The translucency and color of a ceramic restoration depends on different levels of light transmission of the core and veneer ceramic material.

**Background:** There is increased use of all-ceramic crowns in place of ceramo-metal crowns in restorative practices. The difference in properties of different ceramics will affect the final esthetics of the restoration, and we need to consider this, especially when restoring anterior teeth. This article compares and analyzes translucency levels of different zirconia-based ceramic CAD/CAM systems. The translucency and color of ceramic crowns are highly correlated, determined by the amount of light scattering. This scattering is multicausal, dictated by different refractive indices, voids, porosities, and number and size of crystal particles of the ceramics.

**Objective:** To measure the difference in levels of translucency of several zirconia-based ceramic CAD/CAM systems, using lithium disilicate glass ceramic as the control.

**Methods:** 8 ceramic zirconia copings were fabricated, using 8 different CAD/CAM systems. Several thicknesses were used, and internal specifications were based as if used for a molar ceramic crown. Measurements of translucency were determined by direct transmission with a digital photoradiometer. The light passed through the ceramic, and each measurement was repeated 3 times.

**Results:** There were significant differences in translucency values of all zirconia groups when compared to the lithium disilicate control. The glass-ceramic IPS e.max Press group and the Lava copings had high translucency. Differences in translucency are due to slight differences in the coping's ceramic structure and chemistry, as well as the effect of different milling and processing methods on the crystalline structure. The authors suggest that the translucency of zirconia could be improved in the future by decreasing the grain size. Zirconia ceramics, despite their lower levels of translucency, are useful for posterior teeth, or anterior teeth when it is desired to have some masking effect of the underlying tooth structure. This situation occurs when prepared teeth are darkly colored, or when carbon fiber or metal posts were used to support the core.

**Conclusions:** The esthetics of ceramic restorations is affected by multiple factors, especially translucency. It can be altered by surface texture, thickness, staining, and color of the veneering ceramic, as well as by the color and opacity of the luting cement. Newer lithium disilicate glass ceramics demonstrate superior light transmission.

**Reviewer's Comments:** The authors did a thorough study comparing the translucency of zirconia coping materials in this in vitro study. Their use of several types of copings from different manufacturers and CAD/CAM systems provides a broad base for comparison. A future study done in vivo would be useful to further evaluate the optical appearance and esthetic differences due to differences in translucency. (Reviewer-Edward N. Friedman, DDS).

**Keywords:** Zirconia Copings, Translucency, CAD/CAM

**Print Tag:** Refer to original journal article
Dentin Pretreatment Increases Bond Strength of Self-Adhesive Resin Cements

The Effect of Dentin Pretreatment on the Microtensile Bond Strength of Self-Adhesive Resin Cements.

Pavan S, dos Santos PH, et al:

J Prosthet Dent 2010; 104 (October): 258-264

Polyacrylic acid is superior to tannic acid in increasing microtensile strength of crowns cemented with self-adhesive resin cements.

**Background:** Self-adhesive cements are becoming more commonly used, frequently replacing conventional resin cements to achieve greater bond strength. Self-adhesive resin cements have several advantages over conventional luting agents. There is better retention, minimal solubility intraorally, and less microleakage. Also, since cements can bond to the tooth as well as to the restoration, the cement provides additional reinforcement. Self-adhesive cements simplify the clinical procedure, requiring fewer steps and providing decreased levels of postoperative sensitivity. Conversely, self-adhesive cements have lower bond strengths. Pretreating dentinal surfaces with etching solutions creates both substrate surface irregularities and an intermediate layer that would increase the bond strength of self-adhesive cements.

**Objective:** To ascertain the effect of pretreating dentin with either polyacrylic or tannic acid on microtensile bond strength.

**Methods:** The dentin was exposed on 18 molar crowns, which were divided into 3 groups. The control group had no surface pretreatment, and the other groups were pretreated with either 25% polyacrylic acid or 20% tannic acid. Specimens were etched, rinsed, and dried. Composite resin blocks were luted to the dentin surface using 1 of 2 self-adhesive cements: Maxcem Elite or RelyX Unicem. All specimens were sectioned and then tested using a microtensile tester. After debonding, the microstructure of the dentin surface was examined with a scanning electron microscope.

**Results:** No significant differences of bonding strength were seen among cements in teeth having no surface pretreatment. There was no evidence of any cement on dentin surfaces after tensile testing was done on untreated specimens. Specimens treated with either polyacrylic or tannic acid both showed residual cement. This pattern was especially observed on polyacrylic acid-treated surfaces. However, there were significant differences in microtensile bond strength in pretreated specimens. The greatest microtensile bond strength value was seen in teeth pretreated with polyacrylic acid, which used RelyX Unicem cement. Teeth etched and pretreated with tannic acid that used Maxcem Elite cement had lower values.

**Conclusions:** The bond strength of self-adhesive cements, such as RelyX Unicem, can be improved by pretreating the dentin with a mild etchant, such as polyacrylic acid. However, polyacrylic acid etching did not improve the bond strength of Maxcem Elite cement. Tannic acid was less effective, as it did not completely remove the smear layer when applied to the dentin.

**Reviewer's Comments:** Treatment of dentin with polyacrylic acid will enhance bond strength with certain cements. However, there is variability in the results depending on which acid and cement are used on the dentin. Therefore, more extensive in vivo studies comparing additional etching solutions and cements would provide needed statistics for comparing the effects of certain acids when they are used in combination with different cements. (Reviewer-Edward N. Friedman, DDS).

Keywords: Microtensile Bond Strength, Dentin Pretreatment, Self-Adhesive Resin Cements

Print Tag: Refer to original journal article
Pulpotomy with a calcium-enriched mixture cement can be considered a realistic alternative therapy to extraction or root canal therapy.

**Background:** Root canal therapy for treatment of irreversible pulpitis can be complicated, expensive, and time-consuming. Therefore, a more simple technique (ie, pulpotomy) should be considered. Calcium-enriched mixture cement (CEM), a recently developed pulpotomy agent, has shown an ability to form hydroxyapatite over material in normal saline, and it exhibits characteristics similar to those of surrounding dentin when used as a root-end filling.

**Objective:** To compare pain alleviation and radiographic and clinical success rates of pulpotomy with CEM (PCEM) and 1-visit root canal therapy (ORCT) in mature human molars.

**Design/Methods:** 36-week, multicenter, randomized, parallel-group, and open-label study performed by 23 dentists. Inclusion and exclusion criteria were defined. Participants were randomly assigned to receive ORCT (arm 1) or PCEM (arm 2), and the 23 dentists were calibrated for study protocols and procedures. Arm 1 patients received root canal therapy via standard step-back and lateral condensation techniques. Arm 2 patients received pulpotomies, and the pulpal wound was covered with 2 mm of CEM. Upon completion of treatment, pain assessments were carried out from baseline up to 7 days postoperatively via NRS color/number scores. Radiographic success was classified based on modification of the Strindberg criteria (1956). Pain intensity (PI) at baseline was compared by the t-test, while PI during the 7 days was compared using the 2-way ANOVA tests. Statistical analysis of clinical/radiographic evaluations between the 2 arms was completed using a Chi-square test, a significance level was set at 0.05, and statistical analysis was performed using the SPSS version 13. The primary outcome measure was long-term clinical and radiographic success rates of PCEM compared with ORCT, and intermediate-term clinical and radiographic success rates after 6 months. The secondary outcome measure was pain relief during 7 days.

**Results:** 407 individuals participated in the study. Clinical findings revealed 91.3% and 94.4% success in the PCEM and ORCT arms, respectively. Consensus treatment outcome of radiographic evaluation between study arms revealed a statistically significant difference. Mean baseline PI scores were comparable between study arms. Mean postoperative PI scores during 7 days were 1.26 in the ORCT arm and 0.67 in the PCEM arm. There were 62% more participants who took analgesics postoperatively in the ORCT arm (60%) than in the PCEM arm (37%).

**Conclusions:** PCEM significantly reduced postoperative pain compared to ORCT. PCEM had higher radiographic success rates. PCEM is not only non-inferior but also may be superior to ORCT in adult permanent teeth with established irreversible pulpitis.

**Reviewer's Comments:** This is the first randomized clinical trial to assess pulpotomy treatment in human permanent teeth with irreversible pulpitis, and it may have clinical implications for patients in developing countries, who may otherwise not have the financial means to retain their dentition. (Reviewer-Kelly A. Halligan, DDS).
There is no cognitive difference between patients with and without amalgam restorations.

**Background:** The negative health effect of mercury released from dental amalgam has been debated for many years, and a relatively high number of adults are concerned about possible adverse health effects. Amalgam-related complaints are defined as self-reported complaints that affected subjects believe are caused by mercury released from their amalgam fillings. Several studies have failed to find any association among numbers of amalgam fillings and surfaces, mercury concentrations in blood and urine, and self-reported amalgam-related complaints. Self-reported cognitive symptoms are frequent in subjects with amalgam-related complaints, but few studies have focused on their cognitive function.

**Objective:** To examine a symptom profile and whether participants with amalgam-related complaints have cognitive deficits, as compared with control individuals.

**Design:** In vivo study using longitudinal and cross-sectional analysis.

**Participants/Methods:** 342 participants with amalgam-related complaints and 342 without amalgam restorations from a longitudinal population-based study used a control group match by age, gender, and education. For 81 participants with amalgam-related complaints and for controls, data were available approximately 5 years before onset of complaints, making a longitudinal analysis possible. All participants were assessed by a self-reported health questionnaire (yes/no to 9 systems review questions) and a comprehensive cognitive test battery (episodic/semantic memory and visuospatial ability). Participants with amalgam-related complaints reported more symptoms, mainly musculoskeletal and neuropsychological, compared with controls ($P < 0.001$).

**Results:** Most commonly reported symptoms related to amalgam fillings on the questionnaire were musculoskeletal and neuropsychological. In the case group, 26% of patients reported having ≥8 symptoms, compared to 9% in the control group. No significant difference between the amalgam and control group, either cross-sectionally or longitudinally, were noted for any of the cognitive tests. Both groups showed decline of cognitive function over time, most likely due to age.

**Conclusions:** No statistically significant differences were found among the amalgam and control groups in cognitive testing.

**Reviewer's Comments:** This was a beautiful review of the literature from the 1980s to the present day. I believe this article could be beneficial as a scientific reference for patients hesitant to accept amalgam restoration, even when its benefits far exceed risks. The fact that this study allowed for both a cross-sectional and longitudinal analysis and for the ability to record changes in cognitive function before and after onset of amalgam-related complaints make this study unique in the literature. There were some limitations, such as small sample size and not knowing the number and amalgam surfaces, which were admitted by the author. (Reviewer-Timothy J. Halligan, DMD).

**Keywords:** Dental Materials, Mercury, Dental Amalgam, Amalgam-Related Complaints

**Print Tag:** Refer to original journal article
Cantilevers Are Not That Bad

Limited Evidence That Cantilevers Are Associated With Slightly Lower Survival Rates of Implant-Supported Fixed Partial Dentures.

Lee H, Yu A, Flores-Mir C:

J Am Dent Assoc 2010; 141 (November): 1371-1372

Cantilever implant-supported fixed partial dentures have a place in the general dentist's armamentarium.

Objective: To review a meta-analysis on survival and complications of implant-supported fixed partial dentures (FPDs) with cantilevers (Zurdo et al, Clin Oral Implants Res 2009; 20: 59-65). Review: The original review conclusion was that implant-supported FPDs with cantilevers had a higher incidence of complications and lower 5-year survival rates. The current authors searched for English-language studies in the Cochran database for systematic reviews and clinical studies on survival rates, as well as technical and biological issues with implant-supported FPDs, both using and not using cantilevers. These studies required a follow-up period of at least 5 years. Eleven articles were chosen from 103 that fulfilled these criteria. These articles were then processed as full-text reviews. Of these 11 reviews, the reviewers then selected 3 studies to evaluate.

Results: Implant fracture was the main cause of failure for the FPD with cantilevers. Weighted mean complication occurrence was 20% with cantilevers and 10% without. It is stated that porcelain fractures and bridge screw loosening were common complications. There were no significant differences in peri-implant bone level change. While both designs showed high 5-year survival rates, cantilevers had a higher incidence of minor complications. Discussion: In a commentary, it is stated that there are reasons, such as lack of space available and financial constraints, for considering cantilever restorative solutions to implant placement, and, therefore, it is quite important that the clinician consider survival rates and complications of both placement alternatives. The reviewers were somewhat critical of the original authors' technique in the systematic review, suggesting publications in languages other than English and more detailed classifications be used. Also, it was recommended that the original authors be contacted for additional information when criteria were unclear. These reviewers used acceptable methods for this systematic review, but it was felt that the number of patients studied was inadequate to provide a good level of evidence. It was suggested that a detailed occlusal analysis be done to minimize these complications.

Conclusions: The implication for the general dental practitioner is that both types of prostheses showed high 5-year survival rates, suggesting cantilevers may be an option, but that they should be aware that there appear to be more technical complications, such as porcelain fractures and loose screws, when a cantilever-type FPD is used.

Reviewer's Comments: Cantilevers should be restricted to usage when bilaterally supported FPDs are not possible. This would be in reduced dimension and inappropriate bone density and configuration sites. (Reviewer-Charles R. Hoopingarner, DDS).

Keywords: Implant-Supported Fixed Partial Dentures, Cantilevers

Print Tag: Refer to original journal article
As dentists, we have a unique opportunity to counsel our patients on some very basic health issues that are directly related to oral health, as well as to general well being.

**Background:** In 2006, 33% of American men and 35% of American women were defined as having a body mass index of ≥30. These rates were twice those seen in adults from 1971-1974. Concurrently, the prevalence of obese children nearly quadrupled.

**Objective:** To investigate dentists’ attitudes about addressing a known risk factor for chronic inflammatory diseases, such as periodontitis, obstructive sleep apnea, and diabetes.

**Methods:** A data collection instrument was developed using focus groups of pediatricians, pediatric dentists, and general dentists. The self-administered questionnaire applied social cognitive theory and was divided into 9 sections with 6 domains: personal characteristics, practice characteristics, attitudes and opinions, outcome expectations, self-evaluated efficacy, and barriers. A pilot group of 500 American Dental Association (ADA) members in the North Carolina area was selected from a pool of 3500 dentists randomly. An introductory letter was mailed; 2 weeks later, a questionnaire and cover letter with a small incentive and a second questionnaire was sent to non-respondents. This was used to develop a final survey. A random sample of 3826 general dentists and 4174 pediatric dentists who were ADA members was used. Study data provided 10% margin of error, and a 95% competence level was weighted, stratified, and adjusted for non-response. The survey was similar but added a second 4-week reminder letter, 2 follow-up phone calls, and 1 additional mailing.

**Results:** Overall response rate was 37.1%. Approximately one fourth of participants identified themselves as overweight. Only 4.8% reported that they offered weight-related screening or counseling services. A total of 61% of general dentists and 66% of pediatric dentists were aware of an increase in the number of overweight patients since they began practicing. Both groups diagnosed more gingivitis and periodontal problems in overweight patients, but there was no increase in caries. Pediatric dentists were significantly more likely to support weight loss education, while general dentists felt that, until obesity was directly linked with dental disease, they would not be interested. Barriers were primarily fear of offending the patient or parent, fear of appearing judgmental, and fear that no correlation existed between caries and obesity. Other barriers included lack of ability to discuss this subject, self-obesity, and cultural biases toward a person's weight. Nearly 40% of all respondents stated they would not consider obesity-related counseling in their office.

**Conclusions:** Dentists need more training, dental schools need to include obesity training evaluation and counseling in their curriculum, and it might be necessary to offer additional education opportunities, teaching dentists to convey this information with sensitivity and objectivity.

**Reviewer's Comments:** Interesting to see the attitude that, until caries is involved, dentists are not interested, despite the obvious connection with periodontitis and obstructive sleep apnea. (Reviewer-Charles R. Hoopingarner, DDS).

**Keywords:** Obesity, Chronic Inflammatory Disease, Dentists’ Attitudes
Healthy periodontal ligament cells on the root of avulsed teeth are vital for reimplantation success.

**Background:** Traumatic dental injuries may include jaw fractures, dental abscesses, and tooth trauma. The incidence of an avulsed tooth/teeth is one that also requires immediate attention. It is critical that the avulsed tooth is properly treated within half an hour of the accident (Andreasen JO) or stored in the appropriate biologic storage medium within hours of the accident (Krasner P, Kargul B). After a tooth is avulsed, if the cells of the periodontal ligament that are on the tooth root and the cells connected to the socket wall are alive, a new periodontal ligament can form. Avulsed teeth must be protected from root cell crushing and loss of normal cell metabolism (Krasner P). Thus, to have a successful reimplantation, teeth must be in a medium that supplies the ideal osmolality, pH, and cell nutrients. Necrotic root periodontal ligaments cells cause replacement root resorption and ankylosis.

**Objective:** To discuss treatment and different armamentaria for avulsed teeth.

**Design:** Literature citations.

**Results/Conclusions:** Various storage media such as saliva, saline, water, ice, milk, and pH-balanced solutions are available as storage media for avulsed teeth. However, water and ice cause cells to burst due to their low osmolality. Saliva also has a low osmolality and also harbors bacteria that can infect the socket upon reimplantation. Saline and milk both have good comparable osmolality but lack nutrients such as glucose for normal cell metabolism. Milk can keep periodontal ligament cells alive for up to 3 hours. However, the ideal storage media studied for >20 years is Hank's balanced salt solution (HBSS). The studies have shown that 90% of cells stored in this media for 24 hours maintain their normal viability, and even after 4 days, 70% of cells are viable (Hiltz J). Studies have even encouraged soaking avulsed teeth for half an hour in HBSS prior to reimplantation to prevent replacement resorption. Reimplanted teeth should also be functionally stabilized (acid etch/resin) for 2 weeks. Antibiotics such as doxycycline or amoxicillin is recommended, and a tetanus toxin injection can be administered. Pulp tissue needs to be removed within 10 days of the procedure in closed-apex teeth, and a calcium hydroxide paste should be placed. Endodontic therapy should be done within 2 weeks. If apices are open, the tooth should be put in a diluted doxycycline solution for 5 minutes to increase pulp revascularization. A 3-month follow-up is recommended, and endodontic therapy is not needed if vital, but if not vital, endodontic therapy is required.

**Reviewer's Comments:** I highly recommend this very well-written, simple article to all dentists for managing and treating patients with avulsed teeth. (Reviewer-Gargi Mukherji, DDS).

**Keywords:** Avulsed Teeth, Hank's Balanced Salt Solution, Ankylosis, Periodontal Ligament, Trauma

**Print Tag:** Refer to original journal article
Patients on anticoagulant and antiplatelet therapy may not have to discontinue their current drug regimen for simple, routine dental extractions.

**Background:** Many patients presenting to the oral surgeon are on oral anticoagulation therapy (OAT). The standard of care in the past for patients on warfarin is to admit them to the hospital, discontinue the warfarin, use bridging therapy with IV heparin until surgery, discontinue heparin 6 hours before surgery, and then resume postoperatively. The warfarin and heparin are titrated appropriately until the INR (international normalized ratio) has reached a therapeutic level and heparin is discontinued. For patients on antiplatelet medications, usually the drugs are discontinued 10 days before surgery and then restarted 1 to 2 days later.

**Objective:** To present data on patients on oral anticoagulation medications, suggesting modifications to the earlier standard.

**Design:** Literature reviews and citings.

**Results:** Various oral anticoagulant drugs including warfarin, low-molecular-weight heparin (LMWH), and idraparinux are taken by patients. Numerous studies have shown that thromboembolic events occur when warfarin is discontinued. Thus, sometimes the INR value is decreased to 1.5 to 2.0 to avoid the rebound phase and hypercoagulable state that occurs when warfarin is stopped and then begun again. Another study, by Souto et al, showed that patients on long-term therapy with acenocoumarol (coumarin derivative) who underwent dental extractions and had an INR of 2 to 3 handled treatment well with local hemostatic measures. Other studies also concluded that using local hemostasis measures, such as gelatin sponges, sutures, fibrin glue, tranexamic acid, etc, had good treatment outcomes in patients whose INR ranged from 1.5 to 4.0. In addition, according to Bajkin et al, bridging therapy with LMWH may not be needed for minor oral surgery in patients whose INR is ≤4. Discontinuing antiplatelet drugs in high-risk patients has been shown to increase cardiac morbidity and mortality. Thus, the current recommendation is not to discontinue aspirin prior to routine dental extractions. However, many patients who are on combination drugs such as aspirin and clopidogrel have a higher risk of complications due to synergistic effects.

**Conclusions:** It is highly recommended to have coagulation lab results on patients on warfarin within 1 day of surgery, and patients with an INR of <4 can undergo routine extractions without adjusting their OAT. For patients needing invasive surgery, an INR of 1.5 to 2.0 is recommended, warfarin may need to be discontinued, and heparin or an LMWH may be needed as bridging therapy. Patients on antiplatelet medications may be treated with aspirin alone if they are on a 2-drug regimen and local hemostasis measures are used.

**Reviewer's Comments:** I highly recommend this very well-written article to all dentists because it explained various anticoagulant and antiplatelet medications, as well as presented knowledge on hemostatic agents. Data from various literature studies supported the discussion on oral anticoagulant therapy. (Reviewer-Gargi Mukherji, DDS).

Keywords: Anticoagulants, Antiplatelet Medications, Bleeding, Warfarin, Aspirin

Print Tag: Refer to original journal article
Most Patients Prefer Removal of Asymptomatic Wisdom Teeth

Most Patients With Asymptomatic, Disease-Free Third Molars Elect Extraction Over Retention as Their Preferred Treatment.

Kinard BE, Dodson TB:

J Oral Maxillofac Surg 2010; 68 (December): 2935-2942

When referring patients with third molars for evaluation in hospital-based programs, the patient's preferences will generally favor removal of all third molars, not just diseased ones.

Background: Routine removal of non-diseased third molar teeth remains an issue of debate in dentistry, and various factors must be considered when informing patients about the prognosis of these teeth, as well as complications that may be associated with oral surgery.

Objective: To estimate the frequency of disease-free third molar teeth in a defined patient population, and to estimate the frequency of 3 treatment recommendations (extraction, retention, patient choice).

Design: Retrospective cohort study.

Methods: Patient records from November 2008 to August 2009 at a large oral and maxillofacial surgery program based in a metropolitan hospital were accessed and were included if the patient had at least 1 third molar that was evaluated. All third molars were classified by pathological status and anatomic variables (Winter's and Pell and Gregory classifications of impactions).

Results: A total of 249 patient records were evaluated. Patients' average age was 27.3 years, and there was approximately equal distribution of male and female patients. Most patients (89%) were ASA I, and the remaining patients were ASA II. Treatments that were recommended were retention of the third molar (6.5%), extraction (55.7%), and patient choice (37.8%). Of patients, 82% elected to have disease-free third molars removed. Factors significantly associated with patient choice to remove included increasing age, presence of other symptomatic or diseased third molars, and treatment recommendations.

Conclusions: When offered the choice of retention or removal of disease-free third molar teeth, most patients choose extraction, and this group becomes even larger in patients with symptomatic or diseased third molars.

Reviewer’s Comments: This study confirms the widely held view that patients referred to oral surgeons for evaluation of third molars will elect to have both diseased and disease-free teeth removed. Bias in this study may have arisen from its location, a hospital-based oral surgery clinic as opposed to outpatient general-practice settings, as well as operator preferences, which can influence patient decisions. (Reviewer-Arthur H. Jeske, DMD, PhD).

Keywords: Third Molars, Oral Surgery, Informed Consent

Print Tag: Refer to original journal article
Assessment of stability of miniscrew implants using insertion torque values agrees with resonance frequency testing in general, at least in cadaveric specimens.

**Background:** Determination of the stability of implants, both for orthodontic and prosthetic purposes, is essential to avoid the possibility of premature loss of implants if they are loaded early, and insertion torque has been used to help make this determination. Resonance frequency analysis (RFA) is a more recently developed tool to make this determination, but it has not been studied for miniscrew orthodontic anchorage implants.

**Objective:** To estimate and compare implant stability scores using RFA and maximum insertion torque values in human cadaveric bone, and to estimate stability scores in various anatomic sites in the maxilla and mandible.

**Design:** In vitro, standardized laboratory testing.

**Methods:** 10 pairs of human maxillas and mandibles were obtained from formalin-preserved human cadavers from a university anatomy department. Two hundred self-drilling miniscrew implants (1.5 mm in diameter and 8 mm long) were inserted into bone specimens using a surgical guide stent and guided by standardized radiographs, and maximum insertion torque values in Newton-centimeters (N-cm) were determined for insertion sites in the anterior, middle, and posterior areas of the jaws. Following placement, RFA was performed with a model 6.0 Osstell device by Integration Diagnostics AB. Maximum torque values and RFA outcomes were compared statistically and were correlated to placement site.

**Results:** Maxillas and mandibles were obtained from equal numbers of male and female cadavers, with an average age of 64 years at the time of death. Miniscrews placed in the posterior maxilla exhibited the lowest torque (average, 7.9 N-cm) and RFA values, followed by anterior placement sites, with highest values in the mid-portion (average, 14.8 N-cm). Generally, mandibular torque and RFA values were significantly higher that those in the maxilla, averaging 15.8 N-cm, compared to the overall maxillary average of 11.8 N-cm. RFA implant stability quotient values were strongly correlated with maximum torque values for both upper and lower jaws.

**Conclusions:** RFA is a valid and viable alternative to insertion torque values for assessing immediate stability of miniscrew implants, but further studies are needed in clinical patients to assess implant stability following loading.

**Reviewer’s Comments:** The results of this study shed interesting light on use of both maximum torque values and RFA, and tend to confirm maximum insertion torque values of >15 N-cm as being indicative of good implant stability. However, these results cannot be immediately applied to actual situations because of the in vitro nature of these tests. Orthodontic anchorage with miniscrew implants may also be dependent on the anatomic site in which they are placed. (Reviewer-Arthur H. Jeske, DMD, PhD).

Keywords: Miniscrew Implants, Stability, Resonance Frequency Analysis

Print Tag: Refer to original journal article
In young adults with measurable periodontal bone loss, consider the possibility of poor glycemic control, elevated blood lipids, and even presence of diabetes.

**Background:** A relationship between periodontal disease and diabetes mellitus has been established, but there is little evidence to support a relationship between periodontal disease and glycemic control in non-diabetic patients.

**Objective:** To determine whether there is an association between fasting plasma glucose level and the periodontal condition of non-diabetic patients.

**Design:** Cross-sectional study, parametric data collection.

**Participants:** Male members of the Israel Defence Forces who were aged >25 years.

**Methods:** Data from periodic medical evaluations of subjects were collected, and their periodontal conditions were assessed using radiographic measurements of alveolar bone height assessed by 2 independent evaluators in interproximal sites, including premolars and first and second molars from standardized bitewing films. Blood samples were drawn from each subject after a 14-hour period of fasting, and fasting blood glucose levels were determined, in addition to basal metabolic index and serum triglyceride and cholesterol levels. Statistical testing compared bone loss to severity of metabolic parameters and subjects with and without periodontitis.

**Results:** A statistically significant higher prevalence of bone loss was found in subjects with fasting blood glucose values >100 mg/dL than that in those with lower values, and in subjects with elevated triglyceride and cholesterol levels.

**Conclusions:** A significant relationship exists between periodontal bone loss and fasting blood glucose levels in a defined male population. Alveolar bone loss may be an indicator of development of metabolic syndrome.

**Reviewer’s Comments:** The results of this study are not too surprising, but application of the results to the general population is limited by the evaluation of relatively healthy and exclusively male subjects. Fasting glucose levels considered in this study are indicative of diabetes, but a cause-and-effect relationship between diabetes and bone loss in this non-diabetic population cannot be determined from this study alone. (Reviewer-Arthur H. Jeske, DMD, PhD).

Keywords: Periodontal Disease, Diabetes Mellitus, Fasting Glucose, Glucose Tolerance

Print Tag: Refer to original journal article
Assessment of a diabetic patient's glycemic control should be part of the overall evaluation of the postoperative prognosis following tooth extraction.

**Background:** Diabetes mellitus, especially type 2, is commonly believed to be associated with impaired healing following surgical procedures, but there is a lack of scientific evidence to substantiate this.

**Objective:** To determine whether glycemic control influences post-extraction healing in patients with diabetes mellitus.

**Design:** Prospective observational study, blinded observer.

**Participants:** Adult subjects with insulin-dependent (type 1) and non-insulin-dependent (type 2) diabetes.

**Methods:** Diabetic patients who needed a fully erupted tooth extracted were enrolled. Exclusion criteria included recent antibiotic or steroid use, immunodeficiency, non-localized odontogenic infections, chemotherapy or radiation therapy, and disease of tissues surrounding the extraction site. Epithelialization of the extraction site was used as the outcome measure as related to the patient's history, non-fasting blood glucose levels, and glycosylated hemoglobin (HbA1c) levels.

**Results:** 115 subjects were enrolled in the study, with 78 finally included for 1- and 2-week observation periods. Average age of patients was 53 years, with approximately equal numbers of males and females. The only variable associated with reduced rates of epithelialization was the size of the extraction socket. There were no statistically significant correlations between healing and glycemic control as measured by non-fasting glucose, history, and HbA1c levels.

**Conclusions:** Glycemic control did not influence post-extraction socket healing in patients with either type 1 or type 2 diabetes. However, assessment epithelialization is generally not well characterized in normal and medically compromised patients.

**Reviewer's Comments:** This is an interesting study, but one that does not allow us to make a generalization that the degree of glycemic control in diabetic patients can be ignored when considering potential complications following oral surgery. A small sample size limits generalizability, too. (Reviewer-Arthur H. Jeske, DMD, PhD).

**Keywords:** Glycemic Control, Third Molars, Third Molar Surgery, Diabetes Mellitus

Print Tag: Refer to original journal article
When considering local anesthesia for maxillary anteriors, the "high V2" tuberosity block cannot be relied upon, and local (eg, infiltration or intraosseous) approaches are more reliable.

**Background:** There are few scientific studies to document the efficacy of the maxillary high tuberosity second-division nerve block, even though standard textbooks present the technique as a method of obtaining complete local anesthesia throughout the hemi-maxilla on the injected side.

**Objective:** To compare the anesthetic efficacy of 2% lidocaine with 1:100,000 epinephrine and 3% mepivacaine plain for the high tuberosity, maxillary division nerve block.

**Design:** Prospective randomized double-blind trial involving human subjects.

**Methods:** Subjects meeting inclusion criteria were randomized into 2 groups. One group initially received a high tuberosity maxillary block using 3.6 mL of 2% lidocaine with 1:100,000 epinephrine, and the second group initially received a high tuberosity maxillary block using 3.6 of 3% mepivacaine, both administered using a standardized block technique (27-gauge long needle inserted). Following a 1-week "washout" period, subjects received the second anesthetic preparation on the same side by the same operator experienced in the technique. Electric pulp testing of posterior and anterior teeth was used to assess success of pulpal anesthesia. Pain of needle insertion, needle placement, and deposition of anesthetic were assessed using a visual analog scale.

**Results:** 50 subjects (27 males, 23 females) with an average age of 25 years participated. There were no significant differences in success rates for the 2 anesthetics. Success rates for second molars were 98%, first molars 92%, second premolars 76% to 78%, first premolars 54% to 58%, canines 54%, lateral incisors 8% to 24%, and central incisors 6% to 10%. Lidocaine anesthesia produced longer duration of anesthesia than mepivacaine.

**Conclusions:** The high tuberosity maxillary division nerve block is effective for the molar and second premolar teeth, but not sufficiently reliable for the first premolars and anterior teeth.

**Reviewer's Comments:** Once again, the research group at Ohio State has debunked a long-held myth regarding local anesthesia, specifically that block of the maxillary division in the pterygopalatine fossa completely anesthetizes both posterior and anterior teeth. (Reviewer-Arthur H. Jeske, DMD, PhD).

**Keywords:** Epinephrine, High Tuberosity, Lidocaine, Maxillary, Mepivacaine, Second Division Nerve Block

**Print Tag:** Refer to original journal article
To prevent tissue damage when removing posts ultrasonically, use short bursts of energy with an active coolant.

**Background:** Post removal is a clinically challenging endeavor with any technique, and ultrasonic energy aids the procedure greatly. However, there is a potential for tissue damage if excessive heating occurs.

**Objective:** To calculate the probabilities for tissue injury and to measure the effectiveness of various coolant methods to counteract heat build-up in metallic posts subjected to ultrasonic energy.

**Design:** In vitro laboratory testing.

**Methods:** Investigators used 10 extracted, single-canal human premolar and canine teeth, which were prepared chemomechanically and then obturated with a conventional technique. Roots were then prepared for #5 ParaPost cementation using standard drills and the posts were luted with Panavia 21. Thermocouples were bonded to the exterior root surfaces at the cervical position, 2 mm apical to the cervical portion, and a third at the apex. Roots were isolated with a rubber dam to prevent direct root cooling with the various coolants, and ultrasonic energy was applied directly to the post by a single operator at the maximum power setting of the device. Five different cooling methods were tested: air only from an air-water syringe, water spray from an air-water syringe, EndoIce on a small (4 mm) cotton pellet, EndoIce on a large cotton pellet (9 mm), and cooling by ambient air only. Temperatures of the roots were assessed at 1-second intervals until a threshold of a 10°C increase had occurred.

**Results:** Maximum temperatures were reached at an average of 45 seconds, to an average increase of 12.5°C, increasing with the time of application of ultrasonic energy. Harmful heat transfer occurred within 1 minute of "dry" ultrasonication. Active coolants decreased temperatures in a linear fashion over time, effectively counteracting the rate of temperature increase. A combination of short (10-second) vibrational times alternated with active coolant resulted in the lowest probability of exceeding the 10°C detrimental temperature increase.

**Conclusions:** Cycles of short ultrasonic instrumentation and the use of active coolants effectively reduce the buildup of heat in roots of teeth containing cemented metal posts.

**Reviewer's Comments:** The outcomes of this study should register as intuitively correct for dentists. While we can never accurately assess the exact amount of heating that occurs in our patients' teeth when they are treated ultrasonically, reducing the amount and/or time of energy and applying coolants is a "reasonable and prudent" precaution to prevent tissue damage. (Reviewer-Arthur H. Jeske, DMD, PhD).

**Keywords:** Active Coolants, Heat-Induced Tissue Damage, Heat Transfer, Post Removal, Ultrasonics

**Print Tag:** Refer to original journal article
Cranberry extracts may help treat and prevent dental caries and periodontal disease through inhibition of biofilm formation.

**Background:** Cranberry extracts are rich in polyphenols, which have biological properties that can be beneficial to human health. These extracts have been used for therapeutic purposes since the 17th century, treating such ailments as stomach and liver problems and scurvy. More recently, cranberry juices and extracts have been used in the prevention and treatment of urinary tract infections. Studies now indicate that the nondialyzable material (NDM) from cranberries may play an inhibitory role in the adhesion and infectious capacity of certain bacteria, viruses, and cancer cells. More specifically, cranberry extracts may help treat and prevent dental caries and periodontal disease through inhibition of biofilm formation.

**Objective:** To educate readers on the potential oral health benefits of cranberry extracts in the prevention of caries and periodontal disease.

**Design/Methods:** Review of the literature using cranberry extracts on cariogenic bacteria and periodontal pathogens.

**Results:** The polyphenols in cranberries may influence the formation of dental caries by affecting the colonization of dental surfaces and the production of acids by cariogenic bacteria. Additionally, the NDM fraction of cranberries has the potential to limit the multiplication of *Porphyromonas gingivalis*, *Tannerella forsythia*, and *Treponema denticola* in periodontal pockets by limiting the availability of amino acids and peptides on which their growth depends. It may also reduce the destruction of tissues mediated by the action of bacterial proteinases and host hydrolytic enzymes. Finally, the NDM fraction of cranberries may inhibit cellular signalling proteins, leading to a reduction in the regulation of activator protein 1 (AP-1), an important transcription factor for the genes coding for proinflammatory mediators.

**Conclusions:** The polyphenols of cranberries, specifically, the proanthocyanidins in the NDM fraction isolated from cranberry juice, have potential for preventing and/or treating dental caries and periodontal disease.

**Reviewer's Comments:** The potential oral health applications and benefits from cranberry extracts are exciting. The authors emphasize that consumption of cranberry juice is unlikely to produce oral health benefits due to the insufficient contact time between the oral tissues and the cranberry polyphenols and the amount of added sugars to the beverage. More studies to isolate and characterize the bioactive molecules in cranberry extracts are needed. (Reviewer-Kelly A. Halligan, DDS).

Keywords: Cranberry, Caries, Periodontal Disease, Cranberry Polyphenols

Print Tag: Refer to original journal article
Adhesive resins significantly improved marginal adaptation when used with amalgam restorations placed in endodontically treated teeth, but did not affect the fracture resistance or the rate of development of secondary caries.

**Background:** Amalgam restorations have the advantage of being a low cost, easily applied, highly abrasive-resistant material. However, it requires mechanical retention since it does not adhere to the tooth surface. Adhesive resin systems that are used as cavity liners have been introduced for use with amalgam with the goal of overcoming this shortcoming.

**Objective:** To examine bonded amalgam fillings to evaluate if this procedure could decrease microleakage, increase retention, provide better marginal adaptation, and decrease the occurrence of secondary caries.

**Design/Methods:** An in vivo study of 36 patients was done, dividing the patients into 3 groups. All teeth selected were maxillary first or second premolars that had been endodontically treated, followed by the placement of a prefabricated post. In group A, 2 layers of copal varnish were applied to the walls of the preparation prior to the insertion and condensation of the amalgam. In groups B and C, either amalgam bond dentin bonding agent or Scotchbond Multi-Purpose adhesive was applied. Dental amalgam was placed immediately against the wet resin, followed by condensation. The restorations were evaluated 1 week postoperatively, and again 1 year after placement by the same investigator. Comparisons were recorded for fracture resistance, marginal adaptation, and for presence of secondary caries.

**Results:** All of the restorations in the 3 groups were intact. There was no significant difference in fracture resistance between the amalgams. However, the marginal adaptation at the amalgam-tooth interface of the teeth restored with adhesive resin bonded amalgam restorations was significantly superior to the copal varnish group. The differences in the third category studied, secondary caries, were not significant since no cases of secondary caries were detected at the 1-year recall visit.

**Conclusions:** Bonded amalgam restorations exhibit significantly better marginal adaptation than do non-bonded amalgam restorations when placed in endodontically treated premolars. The occurrence of fracture resistance and secondary caries was not significantly altered by the use of adhesives prior to amalgam insertion.

**Reviewer's Comments:** This clinically relevant study presents a choice for the clinician. Partial or complete coverage with indirect restorations is often the treatment used when restoring non-vital teeth. If that cannot be done, this alternative bonded amalgam technique is one to consider, even if only for the short-term. There are 2 limitations of this study: the small sample size and the short follow-up. Further statistics of the clinical success of these bonded restorations would be helpful to establish if this technique would provide long-term, predictable results. (Reviewer-Eduard N. Friedman, DDS).

Keywords: Amalgam Bond, Bonded Amalgam, Fracture Resistance, Marginal Adaptation
In this study, the Cercon system showed significantly larger marginal gaps than both the IPS Empress II and complete metal crowns, but no significant differences were found in marginal overhang among the 3 material groups.

**Background:** The need for esthetic, biocompatible dental restorations has increased the demand for ceramic crowns in place of metal-ceramic crowns. Several ceramic systems are being used, and as a result different materials and techniques for fabricating crowns have been introduced. Limitations of fracture resistance and marginal fit with these materials have arisen, and these factors need to be considered when preparing the teeth for full coverage. Zirconia, a high strength ceramic core material, is currently used due to its flexural strength.

**Objective:** To evaluate the marginal fit of lithium disilicate pressable ceramic and complete metal crowns (the control group) by measuring the marginal gap and overhang between the crowns and the dies, as well as to evaluate the effect of the type of finish line on the marginal fit of each of 3 types of crowns.

**Methods:** 2 maxillary first premolar teeth were prepared with different types of finishing lines, one with a rounded shoulder; the other with a rounded chamfer. The crowns fabricated were Cercon, IPS Empress II, or complete metal. There were 3 groups of shoulder and chamfer die specimens. All crowns were finished and polished. The marginal gap and overhang of each crown was evaluated using a computerized digital image analysis system. Measurements at the margins were taken at 6 predesignated points, and the overall mean measurements were correlated.

**Results/Conclusions:** Comparing the 3 systems, marginal gaps were larger in the Cercon system than in the IPS Empress II or complete metal crowns. There was no significant difference in marginal gaps between the latter 2 groups, the metal and the Empress. Marginal overhang between these materials was similar.

Comparing the shoulder and the chamfer preparations, marginal gaps were similar in the ceramic group. However, there were differences among the different material groups in the amount of marginal overhang present between the teeth prepared with the shoulder versus chamfer preparations.

**Reviewer’s Comments:** This study has some limitations. Marginal fit was measured, but the internal fit of the crowns was not. Obviously, the results of marginal adaptation, gaps, and overhangs would be altered if the crowns were not completely seated. Also, the measurement of marginal fit was taken on uncedented crowns, something that does not simulate an actual clinical situation. A larger sample size would also be needed.

(Reviewer-Eduard N. Friedman, DDS).

Keywords: Marginal Fit, Zirconia Ceramic, CAM Crown System

Print Tag: Refer to original journal article
The inconsistent position of the lingual nerve in the interpterygoid fascia is a main cause of lingual nerve trauma during inferior alveolar nerve blocks.

**Background:** Local anesthesia is critical in dentistry, and inferior alveolar nerve (IAN) blocks are carried out routinely by practitioners. One of the most common etiologies for orofacial nerve trauma referrals include injuries to the branches of the trigeminal nerve caused by inferior alveolar nerve blocks. However, lingual nerve trauma occurs almost twice as often as IAN injuries.

**Objective:** To study the anatomic variations in position of the lingual nerve in the pterygomandibular space with respect to the IAN.

**Methods:** 44 formaldehyde-fixed cadaver heads were sagittally bisected and an IAN block was administered with a 25-gauge needle using Dr Malamed's technique. The region was then carefully dissected until the lingual nerve could be seen. Four measurements were taken using a Boley gauge: (1) greatest width of the lingual nerve at the horizontal plane of needle placement, (2) greatest width of the IAN at the horizontal plane of needle placement, (3) distance between the needle's outer edge and center of the lingula, and (4) the smallest distance between the needle's outer edge and the lingual nerve.

**Results:** The study showed that out of 44 simulated injections, about 95.5% passed lateral to the lingual nerve, 16% were within 0.1 mm of the nerve, and 4.5% penetrated the nerve.

**Conclusions:** The anatomic variation of the distance of the lingual nerve to the lingula varied from 0.85 mm to 8.10 mm concluding that it is impossible to estimate the location of the lingual nerve in relation to the lingula. Nerve damage may occur during IAN blocks from the following: neurotoxic properties of the anesthetic, sharp needle tip trauma to the neurovascular bundle, extraneural and intraneural hemorrhage from injury to blood vessels, etc. It is important to increase the awareness of patients about possible complications such as nerve injury during local anesthesia administration during a preoperative informed consent.

**Reviewer's Comments:** The article had a small study sample; however, it did reiterate that anatomic variations are present in the oral cavity, especially concerning the location of the lingual nerve in association with the IAN and other associated structures. Patients should be aware of possible complications that may arise from simple local anesthesia administration causing possible nerve injury through a proper informed consent. (Reviewer-Gargi Mukherji, DDS).

Keywords: Lingual Nerve, Inferior Alveolar Nerve Blocks, Nerve Injury, Nerve Trauma

Print Tag: Refer to original journal article
Metastatic melanoma of the mandible is a serious form of cancer, and must be treated quickly and properly.

**Background:** Among the forms of skin cancer, melanoma is the most life-threatening. Basal cell or squamous cell carcinomas are not as aggressive or unpredictable as melanoma. Melanoma's progression and development is often related to the amount of exposure of ultraviolet B radiation over a person's lifetime. The pigment-producing melanocytes are affected and mutations in the tumor suppressor gene CDKN2A and in the oncogenes N-ras and H-ras are often noted. Although metastasis of melanoma to the maxillofacial region is rare, it is extremely serious.

**Objective:** To present a case report of a patient who had metastatic melanoma of the mandible and to discuss the treatment rendered.

**Design:** Case report and literature reviews. **Case Discussion:** A 56-year-old man presented to the University of Michigan Oral Surgery Department for the evaluation/treatment of a biopsy-proven melanoma to the mandible. His medical/dental history included hypertension, arthritis, smoking in the past, and a history of multiple sunburns. In 2003, he had melanoma (T2b tumor classification) of the back that was treated. However, 28 months later, in 2005, the patient presented to his general dentist with pain in his anterior mandible (also radiolucent lesions were noted) and root canal therapy was performed on 2 teeth. Since the infection did not resolve, the patient was referred to an oral surgeon. Extractions were performed and an incisional biopsy from the pathologist read metastatic malignant melanoma. At the University of Michigan oral surgery clinic no lesions/masses were noted and the Panorex showed a single 2.5-cm well-defined radiolucent lesion. After histopathology/immunohistochemical tests, a diagnosis of metastatic melanoma was made, and follow-up tests including blood work, ECG, chest x-rays, PET scans, etc were ordered. Treatment included surgical resection of the anterior mandible, tracheostomy, and reconstruction with a vascularized free fibula osteocutaneous flap from the right leg. Later, 5 endosseous dental implants were placed to support a mandibular prosthesis. It has been 4.5 years since surgery and the patient is doing remarkably well and is being monitored. In 2007, he did have metastatic spread to the right axilla which was then treated.

**Conclusions:** Melanoma usually first metastasizes to regional lymph nodes before spreading to other sites. When melanoma spreads to the maxillofacial area, neoplasms are usually to the marrow of the posterior mandible. Treatment may include radiation therapy, surgery, or immunotherapy. Although metastatic melanoma to the mandible is rare, it can be a life-threatening disease.

**Reviewer's Comments:** There are few documented cases of metastatic melanoma to the mandible. This well-written article presents a case of metastatic melanoma to the mandible and discusses how it was treated. Survival rates are not very high for patients in these cases; however, in this case the patient is alive and still well without any evidence of disease. (Reviewer-Gargi Mukherji, DDS)

**Keywords:** Melanoma, Metastatic Disease, Cancer, Posterior Mandible

**Print Tag:** Refer to original journal article
CKD Limits Analgesics, Sedatives

Chronic Kidney Disease. Pharmacological Considerations for the Dentist.
Brockmann W, Badr M:

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In cases of chronic kidney disease, avoid drugs that depend on renal excretion for elimination. Non-acetylated salicylates and penicillin VK are viable alternatives in such cases.

Background: The incidence of chronic kidney disease (CKD) and end-stage renal failure is increasing in the U.S. population, and may represent parallel increases in the incidence of early onset diabetes mellitus. Because the metabolic disposition of drugs used in dentistry is affected by CKD, the dentist must be prepared to adjust dosages of certain drugs or select drugs from alternative classes in such patients.

Objective: To review the comorbidities and recognition of CKD in dental patients and to suggest methods for individualizing drug administration in these patients.

Design: Expert review of relevant clinical-scientific literature.

Methods: This is a review of the authors’ 101 relevant publications, including textbooks and peer-reviewed journals in dentistry and medicine.

Results: Patients with CKD may be recognized by a history of diabetes, hypertension, anemia, hyperlipidemia, and uremic bleeding. Typically, drugs used to manage CKD include sodium polystyrene sulfonate (for hyperkalemia), calcitriol (for hypocalcemia), calcium salts (to counteract hyperphosphatemia), erythropoietin (for anemia), statin drugs for control of blood lipids, and antihypertensive drugs. Drugs that should be avoided or used with caution in cases of CKD include NSAIDs, certain opioid analgesics (codeine, meperidine, propoxyphene, tramadol), certain sedatives (chloral hydrate, meprobamate, and benzodiazepines), and certain antibiotics. Alternative analgesics would include non-acetylated salicylates (eg, diflunisal) or some NSAIDs with less effect on renal function (nabumetone, etodolac). Methadone or fentanyl may represent opioids with potentially less harm in such patients, while azithromycin, clindamycin, and penicillin VK do not require dosage adjustment.

Conclusions: Practitioners must be aware of CKD in patients with other disorders, and drug use should be tailored accordingly. Consultation with the patient’s physician is important to assess the degree of CKD and the types of dosage adjustments needed.

Reviewer’s Comments: In this review of the pharmacologic implications of chronic kidney disease, the authors provide practical information on dosage adjustments and drug selection. One overlooked alternative for sedation, however, was nitrous oxide/oxygen, which depends entirely on the respiratory tract for elimination, and undergoes no renal or hepatic metabolism. (Reviewer-Arthur H. Jeske, DMD, PhD).

Keywords: Chronic Kidney Disease, Drug Dosing, Renal Failure, Renal Dosing

Print Tag: Refer to original journal article
The success of cervical restorations is multifactorial and is influenced by the adhesive system, adhesive class, and whether the dentin/enamel is prepared or not; 2-step self-etching and 3-step etch-and-rinse systems have the best outcomes.

Background: About one fourth of the population has noncarious cervical lesions. The etiology is multifactorial with mechanical/abrasive erosion and occlusion. There is no biological reason to restore noncarious lesions other than esthetics or prevention of further damage. Loss of retention and marginal discoloration remain the major shortcoming of cervical restorations placed with adhesive dentistry.

Objective: To assess the influencing factors on retention loss and marginal discoloration of cervical restorations made of composites and glass ionomer (derivatives).

Design: Meta-analysis.

Methods: The authors did a literature search on limited prospective clinical studies between 1994 and 2008 on cervical restorations with an 18-month follow-up observation period.

Results: 50 clinical studies involving 40 adhesive systems matched inclusion criteria. On average, 10% of the cervical fillings were lost (variability ranged from 0% to 50%) and 24% exhibited marginal discoloration (variability ranged from 0% to 74%) after 3 years. Secondary caries was rarely detected. The analysis revealed that the adhesive/restorative class had the most significant influence on retention, with 2-step self-etching adhesive systems performing best and 1-step self-etching adhesive systems performing the worst; 3-step etch-and-rinse systems, glass ionomers/resin-modified glass ionomers (RMGI), 2-step etch-and-rinse systems and polyacid-modified resin composites ranked in between. Restorations placed whose dentin/enamel that had been prepared or roughened showed a significantly higher retention than those placed in unprepared or sclerotic dentin. Beveling the enamel and isolation (rubber dam or cotton rolls) had no significant influence.

Conclusions: The clinical performance of cervical restorations is significantly influenced by the type of adhesive system used (1-, 2-, or 3-step) and the adhesive class (RMGI or polyacrylic modified resins). Whether the dentin/enamel is prepared or not, 2-step self-etching or 3-step etch-and-rinse systems should be chosen over other options if esthetics is the primary goal (some providers would elect to place RMGI if the patient has a high caries risk). The dentin or enamel surface should be roughened before bonding and placement of the definitive restoration.

Reviewer's Comments: I found this article interesting as it reinforced the idea that "newer is not always better." It is interesting to note that the American Dental Association, prior to 2008, would grant "full acceptance" if the retention rate of restorations placed in noncarious lesions was higher than 90% after a 1.5-year observation. Today, 1-step systems are marketed as simple, efficient (read: "easy/quick") bonding systems, but many of the systems sold today would not receive acceptance if the previous standard was still in place. (Reviewer-Timothy J. Halligan, DMD.)

Keywords: Fillings, Cervical Plexus, Discoloration, Acid Etching, Glass

Print Tag: Refer to original journal article