, which also correlated the use of alendronate with tooth extraction and other procedures. This group was compared with all other patients from the same school who had not taken alendronate, but who also had teeth extracted.

**Results:** Of the 208 patients who had used alendronate, 9 (4%) had been diagnosed with ONJ. All cases occurred after simple extraction or traumatic exposure of bone due to dentures. The patients affected with ONJ ranged in age from 63 to 80 years (average, 73 years), and all were female with a history of bisphosphonate use of at least 12 months' duration. Other coexisting conditions in these patients included Type 2 diabetes mellitus, high blood pressure, steroid therapy, and/or cancer chemotherapy. Of the 208 patients, 66 had undergone simple tooth extraction without any preventive treatment modifications or any prophylactic measures, and 4 of them developed ONJ at the extraction site. Another 5 cases of ONJ were related to denture irritation and mucosal ulceration. In comparing these cases with 13,522 patients who had no history of alendronate use, 4,384 had tooth extraction but without any cases of ONJ.

**Reviewer's Comments:** Conclusions/Reviewer's Comments: This study suggests that the prevalence of ONJ in dental patients who have taken oral bisphosphonates may be higher than previously thought and is supported by the outcomes obtained in another similar study in Australia. The study reinforces the need to carefully screen patients for all types of bisphosphonate use (oral dose forms as well as IV ones), particularly patients with other medical conditions that appear to put them at elevated risk of ONJ. The authors emphasize that ONJ is a serious risk-management concern in dental practice to be addressed with proper informed consent prior to dental treatment, and patients at risk for this condition should be managed carefully, with appropriate, frequent preventive care, an emphasis on excellent oral hygiene, and utilization of atraumatic alternatives to tooth extraction whenever possible. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: ONJ

Print Tag: Refer to original journal article
N₂O scavenging systems can no longer be considered optional in minimizing exposure of dental office personnel to this sedative agent.

**Background:** Nitrous oxide (N₂O) contamination of dental offices represents a health threat to male and female dental personnel. Retrospective studies have shown an increased risk of spontaneous abortion and premature births, decreases in fertility in women, and both sexes may experience neurologic toxicity, with effects on memory and tactile sensation. Other effects may include bone marrow suppression with a decreased numbers of white cells.

**Design/Objective:** To evaluate the effectiveness of 2 scavenging systems (the Safe Sedate Dental Mask and the Porter Nitrous Oxide Sedation System) in oral surgery patients during 3 "phases" and comparing 1 experienced operator to an inexperienced operator; the size and ventilation characteristics of the 2 operatories in which the sedations were performed were also considered.

**Methods:** Nitrous concentrations were determined using infrared thermography and infrared spectrophotometry, and video recordings of the procedures were made to correlate nitrous concentrations in the air as the dental procedures were being performed. Both scavenging systems were set at vacuum flows of 45 L/minute. Procedures were limited to the removal of at least 2 third molars, averaging 30 to 60 minutes, and N₂O concentrations were 60% at 5 L/minute in all patients.

**Results:** The Safe Sedate system performed better than the Porter Nitrous Oxide Sedation System; the experienced surgeon achieved overall better results. Neither system met the recommended exposure limit of <25 parts per million (ppm) set by the National Institute for Occupational Safety and Health. The experienced surgeon achieved average N₂O concentrations of 62 ppm with the Safe Sedate system and 226 ppm with the Porter system. However, the Safe Sedate system, in the hands of an experienced operator, reached the 50 ppm limit proposed by the American Conference of Governmental Industrial Hygienists in 50% of the cases in which the Safe Sedate system was used by an experienced surgeon. This study also established that additional controls to limit N₂O exposure are required, including good fit of the scavenging system and nasal hood, turning on the scavenging system before turning on the N₂O, and minimizing talking and mouth-breathing by the patient.

**Reviewer's Comments:** This study confirms that the use of N₂O inhalation sedation produces levels of N₂O in the operatory air that exceed those recommended by leading agencies in workplace safety. It also demonstrates that a good scavenging system, used in conjunction with workplace controls on N₂O exposure during sedation, can minimize exposure of dental personnel to N₂O and should reduce overall risk of chronic complications associated with N₂O contamination of the workplace. A scavenging system is an essential safety factor during N₂O sedation and must now be considered a requirement during the use of inhalation sedation. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Nitrous Oxide Scavenging

Print Tag: Refer to original journal article
Pregnant patients should receive dental care as needed, with appropriate precautions. Based on a current survey, some widely-held notions about dental care of pregnant patients are not founded on scientific evidence.

**Background:** Pregnancy requires special precautions in dentistry and avoidance of potentially harmful interventions. While dental care of pregnant patients is frequently essential, dentists may lack sufficient knowledge about the care of pregnant patients to actually accept them for treatment. In addition, education of pregnant women may significantly improve the dental prognosis of the infant/child.

**Design/Objective:** This report is based on a survey sent to general dentists and was designed to determine the dentists’ attitudes, beliefs, and practices regarding the dental care of their pregnant patients and their utilization of “anticipatory guidance” to improve the oral health of infants.

**Methods:** The survey included questions on demographics, preventive care, routine treatment, and emergency treatment of pregnant patients. Eight procedures were referenced in the questions, including single radiographs, full-mouth radiographs, extractions, fillings, local anaesthetics, and nitrous oxide. The survey also determined the trimester in which the treatments were done and how frequently they were performed, as well as assessing the prescribing of medications for pregnant patients and the impact of continuing education. Statistical analysis compared survey responses to treatment guidelines published by a state department of public health and the Food and Drug Administration pregnancy categories for medications. Finally, dentists’ attitudes, knowledge, and practices in the dental care of pregnant patients were correlated to continuing education.

**Results:** A high percentage of the responders believe that prenatal counselling is important, although 2 barriers to implementing this are cost and inadequate compensation by insurance and concern about liability. The survey indicated a preference for the second trimester as the preferred stage for treatment, as recommended in the guidelines, and most indicated that emergency care should be rendered, again in the second trimester. Nitrous oxide and full-mouth radiographs were the procedures that dentists vary most from in regard to the guidelines, with most indicating that they "never" utilize these procedures at any time during pregnancy. However, 28% indicated that they would prescribe aspirin to a pregnant patient, even though this drug is contraindicated throughout pregnancy, and other nonsteroidal anti-inflammatory drugs should only be used short-term and not at all during the first trimester. Finally, there was little correlation between years since graduation or continuing education and practices preferred in pregnant patients, although the more recent graduates had a greater tendency to counsel pregnant patients about transmitting caries to their babies, and tended to agree that full-mouth radiographs are safe and were less likely to recommend aspirin for pain control.

**Reviewer's Comments:** This study confirms that a significant proportion of dentists do not manage pregnant patients in accordance with scientifically-based guidelines, although continuing dental education and changes in insurance benefits for pregnant patients may lead to greater compliance. Greater availability of continuing education courses focusing on care for pregnant patients will improve their access to dental treatment, although dental schools share in this responsibility. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Pregnant Patients

Print Tag: Refer to original journal article
Most patients with oral lichen planus have long-lasting lesions and a low risk of malignant transformation; therefore, they require long-term periodic follow-up by their dentist and oral medicine specialist.

**Background:** Oral lichen planus (OLP) is a chronic inflammatory disease affecting 1% to 2% of the population. OLP lesions are potentially premalignant, seldom remit, and have significant morbidity. Reported frequency of malignant transformation to oral squamous cell carcinoma (OSCC) ranges from 0% to 12.5%.

**Objective:** To retrospectively determine the clinical features and outcome of Italian patients with OLP followed for 6 months to 17 years.

**Design/Participants:** Retrospective chart review study of patients of an oral medicine clinic in Turin, Italy, seen for the diagnosis and management of OLP from November 1987 through December 2004. Patients with at least 6 months of follow-up were included.

**Methods:** Data collected included demographics, histologic diagnosis, and age at time of diagnosis, gender, smoking, alcohol consumption, first oral symptoms, clinical types, oral sites, extraoral sites, systemic diseases, and drugs. During the follow-up period, data collected included duration of disease, clinical evolution, treatment, systemic diseases, and skin or mucosal lichen planus. The clinical form of OLP was recorded for the beginning and the end of the follow-up period. Descriptive statistics were calculated. Standardized incidence ratios (SIR) of development of OSCC were calculated with 95% confidence intervals. SIRs were obtained by comparing the observed number of oral tumors with the expected number of cases in the study population based on local cancer statistics.

**Results:** 808 patients (315 men and 493 women; female-to-male ratio, 1.56:1) were included. Mean age at presentation was 58.3 ± 12.4 years for men and 61.4 ± 13.3 years for women. Follow-up ranged from 6 to 204 months; 77.8% were nonsmokers and 87.7% were nondrinkers. More than 20% had liver abnormalities, 83.5% of which had hepatitis C. Sixty percent had reticular and plaque OLP, while 40% had erosive or atrophic forms. Approximately 12.3% had extraoral lesions; 40% of patients were symptomatic and required treatment, mainly with topical corticosteroids. At the end of the follow-up period, 78% had oral lesions, 76.6% showed a stable clinical appearance, 6% had gotten worse, and 2.47% had improved. OSCC developed in 15 patients (3 men and 12 women; 14 invasive SCCs and 1 verrucous carcinoma) an average of 52.33 months after initial diagnosis. Overall SIR was 45.3 (95% CI, 21.2 to 87.3) higher in women than in men. Malignant transformation rate was estimated at 0.69% per year.

**Conclusions:** Most patients with OLP have long-lasting lesions and a risk of malignant transformation, so they need periodic follow-up for many years by well-trained clinicians, including oral medicine specialists and primary care dentists.

**Reviewer’s Comments:** Despite limitations associated with the retrospective study design, this paper uniquely contributes to an understanding of the natural history of OLP, because it presents data on one of the largest groups of OLP patients with long-term follow-up. Malignant transformation occurred in 1.85%, with a transformation rate of 0.69% per year. Patients with OLP need long-term periodic follow-up by their dentists (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Lichen Planus

Print Tag: Refer to original journal article
CBCT Imaging Better for Periapical Diagnosis

Interpretation of Chemically Created Periapical Lesions Using 2 Different Dental Cone-Beam Computerized Tomography Units, an Intraoral Digital Sensor, and Conventional Film.

Özen T, Kamburoğlu K, et al:


CBCT performs better than intraoral digital and film radiographs for the detection of chemically created periapical lesions.

Background: Radiography is the only method for detecting periapical pathology. Intraoral radiographic diagnosis is obstructed by superimposition of structures, beam angulation, and lesion size and location. Cone-beam computerized tomography (CBCT) shows the teeth in 3 dimensions and could aid in diagnosis of periapical inflammatory lesions.

Objective: To compare the performance of 2 different CBCT units, intraoral digital, and intraoral film radiography in the detection of chemically created periapical lesions.

Methods: 3 fresh cadaver mandibles were used. After soft tissue was removed and radiographs taken, 27 intact roots of 23 teeth (6 incisors, 4 canines, 6 premolars, and 7 molars) were selected. Periapical lesions were created by previously described methods using 70% perchloric acid for 6 to 12 hours, and replacing the tooth. Intraoral digital and E-speed film periapical images and CBCT images were obtained before and after the creation of the lesions. Digital images were captured using a charge-coupled device sensor. CBCT images were obtained using a Next Generation i-CAT machine and an Iluma Ultra CBCT. The smallest voxel size was selected (0.125 mm for i-CAT; 0.09 mm for Iluma). Volumetric data were reconstructed to provide serial coronal and sagittal sections. Images were independently evaluated by 3 trained observers. The presence or absence of periapical pathology was scored using a 5-point scale. All images were coded and viewed randomly (film images on a view box and digital and CBCT images on a computer monitor). Kappa statistics were calculated and data were analyzed using repeated measures analysis of variance (ANOVA) for nested designs. R2 values were calculated for each observer for each method. The paired sample t test for 2 proportions was used to test for significant differences between observers and methods.

Results: Kappa values for intraobserver agreement were 0.196 to 0.542 (intraoral) and 0.533 to 0.699 (CBCT). Kappa values for interobserver agreement were 0.223 to 0.302 (intraoral) and 0.417 to 0.461 (CBCT), indicating better agreement for CBCT images. There was no significant difference between the 2 CBCT units tested (P >0.05) and no difference between the 2 intraoral radiographic techniques. CBCT images from both machines performed better than intraoral images for all observers.

Conclusions: CBCT performed better than intraoral digital or film images for the detection of chemically created periapical lesions. CBCT should be considered for diagnosis of suspected periapical pathology when conventional radiographic techniques fail.

Reviewer’s Comments: The chemically created lesions were small with radiographically diffuse borders, similar to naturally occurring periapical inflammatory lesions. This is the first study comparing CBCT images to intraoral digital and film images for detection of chemically created periapical lesions. Because of the relatively high dose and acquisition times associated with the high-resolution scans compared to intraoral radiography, CBCT should be reserved for cases where intraoral radiography fails to assist in the diagnosis of suspected periapical pathology. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Periapical Pathology

Print Tag: Refer to original journal article
Ethanol-wet-bonding leads to higher bond strengths and increases the durability of resin-dentin bonds over time.

**Background:** At first blush, most of us would assume that a simplified technique is new and improved, and thus better. But then we have to question in what sense is it better. If the so called "simplified adhesive" saves me a step, then what is the cost? Do I have to sacrifice durability to save time, or would I be willing to take an extra step for increased durability?

**Objective:** To test the hypothesis that "ethanol-wet-bonding" would increase the durability of the resin-dentin bond when compared to traditional 1-bottle wet-bonding.

**Methods:** Flattened, etched dentin samples were saturated with 1 of 2 solvents (water or ethanol) for 1 minute and then treated with 1 of 5 experimental adhesives followed by composite build-ups. Each tooth was sectioned into multiple beam shape specimens and assigned to 1 of 4 time groups (24-hours and 3, 6, and 12 months). Microtensile bond testing was conducted for each group.

**Results:** Over time, the microtensile bond strengths for the water-saturated groups showed mixed results for the 5 experimental adhesives. Some of the groups remained the same, while others decreased, but the general trend was toward lower bond strengths. With the exception of 1 adhesive (which was still higher than the water group of the same adhesive but not significantly), the ethanol-saturated groups showed significantly higher bond strengths for the remaining adhesives at 12 months.

**Conclusions:** The authors concluded that ethanol-wet-bonding leads to higher bond strengths and increases the durability of resin-dentin bonds over time.

**Reviewer's Comments:** Other studies on the topic of adhesive durability have not shown favorable results. What I like about this study is that the researchers demonstrate a technique that not only increases immediate bond strengths, but maintains or increases the durability of the resin-dentin bond long-term. While bond studies that report 24-hour results can provide some beneficial information when screening materials, it is the longer-term studies like this one that will help guide future trends. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Dentin Bonding

Print Tag: Refer to original journal article
The use of 2% chlorhexidine digluconate as a dentin primer to etched dentin may preserve dentin bond strength over time.

**Background:** It is believed that endogenous collagenolytic activity contributes to the degradation of caries-affected dentin (CAD) bonds more so than normal dentin (ND). Chlorhexidine is considered an effective therapeutic agent that could minimize the degradation of exposed collagen fibrils more prevalent in the CAD matrix.

**Objective:** To evaluate bond strength durability of 2 etch-and-rinse adhesives on CAD pretreated with 2% chlorhexidine digluconate (CHX).

**Methods:** Extracted human molars were flattened to expose dentin and divided into carious and normal groups. The carious dentin surfaces were excavated to where only CAD remained, defined by the authors as "colorless to light pink, firm and opaque." The dentin surfaces were etched and rehydrated with water (controls) or 2% CHX, followed by application of either a 3-step etch-and-rinse adhesive (Scotchbond Multi-Purpose-MP), or a 2-step etch-and-rinse adhesive (Single Bond 2-SB). Composite was bonded to the dentin surfaces followed by immediate and 6-month microtensile bond testing.

**Results:** The results showed the following. (1) Bond strength to dentin for the control and CHX generally decreased after 6 months with the 2-step etch-and-rinse adhesive. (2) When using the three-step etch-and-rinse adhesive, bond strength to dentin did not significantly change at 6 months, that is, baseline values were maintained over time. (3) Irrespective of the adhesive used or dentin substrate rehydration technique, there were no significant differences between the bond strength to ND versus CAD.

**Conclusions:** The rehydration of etched dentin with 2% CHX may preserve bond strength over time with the use of conventional 3-step etch-and-rinse adhesive.

**Reviewer's Comments:** The results of this study add to the growing body of literature that demonstrates the superior performance of 3-step etch-and-rinse adhesives over the simplified 2-step etch-and-rinse adhesives. It is interesting to note that 2% CHX will not only help preserve dentin bond strength to ND, but CAD over time. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Chlorhexidine Digluconate Primer

Print Tag: Refer to original journal article
While 4% articaine appears to have a good success rate when used by infiltration of mandibular teeth, its success rate is poor when irreversible pulpitis is present. Intraosseous anesthesia remains the injection-of-choice in such cases.

**Background:** Several well-designed studies have established the effectiveness of 4% articaine when used for infiltration anesthesia in asymptomatic lower posterior teeth, but there remains a need for a study of this technique for teeth with irreversible pulpitis.

**Objective:** To determine the efficacy of 4% articaine for endodontic procedures involving lower posterior teeth with irreversible pulpitis, following administration of an inferior alveolar nerve block that did not provide profound pulpal anesthesia.

**Design/Participants:** This study was focused on patients who had lower teeth with irreversible pulpitis and who had been scheduled for endodontic therapy. All subjects would receive a conventional inferior alveolar block, and endodontic treatment would begin when lip anesthesia on the injected side was present for at least 15 minutes. If the anesthesia was deemed unsuccessful when the pulp chamber was entered (based on a visual analog score [VAS] score >54 mm), 1.8 mL of 4% articaine was infiltrated over the affected tooth. The procedure was resumed 5 minutes after the infiltration injection. **Participants:** Study subjects were 82 adult patients who required endodontic treatment of lower posterior teeth (first and second molars, first and second premolars) due to irreversible pulpitis, but who were otherwise normal and healthy.

**Methods:** Subjects received a conventional inferior alveolar nerve block injection using 1.8 mL of 2% lidocaine with 1:100,000 epinephrine, and the endodontic procedure was begun after the patient's lip was numb for 15 minutes (to allow for the slower onset of pulpal anesthesia than for soft-tissue anesthesia). If entry into the pulp chamber resulted in significant pain (ie, VAS score >54 mm), 1 cartridge of 4% articaine was infiltrated over the tooth being treated and the procedure resumed after 5 minutes. If pain continued to be present, an intraosseous injection was performed and the procedure completed.

**Results:** Success rates for the second injection of 4% articaine were 58% for first molars, 48% for second molars, and 100% for premolars. However, only 3 first premolars and 3 second premolars were included in the study.

**Conclusions:** In cases of irreversible pulpitis in lower molar teeth, the infiltration of 4% articaine as a supplemental anesthetic technique does not demonstrate an acceptable success rate, although the thinner cortical plate of the premolar region may facilitate greater success in these teeth. Intraosseous techniques remain as the injections-of-choice for anesthetizing lower posterior teeth that are not successfully managed with the conventional alveolar block injection. Lip numbness is not predictive of successful anesthesia in such cases.

**Reviewer's Comments:** This study confirms that infiltration of lower molars with 4% articaine does not adequately overcome failure of conventional block techniques when irreversible pulpitis is present, although premolar teeth may yield better results. Intraosseous injections remain as the best alternative in such cases. (Reviewer-Arthur H. Jeske, DMD, PhD).

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**Keywords:** Articaine

**Print Tag:** Refer to original journal article
Plaque Inhibition Efficacy Varies Between Dentifrice Brands

A Randomized Clinical Trial to Compare Plaque Inhibition of a Sodium Flouride/Potassium Nitrate Dentifrice Versus a Stabilized Stannous Flouride/Sodium Hexametaphosphate Dentifrice.

Bellamy P, Khera N, et al:

J Contemp Dent Pract 2009; 10 (March 1): 1-8

Plaque inhibition efficacy varies significantly from dentifrice to dentifrice, and practitioners should evaluate which products best serve their patients' needs.

**Objective:** To investigate, by comparison, the plaque inhibition abilities of 2 leading dentifrice brands, one of which is commonly used for the treatment of dentinal hypersensitivity.

**Design:** Randomized, double-blind, crossover, clinical trial.

**Participants:** 20 subjects familiar with plaque trials were evaluated over two 17-day intervals with a 4-day normalization period in between.

**Methods:** Subjects were randomized, acclimatized, instructed, and given a blinded tube of dentifrice containing either NaF/KNO₃ or SnF₂/SHMP (sodium hexametaphosphate). Normal, twice-a-day brushing was prescribed with identical manual toothbrushes. Plaque scores were determined using a digital plaque image analysis (DPIA). Overnight, pre- and post-brushing images were evaluated at specific times during the study. After a 4-day normalization period, the dentifrices were switched and the evaluations repeated.

**Results:** There were no statistically significant differences based on the order in which the dentifrice was used or between the results from any time point analyzed. However, there was a statistically significant difference varying from 17.3% to 23% between the 2 products tested, with the SnF₂/SHMP product being more effective than the NaF/KNO₃ product. Even the post-brushing DPIA scans were lower using the SnF₂/SHMP product. This was thought to result from less plaque being present before brushing due to the effective inhibition of that product. This was consistent during the crossover period.

**Conclusions:** The crossover design of the study served to limit individual participant variables and confirm the result findings. The SnF₂/SHMP product was clearly more efficient in plaque inhibition than the NaF/KNO₃ product.

**Reviewer's Comments:** This study was conducted at the facility of Procter & Gamble, maker of the SnF₂/SHMP product, at the London Innovative Centre in response to increased claims that the NaF/KNO₃ product could be used as a replacement for a regular fluoridated dentifrice. While gingivitis and more advanced periodontal disease have plaque accumulation as a very important etiologic factor, there are other factors involved in the process that are not dependent on plaque removal. Additionally, a number of other conditions (dental hypersensitivity and erosion) may exist and require intervention as well. These 2 conditions in particular have been shown to respond to medicament application through a dentifrice delivery system. The main benefit of this study was to make apparent the fact that there is a variation in the efficacy of specific products in treating specific conditions. It is then up to the dental practitioner to determine which conditions require intervention and which product warrants recommendation to the patient. (Reviewer-Charles R. Hoopingarner, DDS).

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Keywords: Plaque Inhibition

Print Tag: Refer to original journal article
Self-adhesive resin cements do not demineralize/infiltrate dentin like the conventional dual-cure etch-and-rinse cements.

**Background:** The interest of Self-Adhesive Cements is ever increasing as the demand for simplified bonding techniques continues to grow. As the simplified adhesives eliminated the etch-and-rinse steps, the simplified cements go a step further and eliminate the adhesive application step. Microscopic studies have demonstrated inconsistencies with decalcification/infiltration of simplified adhesives.

**Objective:** To analyze the extent of infiltration of various self-adhesive resin cements at the dentin-cement interface.

**Methods:** Human third molars were flattened to expose mid-coronal dentin. Cylinders (4 x 8 mm) of composite resin were fabricated and luted to dentin with 1 of 6 resin cements. Four of the cements were classified as self-adhesive cements (Multilink Sprint, Rely X Unicem, G-Cem, and Bis-Cem), 1 was a dual-cured self-etch cement (Panavia F 2.0), and 1 was a control dual-cured etch-and-rinse cement (Calibra). A staining technique specific for visualizing (under optical microscopy) the depth of decalcification at the dentin-cement interface was used to analyze the specimens. The staining technique causes the dentin to stain green and exposed protein/de-mineralized collagen to appear red as the cement remains clear. Therefore, the depth penetration of the red dye would be associated with a zone of decalcification. Scanning electron microscopy (SEM) was used to confirm resin tag infiltration and the formation of a hybrid zone.

**Results:** A distinct zone of demineralization (red zone) was observed along with resin infiltration confirmed (SEM) for the control etch-and-rinse cement. Evidence of demineralization/infiltration into dentin was absent when the self-adhesive cements were analyzed.

**Conclusions:** The self-adhesive resin cements do not demineralize/infiltrate dentin like the conventional dual-cure etch-and-rinse cement.

**Reviewer's Comments:** This study provides a good picture of what is occurring on the microscopic level of the self-adhesive cement and dentin, and may shed light on why we see lower bond strengths with self-adhesive cements compared to etch-and-rinse resin cements. A natural parallel exists with simplified resin cements and simplified adhesives in which components are combined to save time. Past studies have shown simplified adhesives to be weak in terms of durability. If the track record of simplified adhesive is a predictor of how the simplified resin cements will perform long term, then we would be well advised to proceed with caution. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Resin Cements/Self-adhesive Dements

Print Tag: Refer to original journal article
Teaching the Relationships Between Oral and Systemic Diseases

Periodontal-Systemic Disease Education in U.S. and Canadian Dental Schools.

Wilder RS, Iacopino AM, et al:


The majority of U.S. and Canadian dental schools teach their students about the oral-systemic disease connection, but the need for collaboration with other health care professionals is needed.

**Background:** Recently, the profession of dentistry has expanded its foundations in evidence-based practice (EBP), including exploration of the relationships between oral and systemic diseases (eg, periodontal disease, diabetes, and pregnancy outcomes). Ultimately, dental education will be the primary means by which these concepts are integrated into general dental practice.

**Objective:** To assess several important areas of the current status of the oral-systemic disease relationship in the predoctoral dental curriculum in U.S. and Canadian dental schools.

**Design:** The authors used a 34-question survey that was sent to the academic deans at U.S. and Canadian dental schools. The survey included questions on demographics, didactic course content, clinical course content, opinions, and educational resources used in teaching the relationship between dental disease and systemic conditions.

**Methods:** 65 surveys were sent to the dental educational institutions, and included both closed- and open-ended questions. The survey was sent both electronically and by regular mail. Survey responses were analyzed statistically, and open-ended questions were categorized by type of response.

**Results:** 50 schools responded to the survey, for a 77% response rate. With regard to time devoted to the various topics, >50% of the schools devoted ≥6 hours to aging, cardiovascular disease, diabetes, tobacco use, and HIV, while 3 to 5 hours were devoted, on average, by one-third of the schools to the topics of HIV, genetics in chronic and aggressive periodontitis, stress, tobacco use, and stroke. Only about 25% of the schools included ≥3 hours of instruction about adverse pregnancy outcomes. With regard to disciplines in which these topics were covered, most were taught in the periodontics curriculum (didactic and clinical), and all used lectures to teach the topics. Most schools utilized dental scientific publications for course resources and, significantly, only 16% of the schools that responded indicated that their teaching activities included students from other health disciplines (nursing, medicine, and allied health science). Less than half of the schools indicated that they teach their students how to educate patients about the relationships between oral and systemic health. Finally, a majority of the schools indicated that while they are confident about their current abilities to teach these topics, more than half indicated they need additional faculty expertise to achieve this goal.

**Conclusions:** Dental school academic deans agree that it is very important to provide new dental graduates the necessary knowledge and skills to evaluate and apply the scientific relationships between oral and systemic diseases, but many also acknowledge that more educational time and faculty experts are needed.

**Reviewer’s Comments:** Additional curricular time and expertise are needed in dental education to adequately address and teach the relationship between oral and systemic diseases. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Oral-Systemic Disease

Print Tag: Refer to original journal article
Modifying plastic implant impression copings may avoid additional surgery.

**Background:** Excellent, accurate impressions of implant abutments are facilitated by the use of impression copings. Using common materials and this technique, impressions of crowded, misaligned implants may be improved based on the authors’ experience.

**Objective:** The authors, faced with a clinical need to improve the implant-level impression of closely spaced, convergent implant abutments, devised a technique for using custom-fabricated copings in a closed tray, to obtain usable dies for fabrication of the final implant-supported restorations. The case report is based on a female patient who presented with two 3.5 x 10-mm internal connection implants spaced <2 mm apart and exhibiting occlusal convergence of approximately 20°.

**Methods:** The treatment plan presented to the patient included the option of removal and replacement of the 2 implants to achieve more ideal positions, but the patient did not want additional surgery. Since conventional impression copings could not be used, the authors modified solid-plastic, press-fit, closed-tray coping, placing the distal coping first, and then modifying the mesial one until it was completely over the more mesial implant abutment. No splinting of the copings was employed to minimize the impact of acrylic shrinkage and related distortion. Following the closed-tray silicone impression, implant analogs were used to fabricate a 2-unit metal substructure, which required an additional appointment to verify fit prior to completion of the restorations.

**Results:** The authors report the successful fabrication of a final, 2-unit, implant-supported posterior restoration using this technique.

**Conclusions:** The authors suggest caution in using this technique because the impression copings are weakened when modified to fit closely together, they lose retention when modified, their fit cannot be confirmed radiographically because they lack radiopacity, and it is difficult to confirm accuracy of the final dies made from this impression technique.

**Reviewer’s Comments:** Appropriate implant alignment during surgical placement in many cases obviates the need for special impression techniques for fabricating the final restorations. Solid plastic impression copings provided by the manufacturers of implant systems may be modified in cases of less-than-ideal implant-to-implant relationships, but additional error can be introduced, and the restorations substructures fabricated from these impressions require an additional try-in appointment. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Implants/Impressions

Print Tag: Refer to original journal article
A 600-mg dose of ibuprofen can significantly reduce sensitivity during in-office bleaching but does not appear to have a postoperative benefit.

**Background:** In-office bleaching frequently results in gingival and tooth sensitivity, particularly when high concentrations of bleach are used. Previous studies have evaluated the beneficial effects of preoperative administration of nonsteroidal anti-inflammatory drugs such as ibuprofen on postoperative pain from endodontic and oral surgical procedures, but this has not been studied to a significant extent for sensitivity associated with in-office bleaching.

**Objective:** To determine the effect of a single dose of ibuprofen on sensitivity prior to in-office bleaching, assessed immediately and up to 24 hours after the bleaching procedure.

**Design:** Randomized, double-blind, placebo-controlled, parallel-group design using human subjects.

**Participants:** Study subjects were adult patients with a full complement of anterior teeth who had been scheduled for in-office bleaching. The teeth being bleached were not restored, not heavily stained, and did not have calculus deposits.

**Methods:** A total of 31 subjects were enrolled and randomly assigned to either a placebo group (16 subjects) or an active-treatment group (15 subjects). A placebo drug or a single dose of 600 mg of ibuprofen (Advil Liquid Gel) was administered 30 minutes before bleaching with 38% hydrogen peroxide (Opalescence Xtra Boost, Ultradent). The bleach was applied for a total of 40 minutes, with two 20-minute applications separated by a brief rinse and drying period. Subjects evaluated sensitivity immediately following the bleaching period and 1 and 24 hours later using a 100-mm visual analog scale (VAS). Presumably, subjects were allowed to subjectively report sensitivity without a specific test stimulus reported. Routine statistical tests were used to compare scores in the placebo and active-treatment groups.

**Results:** The placebo group reported significantly greater post-bleaching sensitivity than the group that received 600 mg ibuprofen, with average VAS scores of 27 mm for placebo versus 5 mm for ibuprofen. However, at 1 and 24 hours after bleaching, scores in both groups were elevated and not significantly different.

**Conclusions:** A prebleaching dose of ibuprofen may reduce sensitivity immediately after in-office bleaching, but the effect is transient and does not provide a significant benefit 1 hour or up to 24 hours postoperatively.

**Reviewer’s Comments:** Given the duration of ibuprofen, it is somewhat surprising that it did not significantly affect sensitivity 1 hour after bleaching compared with placebo, although any effect would likely not have been detectable at 24 hours. This suggests that mechanisms other than induction of inflammatory prostaglandins underlie post-bleaching sensitivity. Future studies should utilize standard, reproducible test stimuli when evaluating this significant clinical problem. (Reviewer-Arthur H. Jeske, DMD, PhD).