The new Linearguide 3D-Master is shown to be superior to the Vitapan Classical or Toothguide 3D-Master shade guides.

**Background:** The most popular shade guide, widely used for the past 50 years, is the Vitapan Classical shade guide (VC). In the late 1990s, an improved Toothguide 3D-Master shade guide (TG) came on the market, yet was not as user friendly. A new shade guide as been recently released called the Linearguide 3D-Master, which rearranged the tabs of the TG to simplify its use.

**Objective:** To compare the performance and user satisfaction of 3 shade guides: Vitapan Classical shade guide (VC), the Toothguide 3D-Master (TG), and the new Linearguide 3D-Master (LG).

**Participants/Methods:** The subjects in this study consisted of 100 dental students. Shade matching was performed under color-corrected light. Subjects were asked to match 4 target shades using 1 of the 3 shade guides: VC, TG, or LG. A 10-point scale was used based on the size in color difference ($\Delta L^*$) measured between the 4 target shade guides and the top 10 matches from each shade guide. For either the smallest $\Delta L^*$ or an exact match if present, 10 points were scored. For the tabs with the largest $\Delta L^*$ (ranked tenth or beyond), a score of 0 points was recorded. The subjects were finally asked to complete a survey concerning the use of the 3 shade guides.

**Results:** A significant mean difference in $\Delta L^*$ between TG/LG and VC were shown. Best shade-matching results were achieved using the LG according to the rank scores. On average, the best match was missed by 1 tab for the LG and VC, and nearly by 2 tabs for the TG. The results of the user survey showed the LG to have a more logical arrangement, easier to use, easier to master, and overall, subjects were more satisfied with its use compared to the TG and VC.

**Conclusions:** Objective laboratory evaluation of the Linearguide 3D-Master shade guide (LG) showed better shade-matching results compared to the Vitapan Classical (VC) and the Toothguide 3D-Master (TG). Survey results indicated that the LG shade guide was more favored among all 3 shade guides.

**Reviewer’s Comments:** This study provided convincing evidence from a user survey and objective laboratory data for the superiority of the new Linearguide. It is remarkable that dentists have waited more than 50 years for a new shade guide from Vita such as this--that provides good color distribution, is logically arranged, and is easy to use. At some point, the visual method may take a back seat to contemporary digital methods of shade matching as these technologies are refined and become more feasible. Until then, it looks like the Linearguide will be a strong contender. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Color/Shade Guides

Print Tag: Refer to original journal article
In this study, dentists and laypeople did not perceive the brightest tooth shade to be the most attractive, and they did not perceive all skin colors to be equally attractive with bright white teeth.

**Background:** Skin color is typically ignored in studies that investigate the influence of tooth color on the attractiveness of a smile.

**Objective:** To determine whether skin color and tooth shade influence the perception of smile attractiveness.

**Methods:** Participants were enrolled for this study (70 dentists and 70 laypeople) to evaluate photographs of a given smile. The participants were asked to rate, on a 4-point scale, from "very attractive" to "very unattractive" the appearance of their own smiles and also the importance ("very unimportant" to "very important") of an attractive smile. The participants were then asked to rate on a scale from 1 to 10 (1 = extremely attractive; 10 = extremely unattractive) several images displayed via computer slide show. The images were of the same smile, but skin color and tooth shade were altered using Adobe Photoshop to create 25 different images. Four different skin tones were displayed from "fair" to "dark" and 6 different tooth shades progressing from light to dark (00=lightest; 05 = darkest).

**Results:** While the majority of participants considered their own smiles to be attractive, laypeople rated their smiles as unattractive more often than dentists. Most of the participants considered an attractive smile to be "important" and dentists, more often than laypeople, considered an attractive smile to be "very important." The image with the lowest rating was displayed for the smile with fair skin and dark teeth (05 shade). Extremely light teeth (shade 00) were rated lowest when combined with the darkest skin. The highest rating given by dentists was for the smile with "fair/medium" skin and a medium-light tooth shade (02 shade). Laypeople also perceived the smile with "fair/medium" skin to be most attractive, but with a lighter tooth shade (01 shade).

**Conclusions:** Laypeople are more likely than dentists to consider their own smiles as unattractive. Furthermore, when given a neutral tone skin color, laypeople generally prefer a lighter tooth shade than do dentists. Extremely light teeth with dark skin, and vice versa, were poorly rated by dentists and laypeople.

**Reviewer's Comments:** One factor that gives this study an advantage is that skin color and tooth shade were altered on one smile. This eliminates many confounding variables such as tooth shape, size, and alignment, as well as lip contours. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Tooth Shade/Skin Color, Smile Assessment

Print Tag: Refer to original journal article
How Can Periodontitis Patients Reduce Their Risk for CVD?

The American Journal of Cardiology and Journal of Periodontology Editors’ Consensus: Periodontitis and Atherosclerotic Cardiovascular Disease.

Friedewald VE, Kornman KS, et al:

J Periodontol 2009; 80 (July): 1021-1032

Lifestyle changes other than improved oral hygiene are valuable in the treatment of periodontitis.

Background: The immune system has now been determined to be an active etiologic part of many chronic diseases.

Objective: To determine the link between atherosclerotic cardiovascular disease (CVD) and periodontitis.

Design: Consensus report of reviewed literature.

Results: Beginning as a microbial infection, periodontitis continues as a host-controlled degradation of soft tissue caused by primed leukocytes with the generation of cytokines, eicosanoids, and matrix metalloproteinases causing clinical connective tissue and bone breakdown. Other environmental and genetic risk factors such as diabetes mellitus (DM) and tobacco use accelerate this process. It has also been shown that an active, progressive periodontal condition adversely affects glycemic control. Periodontitis and CVD share many of the same risk factors such as DM and tobacco use. The incidence of CVD increases in the presence of chronic inflammatory diseases such as periodontitis. Recent studies have established periodontitis as an independent risk factor or marker for coronary artery disease (CAD) and cerebrovascular disease. Although a direct causal relationship has not been established, multiple studies suggest such a relationship based on elevated C-reactive protein levels seen in advanced periodontitis and similar gram-negative bacteria that infect both periodontal pockets and atheroma. There are recommendations arising out of this consensus report. Patients with moderate or worse periodontitis should be informed of the increased risk of CVD, and if other risk factors are present, referred for medical evaluation. Medical evaluations should include history of risk factors, blood pressure assessment, and appropriate blood studies. Periodontal patients with elevated lipid/cholesterol levels should initiate lifestyle changes such as weight loss and dietary restriction of lipid intake and take appropriate medications to normalize their blood work if necessary. All patients should stop smoking. Patients with elevated BP should initiate lifestyle changes and work to bring their BP into a target range using medications if necessary. Patients on calcium channel blockers should be more closely monitored, as they are risk for worsening periodontitis due to gingival hyperplasia. Patients meeting the criteria for metabolic syndrome, which is closely linked to insulin resistance, should be identified and treated. Initial treatment protocol should include lifestyle changes and weight loss. Patients with CVD need not be treated differently from a periodontal standpoint. Physicians and treating dentists should collaborate and recognize periodontitis early, making appropriate referrals when patients display signs of CVD. Additional research needs to be undertaken to firmly establish this model relationship.

Reviewer’s Comments: Conclusions/Reviewer’s Comments: This article suggests many questions that beg resolution by further collaborative research. It raises the suggestion that periodontitis is an independent marker for risk assessment for CVD. (Reviewer-Charles R. Hoopingarner, DDS).

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Keywords: Atherosclerotic Cardiovascular Disease, Periodontitis, Diabetes

Print Tag: Refer to original journal article
Understanding the phenomena of neuroplasticity and central sensitization can improve diagnostic and treatment decisions.

**Background:** All too frequently a patient will present with multiple missing teeth in one quadrant only and give a history of significant pain treated by restoration, endodontics, and ultimately extraction, yet the pain remains.

**Design:** Clinical practice update. **Discussion:** The nervous system can and does change as a result of noxious stimulation. This is called neuroplasticity. The Cartesian model of the 3-neuron chain from stimulus to response has been replaced by a much more complex model in which various modulators determine how pain events and response are manifested. These modulators can be motivational, cognitive, and behavioral factors. According to the concept of neuroplasticity, every event acting on the brain can change the brain, both physically or anatomically and functionally or physiologically. Pain events can be perceived over a broader area, with greater intensity or manifest as chronic pain, after the stimulation ceases and the injury has healed. This chronic pain can increase in intensity over time. Knowledge of this will affect our responses and treatment decisions for patients with pain complaints. Each pain stimulus travels to a higher center via a second-order neuron and is met with excitatory or inhibitory processes. The excitatory neurotransmitters can sensitize the receiving neuron to the point that further nonpainful peripheral stimulation will be perceived as additional pain or pain in an adjacent area. This process takes place in most stimulation, but is usually reversed in a timely manner. When central sensitization takes place and is maintained because the system fails to return to its normal state, even non-painful stimuli can initiate or maintain pain long after the initial injury or pathology has cleared. Because most of our procedures are done under local anaesthesia, this process is not frequent. People who delay treatment and are in pain for a longer period of time seem to be more susceptible to these issues. There are pharmacologic therapies for central sensitization. Following a biopsychosocial approach to pain management is also helpful.

**Conclusions:** Clinicians need to understand this concept in order to prevent misdiagnosis and inappropriate dental treatments.

**Reviewer's Comments:** Chronic pain and pain management are complicated subjects. The dental practitioner needs to be aware of advances in understanding in this field in order to most appropriately help the patient. (Reviewer-Charles R. Hoopingarner, DDS).

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Keywords: Neuroplasticity, Sensitization, Orofacial Pain

Print Tag: Refer to original journal article
Objective: To study implant outcome, loss prevalence, and factors associated with outcome.

Design/Participants: Retrospective study analyzing 109 volunteers who had received varying numbers of implants and superstructures at the University of Oslo.

Methods: There were 372 implants available for analysis. Maximum number per patient was 12. All fixtures were placed under local anaesthesia with a full crestal incision. From the charts, the presence of periodontal disease, the size, location, and types of implant and superstructure were determined. Data on influencing factors were obtained. A partial list of conditions studied included age, sex, smoking, alcohol use, general health conditions, and presence of periodontitis. Mean time of implant loading was 8.4 years, with a range of 1.1 to 16.0 years. Radiographs at time of loading and for the study were obtained and calibrated measurements were made from reference point to the level of the bone. These reference points were chosen appropriate to the implant brand, as many differing brands of implant fixtures were evaluated in the study with intraexaminer variability controlled. Patients were clinically examined to determine presence of periodontal disease and presence of the implants themselves. Subjects were classified by periodontal disease state, bone loss, and loss of implants with reference to the time since loading.

Results: Only 18 implants were lost. All implants lost in the late loss classification were preceded by an early loss of another implant. Loss rates were 4.8% of implants placed and 9.2% on the subject level, giving an implant survival rate of 95.2%. Subjects displayed periodontal disease ≥4-mm pocket depth (PD) with bleeding on probing (BOP) at a 74.8% rate, while 60.4% of implants showed PD ≥4 mm and BOP. Subjects showed ≥2-mm bone loss 25.3% of the time, while 15.4% of implants displayed ≥2-mm bone loss. Smokers and subjects with a history of periodontal disease had significantly higher implant loss rates. Age at the time of insertion was also a significant factor. Other factors assessed were not significantly associated with implant loss in this study. In total, 3.0% of implants were lost before loading, 0.8% between loading and 5 years, 1.8% at 5 to 10 years, and none after 10 years. As all late implant losses were preceded by loss of at least 1 implant prior to loading, the number of subjects with implant loss remained the same after initial loading. This suggests that loss factors are different for implants lost early versus late.

Conclusions: Implant loss is relatively low. Early loss suggests a higher future loss rate. Smoking and periodontal disease are significant risk factors.

Reviewer’s Comments: This is an interesting study that was done with multiple implant systems and follow-up in the referring dentists' offices, which produces a more clinically realistic circumstance. (Reviewer-Charles R. Hoopingarner, DDS).

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Keywords: Dental Implants, Periodontitis, Smoking, Outcome

Print Tag: Refer to original journal article
Ultrasonic Tx Is "Ultra-Good" for Reducing Periodontal Pathogens

Clinical Effectiveness of Photodynamic Therapy in the Treatment of Periodontitis.
Polansky R, Haas M, et al:


In this study, ultrasonic debridement was shown to reduce subgingival levels of *Porphyromonas gingivalis* in patients with moderate-to-severe periodontitis.

**Background:** The goal of nonsurgical periodontal therapy is to remove bacterial pathogens and diseased tissue. It is not clear if ultrasonic debridement can eliminate bacteria. Photodynamic therapy (PDT) using low-level laser light with a photosensitizing dye that binds to bacteria may aid in removal or inactivation of bacteria from the periodontal pocket.

**Objective:** To determine the bactericidal potential and clinical effects of PDT applied with ultrasonic treatment.

**Participants/Methods:** 58 healthy subjects with moderate-to-severe chronic adult periodontitis (36 female and 22 male) with a mean age of 48.7 years, (25 to 67 years) were randomly assigned to control (ultrasonic) or PDT (ultrasonic with PDT) groups. Inclusion criteria included no periodontal treatment in the past 2 years, no antibiotics in the past 12 months, at least 3 periodontal pockets 5 to 8 mm deep, positive for *Porphyromonas gingivalis*, and plaque index <30% after pre-enrollment oral hygiene program. The 4 deepest pockets ≤8 mm (total of 225 evaluable sites) were analyzed for each subject. Controls (n=29; 20 female, 9 male; mean age, 49.1 years; 110 sites) had full-mouth ultrasonic debridement. The PDT group (n=29; 16 female, 13 male; mean age, 48.2 years; 115 sites) had same ultrasonic therapy and PDT using HELBO® Blue (HELBO Photodynamic Systems, Grieskirchen, Austria) followed by saline rinse and low-level laser light therapy (diode laser at 680 nm, 75 mW, via fiberoptic pocket probe applied subgingivally using standardized procedure). Response assessed 3 months posttreatment: plaque scores, probing pocket depths, clinical attachment loss, bleeding on probing, and *P gingivalis* levels.

**Results:** Mean probing depths, clinical attachment levels, *P gingivalis* levels, and bleeding on probing were not significantly different between groups at baseline and after treatment. Probing depths decreased after treatment (*P* <0.001). Bleeding on probing was reduced from 100% to 47% for PDT and 59% for controls (*P* =0.28). *P gingivalis* levels were significantly reduced after treatment for both groups (PDT, *P* =0.016; controls, *P* =0.041).

**Conclusions:** Subgingival ultrasonic therapy with or without PDT reduces the number of periodontal pathogens in periodontal pockets. The reduction in *P gingivalis* load appears to be due to the ultrasonic therapy, not the PDT.

**Reviewer's Comments:** There was a trend for relative improvement in bleeding on probing with PDT and ultrasonic therapy compared to ultrasonic therapy alone. Additional longitudinal studies are needed to determine whether this has long-term clinical significance. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Photodynamic Low-Level Laser Therapy, Periodontal Therapy

Print Tag: Refer to original journal article
Arthrocentesis Provides Better Pain Management in TMJ Disk Displacement

Arthrocentesis Versus Nonsurgical Methods in the Treatment of Temporomandibular Disc Displacement Without Reduction.

DiraçoAyD, Saral IB, et al:


Arthrocentesis provided better pain management at 3 and 6 months after treatment than conventional nonsurgical therapy for patients with TMJ disk displacement without reduction.

Background: Temporomandibular joint (TMJ) disk displacement without reduction (DDw/oR) is usually treated nonsurgically. Arthrocentesis is a minimally invasive surgical therapy that has recently been recommended as first-line treatment for DDw/oR.

Objective: To compare the short-term and medium-term effects of arthrocentesis and conventional nonsurgical treatment in patients with early DDw/oR.

Participants/Methods: 120 consecutive patients treated in a multidisciplinary TMJ clinic participated. All had clinical diagnosis of DDw/oR of TMJ: history of sudden reduced mandibular opening; unassisted opening <35 mm; mandibular opening with assistance increased by ≤3 mm; prior history of click, then loss of click with reduced opening; MRI diagnosis of DDw/oR; and persistence of symptoms for ≤3 weeks. Patients with other disorders of the TMJ, history of major jaw trauma, dentofacial deformity, psychiatric illness, or chronic headache were excluded. Subjects rated pain on 10-cm visual analogue scale (VAS), and maximal mouth opening (MMO) and maximal movements during excursions were measured at baseline and at 1, 3, and 6 months after treatment. Subjects were alternately assigned to 2 groups. Controls received splint (stabilization, worn night and day except during eating for 6 months), hot pack (20 minutes daily for 10 days), and home exercise program. Arthrocentesis was performed under sedation and local anesthesia, in which the superior compartment was distended with 2 mL lactated Ringer solution, then the joint was lavaged with 60 mL of lactated Ringer solution.

Results: 54 subjects (51 female and 3 male), mean age 33.4 years, received arthrocentesis and 56 controls (49 female and 7 male), mean age 34.8 years, had conventional therapy. Ten were lost to follow-up. There was no difference in baseline VAS values and MMO values between the groups. There was a significant reduction in baseline VAS values at 3 months and 6 months after treatment: from 6.26 ± 2.35 to 1.51 ± 1.82 at 6 months (arthrocentesis) and from 5.66 ± 2.47 to 4.39 ± 2.31 at 6 months (controls) \(P < 0.01\). At 3 and 6 months, there was a similar significant increase in MMO, maximal lateral movement, and maximal protrusion in both groups compared to baseline \(P < 0.01\). Reduction in VAS scores was significantly greater for arthrocentesis than conventional therapy, except at 1 month. \(P = 0.01\).

Conclusions: Early treatment of TMJ DDw/oR with either arthrocentesis or conventional therapy improved range of motion and reduced pain. Arthrocentesis is superior for pain reduction.

Reviewer's Comments: Arthrocentesis may be justified as first-line therapy for DDw/oR given its superior effects on pain. Conventional therapy and arthrocentesis were equally effective in restoring range of motion.

(Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Arthrocentesis, TMJ Disk Displacement Without Reduction

Print Tag: Refer to original journal article
Background: Emergent postoperative complications of dental implant placement are rare. Hemorrhage is the third most commonly reported complication.

Objective: To present a case of a patient who developed immediate postoperative floor of mouth swelling after the placement of 2 implants in the posterior mandible for the purpose of raising awareness of this potential complication.

Methods: A 77-year-old man presented to the hospital emergency department with a swelling of the floor of the mouth. Swelling had arisen 3 hours after he had 2 dental implants placed in the right mandible in the position of the second premolar and first molar. Medical history included hypertension treated with hydrochlorothiazide. The tongue was deviated to the left and had full range of motion. Interocclusal opening was 35 mm. Computed tomography (CT) scan demonstrated perforation of the lingual plate of the right mandible by the first molar implant, a right submandibular/sublingual hematoma, and deviation of the airway to the left side. The patient was admitted to the step down unit of the intensive care unit, administered dexamethasone 8 mg IV every 4 hours, and was monitored. He had been given 2 grams of penicillin V before surgery and was continued on 2.0 million units of aqueous penicillin-G every 4 hours.

Results: Over the next 2 days, the swelling began to resolve, so he was transferred to the floor for 1 day, and he was discharged on the third day.

Conclusions: Patients receiving dental implants should be informed of the risk of hematoma and airway compromise, warning signs of hematoma, and need for emergency treatment. Dentists who place implants should be prepared to manage this rare complication.

Reviewer's Comments: The authors do not recommend routine preoperative CT imaging to avoid this and similar complications because they believe the cost and radiation dose outweigh the benefit. They recommend panoramic radiographs and palpation to visualize the anatomy. They failed to recognize the potential benefit of preoperative cross-sectional imaging using cone-beam CT, which is associated with less radiation and expense than conventional CT, and provides more accurate visualization of the anatomy than panoramic radiographs, including the cross-sectional morphology of the mandible and location of neurovascular structures. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Implant Surgery, Complications

Print Tag: Refer to original journal article
Procedural errors such as stripping and perforation occur significantly more frequently with hand-filing techniques versus rotary filing. Other factors influence this comparison, including presence of periapical lesions and dental arch.

**Background:** Since the early 1990s, nickel-titanium root canal files and rotary filing techniques have been used to facilitate root canal therapy and reduce errors and time required for treatment when compared to older hand files and filing technique.

**Objective:** To compare rates of periapical healing and the frequency of various procedural errors for nickel-titanium rotary filing (NiTi) versus hand filing.

**Design:** Retrospective cohort study conducted by review of the procedural records of a large number of conventional endodontic procedures conducted in a single center.

**Methods:** The treatment records from 1786 primary endodontic procedures were accessed from a hospital database, and then 117 hand-filing cases and 112 NiTi cases were selected randomly for inclusion in the study. Records were examined for evidence of 5 different procedural errors (ledging, perforation, apical transportation, stripping, and instrument fracture) and corrective efforts, if available. Patients whose records were studied were recalled and clinically and radiographically examined. Outcomes were classified as "favorable" (no signs or symptoms of root canal failure and radiographic evidence of periapical healing), "uncertain" (asymptomatic, with no discernible change in radiographic periapical appearance), and "failure" (new or enlarging periapical lesion and/or symptomatic). Data were compared statistically using Mann-Whitney or chi-square testing as appropriate.

**Results:** 229 molar teeth were evaluated in 216 patients. A total of 24% were classified as failures, and 68% with complete healing or definitive signs of healing. Overall, teeth treated with rotary NiTi technique had a significantly higher healing rate than those treated with hand filing (77% vs 60%). In cases without a periapical radiolucency at the time of treatment, there was no significant difference in healing rate, but the lowest success rate was seen in teeth which had a periapical lesion at the time of treatment with hand-filing technique, and there was no significant difference in outcomes for teeth without a periapical lesion at the time of treatment. Overall, NiTi produced fewer procedural errors, and the differences were significant for ledging and perforation.

**Conclusions:** The NiTi endodontic technique is associated with better treatment outcomes and fewer procedural errors, although the authors concede that uncontrolled variables in a retrospective cohort study and the availability of many new rotary filing systems limit the strength of these conclusions.

**Reviewer's Comments:** There are many, many variables that influence outcomes in endodontic therapy, not the least of which is inter-subject variability in root canal and tooth morphology, healing competence, etc. However, more and more evidence is accumulating that favors rotary endodontic techniques, particularly for shaping canals and reducing classical errors, such as ledging and perforation. (Reviewer-Arthur H. Jeske, DMD, PhD).

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**Keywords:** Endodontic Success, Outcomes, Rotary Filing Technique, Hand Filing Technique

**Print Tag:** Refer to original journal article
When diagnosing persistent pain following endodontics, female sex and maxillary posterior location should indicate the possibility of neuropathic pain and a potential prescription for tricyclic antidepressant.

**Background:** There are several potential causes of pain following root canal procedures, but one of the most challenging to diagnose and treat is chronic, neuropathic pain.

**Objective:** To determine the types of patients who develop neuropathic pain following endodontic treatment and diagnostic characteristics of this clinical disorder.

**Design:** Retrospective study of patients in a single center who had a history of persistent pain following endodontic procedures, including periapical surgery.

**Participants:** Patients were identified from a pool of patients who had been referred to a university dental clinic in Tokyo, Japan, for refractory pain following endodontic treatment, during a 5-year period.

**Methods:** Patients who met inclusion criteria were examined by 3 endodontists using conventional endodontic diagnostic techniques, including radiographic evaluation. When any definable odontogenic cause of the persistent pain had been ruled out, further diagnosis was undertaken using American Academy of Orofacial Pain and other guidelines, and appropriate pharmacologic treatment was initiated.

**Interventions:** All patients in the study who were diagnosed with neuropathic tooth pain were initially treated with tricyclic antidepressants (amitriptyline or imipramine) or with escalation of dosage until pain relief or limiting adverse effects occurred, in which case the medication was changed to gabapentin.

**Results:** 16 patients were included in the study, and most (81%) were female, with an average age of 47 years. Maxillary pain predominated over mandibular (88% vs 12%, respectively. Pharmacotherapy resulted in a "drastic" reduction in pain in 75% of cases, and 25% reported no change in pain intensity. The average dose of tricyclic antidepressant was 36 ± 21 mg.

**Conclusions:** A small subset of endodontic patients develops true neuropathic tooth pain, with a strong predilection for females, maxillary locations, and endodontic retreatment, but tricyclic antidepressants are effective to relieve pain in a majority of such cases.

**Reviewer's Comments:** This study was limited by a small number of subjects but sheds light on the vexing clinical problem of persistent pain after endodontic treatment and retreatment. The effects of tricyclic antidepressants and doses in this study are consistent with those reported in other well-designed clinical studies of neuropathic orofacial pain, but attention must be paid to their anticholinergic and other adverse effects, particularly in elderly and medically compromised patients. (Reviewer-Arthur H. Jeske, DMD, PhD).

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**Keywords:** Neuropathic Pain, Atypical Odontalgia, Phantom Tooth Pain, Endodontics

**Print Tag:** Refer to original journal article
Background: Millions of Americans have Parkinson's disease (PD). Precautions should be taken to ensure safe treatment of these patients.

Design: Literature review. Discussion: PD is a neurodegenerative disease characterized by tremor, akinesia, rigidity, postural imbalance issues, and cognitive disorder. Autonomic dysfunctions include blood pressure issues, orthostatic hypotension, cardiac dysrhythmias, incontinence, constipation, and sleep disorders. PD patients may be depressed and show significant cognitive deficits including dementia, hallucinations, and paranoid delusion. They frequently are unable to make sound decisions regarding their physical abilities or treatment decisions. Diagnosis is made mostly by history and physical evaluation. Motor deficits are caused by a significant loss of neurons in the substantia nigra that store and release dopamine. The behavioral issues stem from degeneration of the dopaminergic and non-dopaminergic neurotransmitters in the hippocampus and amygdala. Parasympathetic and sympathetic cholinergic failure as well as sympathetic noradrenergic failure leads to autonomic symptoms. Suggested etiologies range from genetic abnormalities to head trauma and pesticide exposure. Frequently used medications are amantadine, benztropine, cabergoline, levodopa, levodopa and carbidopa with or without entacapone, pramipexole, rasagiline, ropinirole, selegiline, and trihexyphenidyl. Some of these medications are primarily directed at symptoms or at facilitating synaptic transmissions, while some act to directly stimulate dopamine receptors. Orofacial findings include decreased blink rate, hypomimia, tremors, involuntary tongue movements, severe bruxism, hypophonia, a gaunt facial appearance, hyposmia, difficulty in swallowing, and xerostomia. As PD is progressive and each patient displays differing needs, a medical consult is always advised. Any long-range prognosis should be guarded at best and focus on immediate needs. It is suggested that the patient not be reclined >45° and that appointments be made early in the day and last no more that 45 minutes. Patients with cognitive deficit should be accompanied by a responsible caregiver who has decision-making authority, as these patients often cannot make sound treatment decisions. Vasoconstrictor usage should be limited to 0.050 mg of epinephrine. Patients on Entacapone should avoid Erythromycin and Ampicillin, as these interfere with biliary excretion. Patients on Selegiline may experience severe hypertension with vasoconstrictor usage. Of course, meperidine should never be used with MAOIs. All analgesics should be taken at a reduced dosage. Practically, rubber dams should be used and restorative materials that release fluoride are indicated. Mechanical tooth brushes with larger handles are also useful.

Conclusions: Dentists who are familiar with symptoms and manifestations of this disease are better equipped to manage these patients.

Reviewer’s Comments: PD patients can be frustrating to manage, and our efforts seldom achieve the longevity we strive for. Understanding the nature of the disease and our limitations can give a fulfilling sense of accomplishment when treating these patients. Care should be taken to review each medication the patient is taking and consider possible interactions. (Reviewer-Charles R. Hoopingarner, DDS).

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Keywords: Parkinson's disease, Local Anesthetics, Saliva

Print Tag: Refer to original journal article
Applying 2% chlorhexidine digluconate on etched dentin may help preserve the dentin bond when using an acetone-based, etch-and-rinse dentin adhesive.

**Background:** Past clinical studies have demonstrated that use of 2% chlorhexidine digluconate (CHX) can stabilize the underlying hybrid layer of resin-bonded restorations, presumably by inhibiting the effect of collagenolytic enzymes within the dentin. The dentin adhesive used in these past studies to this point has been the same ethanol-based adhesive.

**Objective:** To evaluate the hybrid layer stability of bonded resin restorations treated with 2% CHX and an acetone-based dentin adhesive.

**Participants/Methods:** Patients who were scheduled to have extractions for orthodontic purposes of contralateral pairs of premolars (16 teeth) were studied. An occlusal cavity (3 mm deep x 2.5 mm wide) was prepared on each tooth. All samples were divided so that one of each pair was randomly assigned to an experimental or control group. For the control group, preparations were incrementally filled with resin and bonded with an acetone-based, etch-and-rinse adhesive (Prime & Bond NT). The experimental group was bonded in the same manner, except the etched dentin was treated with CHX for 30 seconds prior to application of the dentin adhesive. All teeth were extracted after 12 months and prepared for sectioning and examination in a transmission electron microscope (TEM). Additional samples were prepared on extracted teeth, independent of the clinical study, according to the same bonding protocol as the experimental and control groups. Immediate microtensile bond strengths were verified on additional samples.

**Results:** Microtensile bond strength values showed no significant difference between the CHX-experimental (55.0 MPa) and non-CHX control group (55.4 MPa). In the non-CHX control group, TEM evaluation of dentin hybrid layers showed extensive degradation as evidenced by loss of collagen. No restorations in the CHX-experimental group showed signs of degradation. All patients remained free of postoperative sensitivity after 12 months.

**Conclusions:** Use of 2% CHX on etched dentin before application of an acetone-base etch-and-rinse dentin adhesive increases the stability of the dentin hybrid layer under bonded resin.

**Reviewer's Comments:** The evidence for treating etched dentin with 2% CHX in order to improve the durability of the dentin-resin bond is promising. In this study, the etched dentin in the non-CHX group was not rehydrated with water. The methods only describe "brief air drying" before application of the adhesive, while in the CHX-experimental group, the authors explicitly note that the dentin surface was left "visibly moist." We can only guess that the dentin was not over dried in the control group with the air drying technique used—it would have been better to leave all doubt aside by suctioning excess water, blot drying, or rehydrating with water. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Dentin Hybrid Layer, Adhesive, Acetone-Based, Chlorhexidine

Print Tag: Refer to original journal article
Taking the Pain Out of Choosing a Desensitizer

Dentin Hypersensitivity: A Randomized Clinical Comparison of Three Different Agents in a Short-Term Treatment Period.

Ozen T, Orhan K, et al:

Oper Dent 2009; 34 (July-August): 392-398

Ninety percent of patients gain relief from hypersensitivity due to exposed dentin after treatment with certain desensitizers (Gluma, UltraEZ, Duraphat) following 1 week of use.

Background: Dentin hypersensitivity is a common occurrence experienced by patients for several reasons, including tooth whitening, exposure of dentin due to gingival recession, abrasion, erosion, or cervical abfractions. Topical desensitizing agents containing different active ingredients are available for treating hypersensitivity.

Objective: To compare in vivo the efficacy of 3 desensitizing agents with different active ingredients.

Participants/Methods: 52 patients (26 men, 26 women) were included; 208 teeth with exposed cervical dentin, sensitive to air or cold stimulus, were investigated. Three randomly assigned agents, glutaraldehyde and HEMA (Gluma), fluoride varnish (Duraphat), and potassium nitrate (UltraEZ), were compared to a distilled water placebo group. Stimulus-pain response (hypersensitivity) was recorded from 0 to 100 using a visual analog scale at baseline, and then again at 24 hours and 7 days following treatment with 2 coats of 1 of the 3 desensitizing agents.

Results: Mean pain scores at baseline were in the mid 50s or low 60s, depending on the group. After 24 hours, among those teeth that were still sensitive, the mean pain score had reduced to a score of approximately 49. About 52% to 57% of all teeth treated with a desensitizing agent had become painless. After 1 week, >90% of treated teeth responded with no pain, and the mean pain score of those teeth that were still sensitive dropped to a mean score near 6. In the placebo group, 100% of teeth continued to elicit a pain response throughout the course of the study, with a mean pain score remaining near 60.

Conclusions: Clinical investigation of topical desensitizers resulted in a significant reduction in dentin hypersensitivity after 24 hours, and greater still after 7 days. Gluma, Duraphat, and UltraEZ were equally effective in treating dentin hypersensitivity.

Reviewer’s Comments: This was a well-controlled clinical study demonstrating that dentin hypersensitivity can be equally treated with fluoride varnish, potassium nitrate, or a glutaraldehyde/HEMA solution. It is useful to inform patients being treated with one of these desensitizers that half of those treated are not expected to respond in the first 24 hours. However, 90% are expected to see significant relief after 7 days. It would have been beneficial to see how long the effects lasted beyond 7 days, to see if one agent has an advantage in long-term effects over the others. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Dentin Hypersensitivity, Desensitizers

Print Tag: Refer to original journal article
Laser treatment of bleached enamel does not improve bond strengths.

**Background:** The surface treatment of enamel with lasers has been proposed as an alternative replacement for acid etching. Tooth bleaching is known to adversely affect the subsequent bond strength of adhesive materials to etched enamel. The effect of laser pretreatment of bleached enamel on bond strength is still not known.

**Objective:** To determine the immediate and delayed bond strength to bleached enamel after laser and 2 different adhesive treatments.

**Methods:** 140 extracted teeth were divided into 2 bleach groups that were treated with either 3 separate 30-minute sessions of 30% carbamide peroxide over 3 days, or 14 separate 1-hour sessions over 14 days. The 2 bleach groups were further divided into 2 treatment time groups. One group was subjected to surface treatment immediately upon completion of bleaching, while surface treatment was delayed for 15 days for the second group. Before application of a 5th-generation etch-and-rinse adhesive, or a 6th-generation self-etch adhesive, 3 of the 5 subgroups where treated with a laser. To serve as adhesive controls, the remaining 2 subgroups received only the 5th- or 6th-generation adhesives without laser treatment.

**Results:** No difference in bond strength between the delayed or immediate bleached groups was shown, nor between 30% or 16% carbamide peroxide concentrations. The etch-and-rinse adhesive performed better than the self-etch adhesive. The groups that were pre-conditioned with laser treatment showed lower bond strengths to bleached enamel.

**Conclusions:** Poor bonding performance to bleached enamel was demonstrated following laser treatment and self-etch adhesive application. Higher bond strengths were shown using an etch-and-rinse adhesive on bleached enamel.

**Reviewer's Comments:** Since all mean bond values were relatively low (approximately 2 to 9 MPa) when the laser was used as a pretreatment to bonding to bleached enamel, there is no benefit to using the laser after bleaching. Even when the laser was not used for pretreatment, the best mean bond strength was <13 MPa when the standard etch-and-rinse adhesive was applied using conventional techniques. By most standards, 13 MPa is not considered to be on the high end of bond strengths, but unfortunately no untreated (non-bleached) control was used in this study to set a baseline norm. It would have been good to see when, or if, bond strength values return to normal after bleaching. (Reviewer-Joe C. Ontiveros, DDS, MS).

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Keywords: Adhesion/Bonding, Laser, Bleach

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Tooth loss, a proxy for periodontal disease, is associated with cognitive decline in females but not in males, according to this cross-sectional study.

**Background:** Chronic systemic inflammation has been associated with cognitive impairment and pathogenesis of conditions such as Alzheimer disease. Elevated serum pro-inflammatory cytokines may precede cognitive decline. Periodontitis is associated with elevated serum cytokines and therefore may be associated with cognitive decline.

**Objective:** To determine if tooth loss, a surrogate for periodontal disease, is associated with cognitive decline in older adults.

**Participants/Methods:** A sample of participants in the cross-sectional Study of Health in Pomerania was studied; there were 1336 subjects (617 females and 719 males) aged ≥60 years. Of these subjects, 97 were excluded because of history of stroke, 15 because of traumatic brain injury or other brain disease, and 180 because of missing data; 1059 subjects (497 females and 562 males) were analyzed. Cognitive status was assessed by the Mini-Mental Status Examination (MMSE). Oral variables included location and number of teeth excluding third molars, age, gender, school education, smoking status, medications, diabetes mellitus, total alcohol consumption, physical activity, income, number of household members, number of children, equalized household income, social network index, blood pressure, height, weight, and body mass index. The relationship between cognitive status, number of teeth, and other covariates was investigated using the Tobit regression analysis of the final study sample. Data from all subjects, including those excluded for missing data, were included in ancillary analyses using imputed data for missing values.

**Results:** >30% of subjects were edentulous. Lower MMSE scores were associated with fewer teeth in females ($P<0.001$) and males ($P=0.007$). After adjusting for age, school education, number of children, household income, and medical confounders, this relationship was significant in females ($P=0.002$) but not in males ($P=0.825$). The major predictors for lower MMSE score were tooth loss, number of children, income, and school education for females, and income, school education, and number of children for males.

**Conclusions:** In females, there was a significant association between tooth loss and cognitive impairment. Prospective longitudinal studies are needed to test whether periodontitis increases long-term risk for cognitive impairment.

**Reviewer’s Comments:** This was a very well-designed observational study in a population with a high prevalence of periodontal disease, which showed a significant association between mild to moderate cognitive decline and missing teeth, a proxy for periodontal disease. A causal relationship cannot be inferred from this study design. However, this is yet another example of a significant chronic disease for which periodontal disease may be shown to be a modifiable risk factor. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Periodontal Disease, Systemic Health, Tooth Loss, Cognitive Impairment

Print Tag: Refer to original journal article
Are Routine Biopsies of Periradicular Lesions Worthwhile?

A Clinicopathologic Correlation in the Diagnosis of Periradicular Lesions of Extracted Teeth.

Omoregie OF, Saheeb BDO, et al:


In this study, routine biopsy of periradicular lesions of extracted teeth contributed to or confirmed diagnosis in the majority of cases.

**Background:** There is controversy regarding the need for routine biopsy and histopathologic examination of periradicular lesions during tooth extractions. If biopsy is reserved only for cases with a questionable diagnosis, malignant conditions may be missed.

**Objective:** To determine the percentage of cases of periradicular lesions for which routine biopsy of the extracted tooth and tissue is informative and to determine clinical indicators for biopsy.

**Participants/Methods:** Consecutive cases of single tooth extractions at a single hospital-based Oral And Maxillofacial Surgery Department in Nigeria, from February to September 2005, were studied prospectively. All teeth tested nonvital, had radiographic examination, and had clinically obvious or suspected periradicular lesions. Teeth were extracted under local anesthesia, and the sockets were curetted to remove periradicular tissues. Biopsy specimens were prepared and viewed under low (10x) and high (40x) power. Age, gender, radiographic features, clinical features, clinical diagnoses, tooth type, facial swelling, and submandibular lymphadenopathy were recorded and analyzed.

**Results:** 136 patients (80 males and 56 females; ratio 3:2) with a mean age of 35 years (range, 3 to 88 years) were included. Of patients who had a lesion diagnosed by biopsy, 36% were in the first 3 decades of life. The most common symptom was toothache (86.0%). The most common clinical findings were carious tooth (67.7%) and mandibular lymphadenopathy (52.2%). Molars (85.3%), especially mandibular first molars (39.7%), were extracted most often. A total of 98.5% had periapical radiolucency; 1.5% had a mixed periapical radiolucency/radiopacity. Acute apical periodontitis (33.8%) and dentoalveolar abscess (31.6%) were the most common clinical diagnoses. Of biopsies, 55.1% had histopathologically diagnosed periapical lesions, including 2.9% with malignancy. Significant clinical/histopathologic correlations were carious tooth and submandibular lymphadenopathy with periapical abscess (P <0.05); broken or loose tooth with periapical granuloma (P <0.05); nonvital carious incisor tooth with periapical cyst; tooth attrition with benign periradicular lesion; and mobile tooth and mixed periapical radiopacity/radiolucency with a malignant lesion (P <0.05). Clinical diagnosis of chronic osteomyelitis was associated with histological diagnosis of Burkitt's lymphoma (P <0.05).

**Conclusions:** Routine biopsy of periradicular lesions contributed to diagnosis at a higher rate than previously reported. Marked radiolucent or mixed radiolucent/radiopaque lesions may need to be biopsied to avoid misdiagnosis.

**Reviewer's Comments:** In this study, 2.9% of cases were diagnosed as malignancies, including 2 cases of Burkitt's lymphoma, a neoplasm of the jaw that is prevalent in Africa but rare in the U.S. The results of this study may not be completely generalizable to non-African populations. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Periradicular Lesions, Biopsy, Extracted Teeth

Print Tag: Refer to original journal article
A Numb Lip Is No Guarantee of Successful Mandibular Anesthesia

Anesthetic Efficacy of Supplemental Buccal and Lingual Infiltrations of Articaine and Lidocaine After an Inferior Alveolar Nerve Block in Patients With Irreversible Pulpitis.

Aggarwal V, Jain A, Kabi D:

J Endod 2009; 35 (July): 925-929

While irreversible pulpitis is usually an obstacle to good local anesthesia, buccal and lingual infiltration after inferior alveolar block can be helpful.

**Background:** The failure rate of the inferior alveolar nerve block is unacceptably high in the presence of irreversible pulpitis ("toothache").

**Objective:** To evaluate the efficacy of supplementary buccal and lingual infiltrations of local anesthetic in overcoming failures of inferior alveolar blocks.

**Participants:** 87 adult patient volunteers who were not currently taking analgesic drugs participated. These dental patients had a diagnosis of irreversible pulpitis and required endodontic therapy of a lower molar. They were randomized into either a control group that received inferior alveolar block only or into 1 of 2 groups that also received supplementary infiltrations with 1 of 2 different amide local anesthetics. The study was double-blind in that neither patient nor operator knew the identity of the local anesthetic being used.

**Methods:** All subjects received an inferior alveolar nerve block with 1.7 mL of 2% lidocaine with 1:200,000 epinephrine. Twenty-five subjects did not receive additional infiltration injections, while 31 received buccal and lingual infiltrations of 4% articaine with 1:200,000 epinephrine and 31 received supplemental infiltrations with 1.7 mL of 2% lidocaine with 1:200,000 (administered directly adjacent to the tooth being treated). All subjects had a numb lower lip on the treatment side before testing of anesthesia occurred. Pain in the 3 groups was assessed with a visual analog scale during the endodontic access opening (success was defined as "no pain" or "weak/mild" pain). Statistical comparisons were made using analysis of variance (Kruskal-Wallis) and t tests.

**Results:** Successful anesthesia was produced in 33% of subjects who received only an inferior alveolar nerve block injection; the addition of lidocaine infiltrations resulted in a 47% success rate, and articaine infiltrations produced the highest success rate at 67%.

**Conclusions:** Buccal and lingual infiltrations of both lidocaine and articaine enhance the success rate of the inferior alveolar nerve block, but none of the success rates observed were successful.

**Reviewer’s Comments:** This study confirms 2 outcomes from several other studies, ie, a numb lip is no guarantee of successful mandibular anesthesia, particularly when irreversible pulpitis is present, and articaine has a better chance of success than lidocaine when used for mandibular infiltrations in the mandible. At this time, it appears that intraosseous injection of local anesthetic remains the best supplementary technique for dealing with failures of the inferior alveolar nerve block. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Local Anesthesia, Articaine, Lidocaine, Infiltration, Irreversible Pulpitis

Print Tag: Refer to original journal article
Alumina Air-Abrasion Consistently Increases Resin Alloy Retention Rate

Effect of Alumina Air-Abrasion on Mechanical Bonding Between an Acrylic Resin and Casting Alloys.

Ishii T, Koizumi H, et al:

J Oral Sci 2009; 51 (June): 161-166

Pressure-induced air-abrasion using alumina is effective in enhancing the retentive characteristics of tri-n-butylborane-initiated resin joined to an alloy.

**Objective:** To determine the mechanical effect of air-abrasion with alumina on the strength of cast alloy-acrylic resin bonding. Theoretically, the air-abrasion would mechanically clean alloy surfaces, increase surface bonding area, and therefore enhance retention of the resin to the alloy.

**Methods:** 66 pairs of disks prepared from 2 alloys were studied. Three groups were created. One group (controls) was not air-abraded. Groups 2 and 3 were air-abraded with alumina with an airborne particle abrader. Ten seconds of abrasion was applied, using either 0.1 MPa or 0.6 MPa air pressure at a distance of 10 mm. Then disks were bonded together with a tri-n-butylborane derivative as the luting material. Bond strengths were measured to evaluate the effect of using the alumina air-abrasion procedure.

**Results:** The greatest bond strength was manifest in specimens abraded with 0.6 MPas of pressure, and the control group showed the lowest strength. All specimens in the untreated group showed adhesive failure. Testing demonstrated the increased bonding to several types of alloys after alumina air-abrasion.

**Conclusions:** Varying the alumina-abrasion pressure on alloys prior to applying resin will increase the retentive surface area. Consequently, the resin-alloy bond will be enhanced, more so if the abrasion pressure is greater and if the alloy is subjected to thermocycling. Surface roughness differences among different alloys also account for variations in the rate of adhesive successes and failures.

**Reviewer's Comments:** This study reinforces the belief that increasing surface area provides for increased retention of restorative resin materials. This concept is significant to the practitioner, who seeks to achieve sufficient bond strengths to provide durable restorations that will withstand excessive occlusal forces. Although the study was conducted in an in vitro setting, the results are transferrable and relevant to bonding procedures delivered chairside. (Reviewer-Edward N. Friedman, DDS).

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Keywords: Abrasion, Alloy, Alumina, Resin, Bonding

Print Tag: Refer to original journal article
Regardless of the specific form used, a caries risk-assessment and dietary analysis instrument is more important now than ever, given the tremendous array of sugared snacks and beverages being marketed in the U.S.

**Background:** Control of caries through dietary analysis is an important but frequently overlooked part of overall dental care, especially in the busy practice when chair time is at a premium.

**Objective:** To present an efficient method of efficiently incorporating a diet-based caries risk-assessment tool and dietary counseling into the dental practice.

**Design:** The advice offered in this article is based on a "Diet Assessment of Caries Risk" tool developed and used by a major U.S. dental school, in the context of its adaptability to the private dental practice.

**Methods:** The assessment tool is presented as a table and uses "key areas" of dietary caries risk factors (number of meals/snacks, meal/snack structure, and exposure to sugared beverages), each of which is keyed to probable responses, relative caries risk, and desired behavior guidelines. The paper also describes a "24-hour dietary recall" form, and suggests strategies for anticipatory guidance, to assist patients with use of alternative sources of calories associated with a lower caries risk and methods of modifying food and beverage intake patterns. The author offers several examples for implementing these caries risk assessment and dietary counseling tools. In the diet assessment, factors associated with high caries risk include ingestion of quantities of sugared beverages >20 ounces/day, ingestion of sugared beverages between meals, >4 exposures to sugared beverages per day, exposures to sugared beverages that last longer than 30 minutes each, and swishing with sugared beverages (as opposed to use of straws or open beverage containers). A 24-hour recall is recommended to provide anticipatory guidance.

**Conclusions:** When counseling patients about dietary caries risk, consideration must be given to replacement of calories and caffeine that will no longer be provided by sugared beverages or other snacks. The assessment of diet-related caries risk factors should be used as part of the initial history and before the exam to improve patient responses, rather than delaying until during the exam, at which time negative findings of active caries may alter patient reporting of possible dietary factors.

**Reviewer's Comments:** This article describes an important addition to our diagnostic and treatment-planning procedures, and is a true step toward management of caries as an infectious disease fueled by carbohydrates, before the patient at high caries risk invests their time and money in restorative treatments that may otherwise be doomed by failure to control this bacterial infection. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Caries, Risk Assessment, Risk Factors, Diet Analysis, Diet Modification

Print Tag: Refer to original journal article
**Background:** There are a variety of nerves involved in postoperative local anesthetic complications. Distribution of the affected area of altered sensation should be determined to diagnose and manage the patient appropriately.

**Objective:** To alert dentists to the infrequent but real risk of developing numbness in non-dental-related nerves and nerve distributions as potential complications of routine dental local anesthetic injections.

**Design:** Based on a case review, complemented with appropriated literature reviews. **Case Report:** A 30-year-old Asian female presented who had been seen for removal of a mandibular third molar associated with pericoronitis. A "standard" inferior alveolar nerve block injection was performed, using a total of 4.4 mL of 2% lidocaine with 1:80,000 epinephrine, and the lower left third molar was removed surgically without complications. Prior to dismissal from the office, the patient reported numbness of the left ear, left temporomandibular joint, and left temple. The nerve deficits were confirmed using "pin pricks."

**Results:** The only necessary intervention for this patient was reassurance that the sensory loss was temporary, and in fact it lasted for a reported 1 hour.

**Conclusions:** The areas affected by sensory loss in this patient were consistent with the normal distribution of the auriculotemporal nerve. Related case reports cited by the author put this complication as high as 22%. The most likely causes for this phenomenon are abnormal anatomic variation of the auriculotemporal nerve, putting it and/or its branches within the area of local anesthetic deposition for the inferior alveolar nerve block, or advancing the needle beyond the limitations of the conventional inferior alveolar block technique toward the neck of the mandibular condyles, as in the Gow-Gates technique.

**Reviewer’s Comments:** Most complications of dental local anesthetic injections are reversible, as was this case. However, sensory deficits outside of those associated with routine dental injections can be discomfoting and/or emotionally traumatic for patients, and they must be evaluated and managed accordingly, particularly if they extend beyond the normal duration of local anesthetic action. The possibility of such complications should be included in informed consent documents. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Inferior Alveolar Nerve Block, Numbness, Nerve Injury

Print Tag: Refer to original journal article
For a dental implant displaced into the maxillary sinus space, it is possible via a lateral access window to use saline and an adapted suction to retrieve the implant if the patient is reclined with the sinus window facing the floor.

A limitation on placement of implants in the maxilla are the sinuses, which tend to enlarge or pneumatize over time due to absence of any teeth or implants in the maxillary alveolar bone. The bone volume in the sinuses can be augmented through sinus grafting via lateral or inferior approach surgery. The extrusion of implants into the sinus of up to 5 mm can be tolerated by the sinus lining, and the Zygoma Implant (Nobel Biocare) penetrates the sinus lining twice yet has been placed successfully without infection. Two methods of retrieval that have been presented in the literature are the Caldwell-Luc and the endoscopic technique. The most vulnerable time for this and other implants is during the second postoperative week of healing.

**Reviewer’s Comments:** As we all know, mishaps do occur, and it is in our best interest to correct them. The author determined a clever method to retrieve an implant in the maxillary sinus that is quite expeditious and can be done in as unobtrusively a manner as possible by using materials and devices that are readily available in the operatory. This article is well worth reviewing to allow practitioners some a priori knowledge should such an untoward event ever occur. (Reviewer-Ralph J. Bozza, DDS).

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Keywords: Displaced Dental Implant, Caldwell-Luc, Lateral Access Window, Maxillary Sinus

Print Tag: Refer to original journal article
Prior to initiating orthodontic treatment with removable aligners, the practitioner should understand their limitations, particularly for extrusion and canine rotation.

Background: Removable polyurethane orthodontic aligners are an attractive orthodontic treatment option, especially among adults. As removable appliances, however, orthodontic forces that can be applied are primarily tipping in nature, which imposes some limitations on their effectiveness.

Objective: To evaluate the effectiveness of Invisalign polyurethane orthodontic aligners.

Design/Participants: Prospective of adult patients treated for anterior crowding of <5 mm. All subjects were aged >18 years (mean, 31 years), and there were 14 males and 23 females of various ethnicities.

Methods: Patients were all treated with anterior Invisalign in a U.S. dental school orthodontic department, and 2 orthodontists, one of whom determined the suitability of the case for Invisalign and one who supervised the actual treatment, selected them. Polyurethane aligners were fabricated, and clinicians were allowed to request or refuse interproximal reduction, proclination, attachments, and/or overcorrections on ClinCheck. Patients used aligners for 22 hours every day for 2 to 3 weeks, and compliance was recorded. Following completion of the initial series of appliances, impressions were made and pretreatment and posttreatment models were analyzed using the ToothMeasure computer software to score a discrepancy index of overjet, overbite, anterior open bite, and crowding. Tooth movements analyzed were labial expansion, lingual constriction, intrusion, extrusion, mesiodistal tip, labiobuccal tip, and rotation, and all were reported as percentage accuracy.

Outcomes were analyzed statistically using ANOVA, Scheffé, and t tests.

Results: 37 compliant subjects completed the study. Mean accuracy of Invisalign for all movements was 41%, with best accuracy for lingual constriction and lowest for extrusion. Rotations of canine teeth had the lowest accuracy values. One fourth of all tooth movements were >70% accurate, and accuracy of labio-lingual tip was the only movement significantly affected by the degree (difficulty) of pretreatment malposition.

Conclusions: Within the limitations of this study, which included no orthodontic movement of posterior teeth, further study is needed to determine biomechanical characteristics and effectiveness of the Invisalign system. These results also indicate that best-case selection can be accomplished with further understanding of these parameters.

Reviewer’s Comments: This study is consistent with others, but it should be extended to include use of auxiliaries, combination treatment with posterior tooth involvement, and measures of patient satisfaction to rate outcomes. Clearly, there is still much to be learned about this mode of orthodontic therapy. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Removable Aligners, Invisalign, Tooth Movement

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