Fissure sealants placed with an etch-and-rinse adhesive technique have superior rates of retention compared to sealants placed using a self-etch technique.

**Background:** The anatomy of posterior teeth with their pits and fissures increases the likelihood of the formation of occlusal caries in these areas. Dental sealants reduce the number of retention sites for plaque and bacteria by forming a smooth surface layer. This inhibition prevents the survival of the bacteria by preventing nutrients from reaching the microflora in these pits and fissures. Therefore, a sealant that demonstrates the best long-term retention is desirable for caries prevention.

**Objective:** To compare the retention rates of a nanofilled occlusal fissure sealant placed with the use of an etch-and-rinse or a self-etch adhesive over 24 months.

**Participants/Methods:** 16 caries-free subjects with a mean age of 20 years were selected. In total, 244 sealants were placed on the permanent molars or premolars. All occlusal surfaces were cleaned with pumice. Prior to applying the sealant, the enamel was treated either with an etch-and-rinse 2-step adhesive or a 1-step self-etch adhesive. Then a nanofilled sealant was applied and light cured. All sealants were evaluated at baseline, and at 1-, 3-, 6-, 12-, 18-, and 24-month recalls, and classified as completely retained, partial loss, or total loss.

**Results:** As the statistics were compiled, a significant difference in the clinical efficacy of the 2 types of fissure sealants was seen. The retention rates of the etch-and-rinse adhesive system were superior to that of the self-etch adhesive. Studies show that 5% to 10% of all sealants fail, and the failure rate for the etch-and-rinse group fell within that range over time. The reason for this difference is most likely due to the fact that the acid used in the self-etching adhesive system is not as strong as the phosphoric acid used in the etch-and-rinse system. With insufficient etching, and therefore less enamel demineralization, less penetration of the material would result in a smaller amount of micromechanical interlocking of the sealant into the enamel. In this study, the difference in the retention rates between the molars and pre-molar teeth also followed this same pattern; no differences were due to whether the tooth was a molar or premolar. However, most other studies have shown premolar retention rates to be higher.

**Conclusions:** A better retention rate for sealants is achieved using an etch-and-rinse adhesive than with a self-etch adhesive.

**Reviewer’s Comments:** This in vivo study demonstrates that the retention rates achieved by one-step self-etching adhesives fall short of the retention rates of the etch-and-rinse technique. Since sealant application is frequently indicated in young children, the quicker one-step technique that combines etching, priming, and bonding is desirable. However, its ability to bond to enamel is lower at this time. The etch-and-rinse technique remains the more predictable option. (Reviewer-Edward N. Friedman, DDS).

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**Keywords:** Nanofilled Fissure Sealants, Adhesive Systems, 24-Month Results

Print Tag: Refer to original journal article
Do Traditional Hybrid Composites Have Higher Strength Than Microfills?

Properties of Hybrid Resin Composite Systems Containing Prepolymerized Filler Particles.
Blackham JT, Vandewalle KS, Lien W:

Oper Dent 2009; 34 (November-December): 697-702

A reduction in the mechanical properties of hybrid resin composite systems occurs due to incorporating prepolymerized filler particles.

**Background:** There are numerous types of composite resin materials available for use today, and deciding which one to use is determined by several factors. All dental resin composites consist of a mixture of a soft organic resin matrix (polymer) and a hard (ceramic) component, an inorganic filler. Differences in the type of filler particles affect the mechanical properties of the composite.

**Objective:** To compare the properties of the new hybrid systems that contain prepolymerized filler particles with those of some traditional hybrid and microfill resin composites. Resin composites are classified based on their filler size. Microfills contain a lower filler content, and have inferior strength. Hybrids contain a variety of particle sizes with increased loading of filler, which serves to improve stress transfer among the composite particles.

**Methods:** 5 materials were tested, 2 hybrids, 1 microfill, and 2 of the hybrid systems containing prepolymerized particles. The properties tested for each composite were tensile strength, flexural strength/modulus, Knoop microhardness, and polymerization shrinkage. All specimens were light cured and tested. The mean and standard deviations were determined for each of the 5 properties for each material.

**Results:** Significant differences were manifest among the 5 different composites tested. The highly filled traditional hybrid composites were best able to withstand occlusal stress because increased filler loading facilitates the transfer of stress between the composite particles. The new hybrid systems use prepolymerized particles composed of a blend of resin and filler particles. Those composites with increased filler content showed increased strength and hardness only up to a certain ratio, beyond which there was a decline in the strength. Microfills demonstrated the lowest strength and stiffness of the materials tested that contain prepolymerized particles, due to lower filler content. However, they do have the advantage of increased esthetics and high polishability, and can therefore be used in areas where the strength of the restoration is not a chief concern.

**Conclusions:** Resin composites containing a high percentage of inorganic filler particles will result in the strongest material. On the other hand, resin composite materials containing prepolymerized particles are weaker because of their lower filler content.

**Reviewer's Comments:** The comparison of these types of composites provides a good review of the strengths and weaknesses of each. Since there are many choices and types of resin composites with different properties, it is necessary to select the appropriate material for specific clinical situations. This article, with its review of each material's strengths and weaknesses, provides guidance in selecting the appropriate composite. (Reviewer-Edward N. Friedman, DDS).

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Keywords: Hybrid Resin Composite, Prepolymerized Filler Particles

Print Tag: Refer to original journal article
Preheating resin composite to 37° Celsius prior to insertion may reduce interfacial gaps and improve marginal adaptation. However, cuspal movement will result at higher temperatures.

**Background:** One problem seen with resin composite restorations is the presence of gaps at the composite-tooth margin.

**Objective:** To study the effect of preheating the composite to 3 different temperatures at the time of insertion to evaluate its effect on marginal adaptation and cuspal movement of the teeth.

**Design/Methods:** This in vitro study involved restoring 50 extracted caries-free maxillary premolars with 3 surface MOD composite restorations. There were 5 groups of 10 teeth each. Group #1 was restored with a composite at room temperature; group #2 was also restored with composite at room temperature, but after a liner was placed on the pulpal floor. Groups 3, 4, and 5 were restored with composite preheated to 37° degrees, 54°, and 68° Celsius, respectively. Cuspal movement was measured for each tooth using special computer software. Next, each specimen was sectioned into 2 halves longitudinally in order to measure the gap total surface area.

**Results:** Polymerization contraction of the resin composite led to cuspal movement, and is directly related to the size of the restoration. The cuspal movement is attributed to the creation of contraction forces as the composite is cured. Use of a flowable composite liner reduced cuspal movement, but led to the highest gap formation. This is most likely a result of the high polymerization shrinkage seen with flowable composites. Group 3, using heated composite at 37° Celsius, showed the lowest gap formation of all groups. Groups 4 and 5, using composite heated to 54° and 68° Celsius, respectively, demonstrated increased cuspal movement. Curing composite at a higher temperature tends to increase the amount of contraction during cooling. The author believes that thermal shrinkage may combine with polymerization shrinkage and result in increased gap formation.

**Conclusions:** Preheating resin to 37° and 54° Celsius helped decrease the area of gaps when restoring teeth with composite resin. Heating to higher temperatures did not lead to any further increase in the marginal seal of the tooth and the composite. Increased cuspal movement resulted when the composite resin was heated above 37° Celsius. Preheating the resin to 68° Celsius is not recommended, as it resulted in tooth deformation.

**Reviewer's Comments:** This is a good article that seeks to find a way to reduce some of the limitations of composite restorations by evaluating the effects of heating the material to see if this could improve the final restoration. It demonstrates that there are limitations to how this material can be modified, as tooth deformation and other negative clinical manifestations can result. (Reviewer-Eduard N. Friedman, DDS).

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Keywords: Cuspal Movement, Gap Formation, Preheated Resin Composite

Print Tag: Refer to original journal article
When considering using a laser, make your choice of lasers based on the procedure you are doing.

**Background:** Lasers are becoming prevalent in all fields of medicine and are finding their way into the field of dentistry. There really is no one laser that will do everything the best. However, by selecting the proper wavelength and operating parameters for the desired procedure, effective results can be obtained.

**Objective:** To give some basic science that will allow the reader to make informed decisions when selecting procedures where lasers may be appropriate and selecting the most appropriate type of laser to use.

**Discussion:** The basic laws of physics and tissue interaction control what we can do with light energy and which procedures are best accomplished with which lasers. It is suggested that information be obtained through scientific organizations such as the Academy of Laser Dentistry or the Academy of General Dentistry, as these organizations’ primary goal is to be the source of unbiased, noncommercial information on the science and clinical application of technology useful to the dental community. Just about any soft tissue surgical procedure from gingivoplasty, frenectomy, tissue management for implant placement or uncovering, tissue management for impressions, biopsies, fibroma removal, vestibuloplasty, hemostasis, operculectomies, flap incisions, and aphthous ulcer management can be effectively performed with the correct dental laser. Laser surgery works by ablation, the vaporization of cells by the interaction of the light with a chromophore (absorber of light) in the tissue that is specific for the wavelength being used. While doing this, the laser both coagulates and sterilizes the tissue surface, reducing discomfort and infection risk. As soft tissue is 70% water, lasers whose primary chromophore is water (CO\textsubscript{2} and Er:YAG) are extremely effective. Other lasers whose chromophores are hemoglobin, oxyhemoglobin, and melanin (810 nm diode, 980 nm diode, and Nd:YAG) are also very good coagulators. As the ability to ablate efficiently is controlled by tissue absorption, amount of energy applied, and time of application, pulsed lasers allow for greater energy peaks to be used for a shorter exposure time. This increases the thermal relaxation interval and decreases collateral tissue damage. Some lasers can also be used with a water coolant spray to enhance this effect. Removing the diseased pocket epithelium while leaving the healthy tissue intact can be accomplished using a laser. The bactericidal effect and formation of a healthy clot allows for reattachment without losing additional gingival height.

**Conclusions:** It is imperative that the practitioner be knowledgeable in the science of laser physics in order to make the best choices in selecting which laser to use and the operating parameters for its use.

**Reviewer's Comments:** This a very good article for anyone considering using lasers in their practice to read. It gives a concise explanation of what to look for by describing the basic physical mechanisms of tissue interaction. (Reviewer-Charles R. Hoopingarner, DDS).

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Keywords: Laser Energy, Soft Tissue Laser, Laser Science

Print Tag: Refer to original journal article
Propriely stored alginate materials are dimensionally stable enough for most common uses.

**Background:** Dental alginate impression materials have long been used for many diagnostic and definitive purposes. Alginate is relatively inexpensive and consists of sodium or potassium salts of alginic acid and calcium sulfate that when mixed with water produce a sol. Traditionally, it has been thought that if these impressions were not poured immediately, they were not dimensionally stable. Wrapping the impressions in a damp towel or placing them in a humidor until they could conveniently be poured has been the norm, even at the institutional level.

**Objective:** To determine whether 2 alginate materials Cavex ColorChange and Jeltrate Plus are dimensionally stable when stored for 5 days in a high humidity environment.

**Methods:** Columbia Dentoform models with Ivorine teeth were modified for the inclusion of ball bearings that allowed for the accurate measurement of both arch width and tooth width. Perforated stock trays were enhanced with the addition of modeling compound to allow a uniform thickness of impression material and were treated with tray adhesive. All impression material was vacuum mixed according to manufacturers' directions and standardized impression technique was used. Impressions were shaken dry and the Jeltate material was wrapped in a wet paper towel and sealed in a plastic bag. The Cavex material was sealed without wrapping in a plastic bag. The impressions were cast using traditional standard techniques at days 1 through 5. Casts were allowed to mature for 24 hours before being evaluated and measured. Measurements of tooth width and arch width were statistically analyzed for differences from the true model.

**Results:** Both materials produced models that were 0.001 inches from the true on the immediate pour with the Cavex being slightly larger and the Jeltate slightly smaller. By day 1 the Cavex was 0.002 inches smaller and remained at that level until days 4 and 5, when it held true to the norm. The Jeltate enlarged through day 4 when it was 0.005 inches from the true before dropping to 0.003 inches at day 5. The processes of imbibition, evaporation of water, and syneresis are responsible for dimensional change, which is multifactorial and material specific. Using an acceptable standard of 0.50% change, the extended pour Cavex was within bounds while the traditional Jeltate was only within bounds immediately and at days 1 to 2.

**Conclusions:** Although both materials produced casts that were statistically accurate up to day 5 the traditional Jeltate material is best poured before day 1 and the extended-pour Cavex is best poured after day 1. Both materials when stored in the stated matter are stable enough to be used for diagnostic casts and acrylic appliances.

**Reviewer’s Comments:** This study seems to validate the handling of alginate materials as seen in practical settings. It would be interesting to extend the study time. (Reviewer-Charles R. Hoopingarner, DDS).

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**Keywords:** Alginate, Extended-Pour Alginate, Accuracy

**Print Tag:** Refer to original journal article
Topical Lidocaine/Prilocaine Gel as Effective as Eugenol for Dry Socket

The Efficacy of a Topical Anesthetic Gel in the Relief of Pain Associated With Localized Alveolar Osteitis.
Burgoyne CC, Giglio JA, et al:

In this study, TA was as effective as eugenol dressing for the treatment of AO, and may be easier to use.

**Background:** Localized alveolar osteitis (AO) is a common painful complication of tooth extraction. A topical anesthetic (TA) gel with antibacterial action may be an effective treatment.

**Objective:** To investigate the effect of a topical lidocaine/prilocaine mixture in a thermosetting gel compared to a eugenol dressing for the treatment of AO.

**Design/Methods:** Subjects with post-extraction symptoms of AO were treated at the Virginia Commonwealth University School of Dentistry oral surgery clinic. Each patient had pain of increasing severity 2 to 3 days after tooth extraction, with no clot present in the socket. Exclusion criteria included immunosuppression, corticosteroids, NSAID use within 4 hours of visit, allergy to study medications, glucose 6-phosphate dehydrogenase deficiency, or pregnancy. Subjects were randomized to the control or treatment group and blinded to group assignment. Before treatment, each scored pain on a visual analog scale (VAS), from 0 (no pain) to 10 (worst pain imaginable). Sockets were irrigated with normal saline. Controls received eugenol on gauze strip placed in socket. For TA patients, 2.5% prilocaine with 2.5% lidocaine in a gel that set at body temperature was dripped into the socket to the alveolar crest with a syringe (<1 mL). All patients completed a diary, recording pain on VAS at 5, 10, and 15 minutes after treatment and hourly during waking hours for the next 48 hours. All were given a prescription for 24 tablets of acetaminophen with 30 mg codeine to take 1 to 2 tablets every 4 hours as needed for breakout pain. Patients recorded when and how many tablets were taken. Follow-up was done at 48 hours and patients with pain were re-treated. Primary outcome was pain at 24 and 48 hours.

**Results:** 35 subjects participated: 20 controls (5 males and 15 females; mean age 33 years, range 19 to 55 years) and 15 TA patients (8 males and 7 females; mean age 27 years, range 17 to 58 years). In total, 63% (n=21) were mandibular third molars; mandibular first molars, maxillary second premolars, and maxillary second molars were also treated. Mean pretreatment pain score was 6.72 (controls) and 6.37 (TA); P=0.62. At 15 minutes, both significantly reduced pain (P<0.001). Mean VAS was 4.83 (controls) and 3.23 (TA); P=0.022. At 24 and 48 hours, the mean pain for TA patients was lower than controls, but this was not significant. Mean number of pain tablets taken per patient was 7.9 (TA) and 10.3 (controls).

**Conclusions:** TA was as effective as eugenol dressing for the treatment of AO, and may be easier to use. Further research is needed.

**Reviewer's Comments:** This study had a small sample size and therefore may not have had the statistical power to detect a difference in the 2 treatments. A larger, adequately powered study should be performed to determine the best treatment. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Localized Alveolar Osteitis, Pain Relief

Print Tag: Refer to original journal article
Are EMDs All You Need to Regenerate Periodontal Attachment?

Do Bone Grafts or Barrier Membranes Provide Additional Treatment Effects for Infrabony Lesions Treated With Enamel Matrix Derivatives? A Network Meta-Analysis of Randomized-Controlled Trials.

Tu YK, Woolston A, Faggion CM Jr:


Bone grafts or barrier membranes may not provide any tissue regeneration effects beyond what is achievable with EMD alone in the treatment of periodontal infrabony defects.

**Background:** Enamel matrix derivatives (EMD) are used alone and with other regenerative materials to treat periodontal infrabony defects. It is not clear how much additional benefit these expensive materials provide in clinical outcomes such as gain in clinical attachment levels (CAL) and reduction of periodontal pocket depths (PPD).

**Objective:** To conduct a network meta-analysis to determine whether combination therapy provides better clinical results than EMD alone for the treatment of infrabony defects.

**Methods:** Randomized clinical trials (RCTs) published from January 1996 through December 2008 were searched in the MEDLINE, EMBASE, LILACS, and CENTRAL databases, using the following key words: "Emdogain," "enamel matrix proteins," "infrabony, infrabony, or intraosseous". In addition, an electronic search was performed on the Journal of Clinical Periodontology, Journal of Periodontology, and Journal of Periodontal Research. Data extraction was done in duplicate. Two authors independently assessed the quality of the studies including randomization, allocation concealment, masking, intention to treat, and sample size calculations. Nonpublished and published RCTs were also searched in ClinicalTrials.gov and Google in English, French, Spanish, German, and Italian. Treatment outcomes assessed were changes in PPD, CAL, and infrabony depth measured at least 6 months following surgery. Network meta-analysis analyzes effects of different treatments in multiple studies, and can indirectly infer relative effects of treatments that are not compared head to head. This may be a more robust statistical method for estimating treatment effects than conventional meta-analysis.

**Results:** 31 articles were reviewed; 3 were excluded because nonregenerative therapies were used with EMD or they were non-RCT studies. Twenty-eight articles were included in the quality assessment and review. Of these, only 14 reported changes in infrabony defect depths. EMD plus bone grafts produced 0.24 mm (95% high probability density (HPD) interval -0.38, 0.65) more PPD reduction and 0.46 mm CAL gain (95% HPD interval, -1.04, 1.04) more PPD reduction and 0.15 mm CAL gain (95% HPD interval, -1.37, 0.30) than EMD alone. EMD plus membranes produced 0.07 mm (95% HPD interval, -1.26, 1.37) more PPD reduction and 0.15 mm CAL gain (95% HPD interval, -1.37, 0.30) than EMD alone. Bovine bone grafts plus EMD had greater treatment effects than the other types of bone grafts and barrier membranes.

**Conclusions:** There is inadequate evidence to demonstrate any benefit of using additional regenerative therapies along with EMD in the treatment of infrabony defects.

**Reviewer's Comments:** Even though this study did not find evidence to support additional benefit of adjunctive therapies used with EMD, when different bone grafts were analyzed separately, the network meta-analysis found indirect evidence that bovine bone grafts performed better than the others. This needs to be confirmed in a large well-designed clinical trial. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Enamel Matrix Derivatives, Tissue Regeneration, Infrabony Defects, Systematic Reviews

Print Tag: Refer to original journal article
There is no conclusive evidence showing that alcohol-free mouthwashes are linked to the risk of oral cancer.

**Background:** Studies have shown a risk of developing oral cancer with repeat use of alcohol-containing mouthwashes. However, other reviews of the evidence report conflicting conclusions.

**Objective:** To look at separate reviews on alcohol-containing mouthwashes and oral cancer risk and to determine the strengths and weakness of the publications in light of epidemiological evidence.

**Methods:** The authors focused on the details of 2 current reviews. The first review (M.J. McCullough, 2008) linked oral cancer risks with alcohol-containing mouthwashes while the second review (C. La Vecchia, 2009) did not. An epidemiological method was used to evaluate the evidence from both studies. The type of study considered the most conclusive evidence was type I—the systematic review with at least 1 randomized clinical trial (RCT). Next was type II—the RCT followed by type III—interventional studies, type IV—observational studies, and type V— descriptive studies, case reports, or expert opinion. Alcohol versus alcohol-free mouthwash studies were also compared.

**Results:** The first study linking oral cancer with alcohol-containing mouthwashes draws on evidence from type IV and V criteria levels. The depth of analysis on key issues was considered lacking. The major evidence of the second study, which refuted the link to cancer, failed to report opposing arguments and was viewed as presenting an unbalance view. Alcohol-containing mouthwashes showed little or no advantage over alcohol-free alternatives.

**Conclusions:** The evidence showing an association between use of alcohol-containing mouthwash and oral cancer is weak and inconclusive.

**Reviewer's Comments:** This study quantifies the evidence that links alcohol-containing mouthwashes to oral cancer. Using epidemiological criteria, the authors showed the link to be weak, but some level of risk was not denied. It may be prudent to recommend alcohol-free mouthwashes to avoid any level of risk. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Oral Cancer/Mouthwashes

Print Tag: Refer to original journal article
Sealant Retention Rates Depend on Tooth Type Long-Term

Long-Term Performance of Resin Based Fissure Sealants Placed in a General Dental Practice.

Hevinga MA, Opdam NJ, et al:


In this study, a retention rate of 73% was shown for sealants place on premolars for up to 15 years.

**Background:** Most clinical studies are conducted under well-controlled conditions that may not reflect the success or failure seen in general private practice. The success of a resin-based sealant depends on the long-term performance in protecting enamel fissures from decay.

**Objective:** To determine the long-term performance of resin sealants placed in a general dental practice.

**Methods:** 1204 resin-based sealants were placed on molars and premolars of 148 patients. Sealant retention was evaluated at 5, 10, and 15 years. Patients were retrospectively grouped, low or high, according to the number of yearly restorations placed since the first sealant. A patient receiving >1 restoration in 3 years was considered high, while a patient receiving <1 restoration in 3 years was considered low. A sealed tooth was classified as a failure only if a restoration was eventually placed on that tooth. If no restoration was required, then the sealant was classified as present, absent, or partially absent. Staining in the fissures was recorded.

**Results:** Patients with a high number of restorations showed lower sealant retention compared to patients with a low number of restorations. Only 11% of the sealed teeth were eventually restored with composite. Of the formerly sealed teeth, 40% showed fissure staining without requiring restorations. Irrespective of time, 40% to 50% of the sealants were present. The complete retention rate was greater for premolars (73%) compared to molars (20%).

**Conclusions:** Long-term sealant retention rate is associated with the patient's history of restorations and is dependent on tooth type.

**Reviewer's Comments:** This practice-based study showed lower sealant retention rates than previously reported in strict controlled university-based studies, with nearly half of the sealants being lost over time. No details were provided on isolation and placement technique. In total, 467 of 1204 teeth showed fissure discoloration after the sealant was lost without requiring further treatment. This is a reminder that discolored fissures are not a good indication for placing a sealant and pushes forward the question of overtreatment. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Fissure Sealants/Clinical

Print Tag: Refer to original journal article
Before recommending the internet as a dental information resource or using it as a practice-based resource, dentists should familiarize themselves with the associated ethical and legal issues.

**Background:** Recent estimates indicate that there are now >70,000 health care websites that can be accessed by patients, and dentistry is impacted by this trend in 2 ways. First, patients are better informed about their conditions and treatment options and second, patients may "shop" for dental care providers as part of the growing "dental tourism" movement.

**Objective:** To determine the extent to which patients use internet/online resources to obtain information on dental conditions and to locate providers in locations outside their home geographic area.

**Design:** 15-question survey of adult dental patients over a 3-month period in late 2008.

**Methods:** Survey questions were designed to assess patients' use of the internet for health-related use of the internet, whether they would consult a dentist online and whether they would use the internet to plan travel for the purpose of obtaining dental care.

**Participants:** 520 patients, age range 18 to 85 years.

**Results:** 500 surveys were completed for a 96% response rate. The average age of the respondents was 44 years, with a greater number of females (65%) versus males (35%). In total, 58% of respondents were new patients, with the remaining 42% consisting of returning patients. Of respondents, 35% had researched their present dental condition(s) on the internet or had asked a relative or friend to do so on their behalf. Google was the most frequently used search engine and only about 8% of respondents deemed the information obtained to be of low quality. Three fourths of respondents would use the internet again for dental-related information. There was a significant correlation between the clinic in which the patient was seen and the use of the internet-for oral medicine clinics, 49% of respondents used the internet, while 20% of oral surgery patients and 12% of restorative patients used it. Nearly 40% of respondents would consult a dentist online and would consider using the internet for dental treatment in another country.

**Conclusions:** While the internet offers many benefits to current and potential dental patients, there is great potential for misinformation as well, and that guidance should be offered to both patients and practitioners regarding the ethical and legal issues of dental tourism.

**Reviewer's Comments:** Even though this study was conducted in Ireland, the outcomes indicating a high potential use of the internet for obtaining information about dental conditions, treatment options, and even travel to other countries to seek dental care would likely translate to most countries. The internet is a tremendous resource, but one which must be used with great caution in recommending and delivering patient care. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Internet, Dentistry, Dental Patients

Print Tag: Refer to original journal article
Elderly Patients With Chewing Problems Are More Dependent on Others

Masticatory Dysfunction Is Associated With Worse Functional Ability: A Population-Based Study.

Laudisio A, Marzetti E, et al:


41% of patients over the age of 75 years report some masticatory dysfunction.

**Background:** Masticatory dysfunction (MD), a consequence of periodontal disease and tooth loss, is common in elderly adults. Disability and impaired function are also common and are associated with increased levels of circulating inflammatory cytokines, as seen in periodontitis.

**Objective:** To determine whether patient-reported MD is associated with functional ability in elderly adults.

**Participants/Methods:** Subjects were all adults aged >75 years, living in Tuscania on January 1, 2004. Physical examination, electrocardiography, Doppler echocardiography, bone mineral density, and serum chemistry were performed. Subjects completed validated questionnaires about socioeconomic status and lifestyle including alcohol consumption, smoking, nutrition, unintentional weight loss, depression, and cognitive performance. Functional ability was measured using the activities of daily living (ADL) and the instrumental activities of daily living (IADLs) scales. The ADL scores independency in bathing, dressing, toileting, transferring, continence, and feeding. The IADL measures independency in shopping, cooking, housekeeping, traveling, taking medications, finances, and talking on the telephone. Subjects were considered to have MD if they reported that they had any difficulties chewing, and if these led to dietary changes.

**Results:** 387 subjects were enrolled; 37 were excluded because of missing data, 31 refused blood draw, and 6 could not stand to record weight. Of the final 350 subjects, 41% reported MD. Subjects with MD were more dependent in ADLs (25%) than those without MD (5%); *P* <0.0001. Subjects with MD were more dependent in IADLs (37%) than those without MD (15%); *P* <0.0001. MD was associated with less frequent ingestion of protein (*P* =0.001), fiber-rich food (*P* <0.0001), and vitamins and antioxidants (*P* <0.0001) and greater unintentional weight loss >5 kg (*P* =0.010). MD was associated with lower serum albumin (*P* =0.001), hemoglobin (*P* =0.002), and higher interleukin-6 levels (0.002) and renal disease (*P* =0.026). MD was associated with disability in the ADLs (OR, 2.40; 95% CI, 1.05 to 5.51; *P* <0.05) and in the IADLs (OR, 2.77; 95% CI, 1.07 to 7.16; *P* <0.05). This relationship was stronger in subjects aged >80 years.

**Conclusions:** MD may be an independent risk factor for reduced functional ability in older adults. Further research is needed.

**Reviewer’s Comments:** Masticatory dysfunction may be a modifiable risk factor for disability in geriatric patients. In preserving teeth and masticatory function, dentists may have an important role in preventing disability and improving quality of life in older adults. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Masticatory Dysfunction, Elderly

Print Tag: Refer to original journal article
Due to its non-invasiveness and ease of use, ultrasonography can be used as a diagnostic tool for Sjögren syndrome.

**Background:** Objective criteria for diagnosis of Sjögren syndrome can be met by labial salivary gland biopsy, sialography, sialometry, or scintigraphy, but each has its own limitations: expense, invasiveness, or technical requirements. Ultrasonography may be an inexpensive, accurate, noninvasive alternative diagnostic tool for Sjögren syndrome.

**Objective:** To compare the diagnostic reliability (using serology and ocular diagnosis as gold standard) of sialography, histopathology, and ultrasonography in the diagnosis of Sjögren syndrome and to correlate the results.

**Participants/Methods:** Patients who were treated from April 2001 through April 2007 at the Department of Oral and Maxillofacial Surgery at Hokkaido University participated in the study. All had ocular examinations and serologic tests for anti-Ro/SS-A and anti-La/SS-B antibodies for Sjögren syndrome (gold standard) followed by sialography, minor salivary gland biopsy, and ultrasonography. Sialography was performed on bilateral parotids. Images were reviewed by 2 dental radiologists and scored (Stage 0 – normal; Stage 1 – punctate; Stage 2 – globular; Stage 3 – cavitory; and Stage 4 – destructive). For Grade ≥1 Sjögren syndrome, ultrasound examinations were performed on bilateral parotid and submandibular glands in axial and coronal planes by 2 dental radiologists blinded to sialographic diagnosis, and scored for inhomogeneity (0 – normal; 1 – slight; 2 – mild; 3 – evident; and 4 – gross). For Grade ≥2 Sjögren syndrome, labial salivary gland biopsy was done under local anesthesia and findings were graded based on focus score (0 – absent; 1 – slight infiltrate; 2 – moderate infiltrate or <1 focus per 4 mm²; 3 – 1 focus per 4 mm²; and 4 – >1 focus per 4 mm²). For Grade ≥3 Sjögren syndrome, sensitivity and specificity were calculated for each diagnostic method and correlations between them were determined.

**Results:** 73 subjects (4 male, 69 female) aged 13 to 68 years (mean age, 48 years) participated. Thirty-six had Sjögren syndrome and 37 had sicca without Sjögren. Sialography showed sensitivity 83.3%, specificity 94.4%, and accuracy 89.0%. Ultrasonography showed sensitivity 77.8%, specificity 78.8%, and accuracy 78.1%. Histopathology showed sensitivity 63.9%, specificity 91.4%, and accuracy 78.1%. Sialography was the most reliable diagnostic tool (P <0.05) and sialography and ultrasonography were most highly correlated (r=0.58). Two subjects developed reversible acute sialadenitis from sialography and 2 had reversible persistent pain in lip after biopsy.

**Conclusions:** Ultrasonography is an accurate noninvasive tool that can aid in the diagnosis of Sjögren syndrome.

**Reviewer’s Comments:** The lack of invasiveness of ultrasound and its good correlation to sialography make it a very attractive alternative to labial salivary gland biopsy for the diagnosis of Sjögren syndrome. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Sjögren Syndrome, Diagnosis, Ultrasound

Print Tag: Refer to original journal article
In this study, the cantilever design zirconia FPD was shown to be promising with 4-year survival rate similar to controls.

**Background:** The clinical situation arises where cantilever design (CD) bridge is opted over the traditional fixed partial denture (FPD) to avoid preparation of an additional tooth or when there is no abutment tooth at the end of the edentulous space. The CD, which is supported at only one end, has shown greater failure than the FPD using metal ceramics. The clinical performance of the CD has not been thoroughly investigated using high strength ceramics.

**Objective:** To investigate the 4-year clinical performance of 3- to 4-unit FPDs with a cantilever design (CD).

**Methods:** 58 all-ceramic bridges with CAD-CAM zirconia frameworks were evaluated over the course of 4 years. Twenty-four were traditional design FPDs (end abutment-control), while 34 bridges were 3- to 4-unit CD (cantilever test group). A minimum occlusal clearance of 1.5 mm was prepared on the abutment teeth with a 0.8-mm shoulder. The connector sizes of the frameworks were 3 x 3. The framework was designed 1 mm short of the margins for the control group and extended to the margins on the CD group. The frameworks for the CD group were veneered using a conventional build-up technique, while the frameworks for the control group were veneered using a loss wax pressed technique. Both groups were air abraded with 50 μm aluminum oxide at 0.25 MPa and cemented with glass-ionomer cement.

**Results:** The 4-year survival rate for the all-ceramic CD group was 91% compared to 96% for the control FPD group. There was no statistically significant difference between the groups. No fractures of the zirconia frameworks were reported. The chipping rate was 13% for the control and 12% for the CD group. Biological complications (endo treatment, decementation, and secondary caries) were 21% for the control and 15% for the CD group.

**Conclusions:** The cantilever design zirconia FPD was shown to be promising with 4-year survival rate similar to controls.

**Reviewer's Comments:** This study shows that the cantilever design may be a viable option for replacing premolars and molars when using a CAD-CAM zirconia framework. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: All Ceramic Bridges/CAD-CAM, Clinical Study

Print Tag: Refer to original journal article
While systematic reviews are central elements in evidence-based clinical decision-making, the needs of the patient and clinical judgment of the dentist remain equally important in determining the overall use of this clinical model.

**Background:** Scientific evidence will play an increasingly important role in decision-making in clinical dentistry, and many dentists may not know the current status of evidence-based dentistry and its applications.

**Objective:** To describe a logic model into the clinical decision-making process as part of the broad philosophy of evidence-based dentistry.

**Design:** Expert review of models for the appropriate management of information derived from systematic reviews and other sources of scientific evidence that can be used to improve dental care.

**Methods:** Expert assessment of tools that are currently used to assess the application of scientific evidence to patient care and their rationale.

**Results:** The authors reviewed a formulation of patient-centered questions using the PICO format (Patient-Intervention-Comparison-Outcome), as well as standard protocols for the evaluation of research studies such as CONSORT (Consolidated Standards of Randomized Trials), assessment of the strength of scientific evidence from research studies (SORT [Strength of Recommendation Taxonomy]), and the evaluation of systematic reviews using AMSTAR. The authors utilized the clinical situation of an avulsed tooth as an example of the logic model, which may indicate reimplantation or no reimplantation, based on evidence from systematic reviews and clinical data as "inputs," the actual procedure as "activities," with root canal treatment as one of the "outcomes" and evaluation of the dentist's and patient's satisfaction with the final product as the "impact."

**Conclusions:** The logic model has specific strengths in facilitating the use of evidence in clinical dentistry by using information from systematic reviews as the central element of clinical decision-making, and proactively identifies the optimal procedures to achieve the best outcomes with an emphasis on the final outcome that is envisioned prior to treatment. In each step of patient care, reliable evaluation helps integrate each procedure within an overall framework.

**Reviewer's Comments:** This rather analytical approach to evidence-based dentistry does not simply make every treatment decision a statistical decision based on publications, but incorporates such information into an overall scheme of several "human" elements, such as the patient's wants and needs and the practitioner's expertise and clinical judgment. This is quite consistent with the American Dental Association's definition of evidence-based dentistry and will become an increasingly important component in the delivery of dental care. (Reviewer-Arthur H. Jeske, DMD, PhD).
Shade matching is a skill that can be improved with training.

Background: The accurate perception of color is an important concept in dentistry for arriving at a restoration with acceptable esthetics. There are several different members of the dental team that are involved in selecting, reproducing, and accepting a proposed restoration color from the doctor and his staff or colleagues to the lab technician and the patient. Many variables are thought to influence shade-matching ability but have not been verified in dentistry.

Objective: To determine the shade-matching ability among general dentists, dental assistants, specialists, and lay people.

Participants/Methods: 120 subjects participated in the study and were divided into 3 groups based on occupational training/shade-matching experience. Group 1 (routine shade matchers) were restorative dentists, dental technicians, and prosthodontists. Group 2 (occasional shade matchers) were dental specialists and general private practice dentists. Group 3 (non-dentists) were dental assistants and lay people. Participants were also categorized based on years of experience, gender, age, eye color, and use of eye glasses. Using the Vita 3D-Master shade guide, the participants were asked to select the best match of 3 different shades of acrylic central incisors (1M2, 2L1.5, 2R1.5).

Results: The only significant difference between the 3 groups was seen when matching the lowest value target (1M2). Group 1 matched the low value tab perfectly 53% of the time, while Groups 2 and 3 performed a perfect matching 30% and 20% of the time, respectively. Greater years of experience and age among all groups were also shown to have a significant effect on matching the more yellow shade (2L1.5).

Conclusions: Restorative dentists, dental technicians, and prosthodontists perform better than dental specialists and lay people in matching a light color. The ability to match a more yellow color was more dependent on age and years of experience.

Reviewer's Comments: Most experts agree that value (lightness) is the most important dimension of color for dental shade matching—if the value is not correct, the restoration will be a mismatch. This study shows that dental professionals who routinely perform shade matching show better matching ability as colors become lighter and stresses the importance of formal training in dental color matching. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Color/Shade-Matching

Print Tag: Refer to original journal article
Gingival Recession Remains Challenging in Spite of Available Surgical Tx

Treatment of Gingival Recession.
Kassab MM, Badawi H, Dentino AR:

Dent Clin North Am 2010; 54 (January): 129-140

Patients should be informed of several surgical approaches in the treatment of gingival recession, none of which provide consistently reliable outcomes, especially over the long-term.

**Background:** Gingival recession is a common periodontal condition in adults that is associated with root sensitivity, caries, and poor esthetics when it occurs on the facial surfaces of maxillary teeth. There are several surgical procedures that may be successful in managing this problem, but outcomes vary considerably.

**Objective:** To review the outcomes of specific surgical treatments for gingival recession.

**Design:** Literature review and summary by experts in periodontics. **Discussion:** The search methodology was not specified, nor were the criteria for inclusion and exclusion of referenced studies, and 64 research reports were referenced. The authors reviewed the status of connective tissue grafting, pedicle grafts, coronally positioned grafts, free autogenous tissue grafts, free epithelialized autogenous gingival grafts, connective tissue autogenous grafts, guided tissue regeneration (GTR), and combination techniques for treating gingival recession. The general criterion for success of a given technique is based on an increased height of attached gingiva relative to the position of the mucogingival junction. No single technique provides consistently superior outcomes, probably because of biologic variations and inter-study technique differences. The combination of connective tissue grafting with a coronally positioned flap appears to yield the highest success rates, and the authors note that while GTR has produced approximately 50% increases in root coverage associated with “shallow” recessions (1.5 to 3.5 mm), connective tissue grafting studies report up to 92% average coverage of exposed roots after 6 months, a success rate that declines to 58% after 25 months.

**Conclusions:** Gingival recession can be treated with any of the techniques described in this review, but outcomes appear to be best when connective tissue grafting is combined with a coronally positioned flap. In cases in which patients are not candidates for free gingival donor tissue harvesting, allograft materials and GTR can be used with some expectation of success.

**Reviewer's Comments:** This review provides the dentist with a fundamental overview of various techniques for the surgical management of gingival recession and the outcomes that may be expected, based on the current literature. For an in-depth review of guided tissue regeneration, the reader is referred to a recent Cochrane systematic review. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Gingival Recession, Gingival Grafting, Connective Tissue Grafting, Guided Tissue Regeneration, Coronally Positioned Flap

Print Tag: Refer to original journal article
Unless systemic conditions preclude implant placement, a history of periodontal disease does not necessarily contraindicate implant placement.

**Background:** Because the etiology of peri-implantitis is similar to that of periodontitis, concerns have been raised about replacement of periodontally involved teeth with implants.

**Objective:** To review the evidence regarding the relationship between a history of periodontal disease and subsequent risk for peri-implantitis and implant loss.

**Design:** Expert review of the literature with emphasis on systematic reviews. No specific review protocol is described.

**Methods:** A total of 83 relevant scientific studies predominantly from the past 20 years was reviewed. The categories reviewed included the effects of the following on development of peri-implantitis and implant survival: etiologic agents of periodontitis, influence of partial edentulousness and complete edentulousness, history of aggressive periodontitis, and the effect of bone grafting. Factors reviewed included probing depth, probing, radiographs, and biochemical markers. Risk indicators for peri-implantitis included history of periodontitis, diabetes, genetic factors, smoking, oral hygiene, absence of keratinized tissue, and implant surface characteristics.

**Results:** Normal periodontal pathogens are involved in peri-implantitis, and even in edentulous patients, soft-tissue reservoirs harbor these organisms that can reinfect implants. In partially edentulous patients, peri-implantitis occurs with a higher significance than in patients without this history, and long-term implant survival depends on their being in a strict maintenance program. In aggressive localized periodontitis, the evidence for implant survival is insufficient for determining risk of implant failure. Both guided tissue regeneration and sinus augmentation allow favorable prognoses for implants, although scientific evidence is limited. There are no biochemical markers for the diagnosis of peri-implantitis, but an absence of bleeding on probing is a favorable indicator, along with stable probing depths. Conditions that increase the risk of peri-implantitis include poorly controlled diabetes mellitus, smoking, and poor oral hygiene. Information on the amount of keratinized tissue around the implant is insufficient to use this factor as a prognostic indicator. At this time, there is insufficient evidence on which to judge the effect of surface quality of the implant (roughness) on implant survival. Prevention of peri-implantitis is predicated on frequent recall, and treatment of peri-implantitis with nonsurgical therapy, including lasers, produces only equivocal outcomes. Surgical therapy is directed at debriding the implant surface and reducing the inflammatory lesion.

**Conclusions:** Overall, implant survival is good in patients without systemic contraindications, and implants can be confidently placed in native bone, grafted bone, or in a sinus with bone augmentation. In the esthetic zone, early removal of teeth with preservation of gingival architecture is key to good outcomes with implants.

**Reviewer’s Comments:** Although root-form dental implants have been available for some time now, prognostic factors are not well defined, particularly in patients with a history of periodontitis. As this excellent review shows, good oral hygiene and frequent maintenance recall visits are key, and sinus augmentation and bone grafting do not necessarily reduce the likelihood of success. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Dental Implants, Periodontitis, Risk Factors

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Evaluation of New Scientific Knowledge Is Significant Impediment

Which Evidence Has an Impact on Dentists' Willingness to Change Their Behavior?

Wårdh I, Axelsson S, Tegelberg Å:

J Evid Base Dent Pract 2009; 9 (December): 197-205

Economic factors will help drive the application of new scientific information to dental care, and dentists will increasingly be called on to not only access this information, but also to interpret it appropriately.

Background: The current emphasis on use of scientific evidence to guide dental treatment decisions calls on the dentist to evaluate various types of evidence and then apply it.

Objective: To evaluate the impact of various types of evidence on the willingness of dentists to change their behavior based on such evidence.

Design: Postal survey/questionnaire and follow-up focus group sessions.

Participants: Swedish dentists.

Methods: Survey questions were analyzed that had previously been validated on demographics, access to and use of computers, postgraduate education, general knowledge about evidence-based patient care, and seeking and understanding new knowledge. Fifteen surveyed dentists comprised 3 focus groups that were interviewed about survey responses of the entire group. Both parametric and non-parametric statistical analyses were performed.

Results: 154 general dentists completed the survey, for a response rate of 85%. Nearly all (>90%) of both male and female dentists have access to computers at work and home, and they use computers on average ≥3 hours/day. Additionally, 58% use personal computers in their work; 54% of general practicing dentists use computers in clinical work, and 50% use computers to seek new knowledge. Discussions with focus groups revealed that the greatest problem for general dentists with regard to evidence is in the evaluation of new knowledge, and that dentists feel a need for a "transfer" of this knowledge into a usable interpretation by a trusted individual. Four factors were identified as influencing dentists seeking new scientific knowledge: economy, access to dental care, work climate and life-cycle periods (ie, during some phases of professional practice, dentists do not have as much time to pursue new knowledge).

Conclusions: Dentists have a problem with the interpretation of new scientific knowledge, and scientific evidence by itself is insufficient to change treatment behavior. This helps explain why interactions with other professionals and continuing education seminars continue to be important.

Reviewer's Comments: Although this study was conducted in Sweden, the outcomes observed would probably transfer well to general dentists in the United States. Qualitative interpretation of scientific reports should help dentists adopt new scientific evidence into their practices. It is likely that continuing education programs will remain an important avenue for introduction of new scientific information in dentistry. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Behavior, Evidence, Knowledge, Qualitative Methodology, Questionnaire

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ECG Abnormalities More Common in Dental Patients Than Generally Believed

ECG Variations in Patients Pre- and Post-Local Anaesthesia and Analgesia.

Hill CM, Mostafa P, et al:

Br Dent J 2009; 207 (December 19): E23

Do not discount the potential occurrence of ECG abnormalities, especially during oral surgical procedures. They are relatively common but, fortunately, few are serious or life threatening. Surgical stress is a factor.

Background: Assessment of ECG patterns is not a regular part of routine dental care, but cardiac rhythms are subject to change with potentially serious outcomes during invasive procedures, such as surgical removal of impacted third molars.

Objective: To assess the incidence of abnormal ECG patterns in adult oral surgery patients, to relate these ECGs to use of local anesthetics and analgesics, and to assess the potential impact of surgical stress.

Design: Prospective, single-group observational study.

Participants: Adult dental patients undergoing removal of at least 1 impacted mandibular third molar under local anesthesia.

Methods: Healthy adult volunteers requiring removal of at least 1 bony-impacted lower third molar and at least 1 other ipsilateral upper tooth were solicited from patients in a Cardiff, Wales, dental hospital. Subjects received plain 4% prilocaine (no epinephrine) before the procedure and 1 of 3 pain medications (ibuprofen 400 mg, pregabalin 50 mg, or placebo) afterward. Preoperative and intraoperative ECG tracings were obtained using a standard 12-lead system.

Results: 198 participants completed the study. In the screening phase, 44 subjects expressed minor ECG abnormalities, including 20 cases of rsR complex patterns, 7 cases of ST-segment elevation, 6 with abnormal P waves, 3 with premature atrial beats, and 3 with shortened PR interval. Abnormal ECG patterns were seen in 60 patients 30 to 45 minutes following the procedure, with 19 cases of rsR complex patterns, 11 sinus dysrhythmias, 7 ST-segment elevations, and 6 abnormalities of the P-wave pattern. Four of these were significant and 1 was accompanied by cardiac symptoms. None of the ECG abnormalities were attributable to use of postoperative analgesics, and 4 were thought to be due to psychological stress and/or local anesthetic.

Conclusions: ECG abnormalities are relatively common in dental patients, and the effect of stress and intraoperative drugs must be considered as possible contributing factors.

Reviewer’s Comments: The observation of a number of abnormal ECG patterns in presumably healthy oral surgery patients, and the occurrence of significant abnormalities in approximately 2% of subjects points to the importance of careful screening of patients prior to surgical procedures and recognition of the possibility of abnormal cardiac rhythms at any point in dental treatment. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Local Anesthesia, Analgesia, Oral & Maxillofacial Surgery, ECG

Print Tag: Refer to original journal article
Chlorhexidine mouthrinses and sub-antimicrobial doses of doxycycline are effective approaches as adjuncts in the treatment of periodontal disease, but they do not replace scaling and root planing as primary therapy.

**Background:** The availability of an effective chemotherapeutic agent for treatment of periodontal diseases would offer many advantages over mechanical debridement and surgery, but there are many obstacles to this approach.

**Objective:** To assess the current status of chemotherapeutics, such as antibacterial mouthrinses, in contemporary management of periodontal diseases.

**Design:** Expert literature review.

**Methods:** A literature search was performed, without a specific protocol described for 5 major chemotherapeutic classes.

**Results:** Systemic antibiotics are generally not effective because antibiotic activity against specific pathogens cannot be determined in any given case, and antibiotics do not penetrate the plaque biofilm. Except for the combination of amoxicillin and metronidazole, systemic antibiotics exert no clinically significant beneficial effects on pocket depth reduction and clinical attachment levels. These drugs may play an adjunctive role in the treatment of severe periodontitis and should not be used as stand-alone therapy. Local antibiotic therapy (placed in the gingival sulcus) produces small favorable results, but insufficient to result in widespread use. Antiseptics are limited by lack of significant penetration into the gingival sulcus. Their best applications appear to be as adjuncts to control gingival inflammation postoperatively and during periods when normal oral hygiene cannot be achieved. With regard to antiseptic mouthrinses, chlorhexidine appears to be the "gold standard," with phenolic compounds ranked next in effectiveness, and oxygenating agents were viewed as least effective. Anti-inflammatory agents include those that inhibit tissue collagenases (eg, doxycycline), and NSAIDs (eg, flurbiprofen) have been shown to be effective in reducing bone loss in periodontal disease. These agents have been shown to be efficacious in combination with scaling and root planing (SRP).

**Conclusions:** The biofilm nature of periodontal inflammation and disease precludes exclusive use of non-mechanical, nonsurgical chemotherapy as sole therapy, although current research on specific antagonists of inflammatory mediators, such as tumor necrosis factor, may pave the way for noninvasive management of periodontal disease.

**Reviewer’s Comments:** This review confirms outcomes of other similar reviews, and highlights the difficulties of eliminating periodontal pathogens residing in biofilm and deep within the gingival sulcus/periodontal pocket. At this time, optimal use of antimicrobial agents appears to be in combination with SRP, particularly in cases that are refractory to SRP alone. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Periodontics, Antibiotics, Antiseptics, Host-Modulatory Agent

Print Tag: Refer to original journal article