Cosmetic Dentistry: Conservative Approaches, Confident Smiles
Nicholas C. Marongiu, DDS
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Cosmetic Dentistry: Conservative Approaches, Confident Smiles
An introduction to the issue.
Nicholas C. Marongiu, DDS

Compromised Anterior Single Implant Restoration Using Pink Ceramic
This article discusses how using pink ceramic can be a viable option in cases where soft tissue is deficient.
John F. Weston, DDS

Minimize Preparations for Maximum Results
This article focuses on prepless veneers as an excellent, yet conservative aesthetic option that can yield outstanding results.
Adamo E. Notarantonio, DDS

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Jeffrey W. Lineberry, DDS

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David J. Clark, DDS
Finding a Way

Ruchi K. Sahota, DDS, CDE

There is always a way. The fable of the crow and the pitcher rings true in everyday life. On his daily walk, a thirsty crow stumbled upon a pitcher. It looked to be full of water. But when the crow went to drink out of the pitcher, his beak could not reach the water. He kept trying and trying and trying. He finally gave up. The water looked so good, so fulfilling. So, obviously, the crow did not want to give up. He had an idea. He started to drop pebbles into the pitcher, so the water would rise to the top. His beak then eventually reached the desired water. His thirst was quenched. Success was achieved.

It could be a lightbulb moment, where a sudden, creative idea that can help us achieve our goals enters our minds. It could be a useful but coincidental circumstance that provides an alternative way of doing things that helps solve a problem. Or it could be a helpful person who has the experience to show us another way. The daily grind of our routines in the four walls of our offices offers many challenges. Some solutions are easy to grasp, and others seem like the water in the crow’s pitcher. Inevitably, we need to find these solutions. We need to find a way. Time is money, is it not? What does this sentiment mean to you? Is it that we have a limited reserve of time every day, so doing everything as quickly as possible is important to capitalize on its value? Or is it that we should spend our time and exertion on things that will result in the successes we are looking for? How much time are we wasting when we keep trying to get the water out of the pitcher? How much money are we wasting on our repeated attempts?

What is the first challenge that comes to mind? Is it benefit plans? Is it retrieving the payment from dental benefit plans for the treatment we have provided? Is it retrieving the payment from dental benefit plans that they have promised their insured patients? Is it retrieving payment from the dental benefit plans for benefits the employers have negotiated for their employees? Is it trying to advocate on behalf of our patients for the payments they deserve because the patients are doing their part in paying the premiums? These challenges are often the most frustrating parts of my day.

Our CDA Dental Benefits and Economics Task Force was charged by the House of Delegates (HOD) a few years ago to address dental benefit plans and economic issues of practices and offer recommendations on how CDA could assist members dealing with these challenges, prioritize researching dental payment denials and delays and urge the board of trustees to intervene and take appropriate action if necessary. The task force found that “benefits and reimbursement models have not kept up with changes in health care environment; systemic and bureaucratic challenges with plans continue; and [noted that there is a] challenge for dental offices to keep up.” The HOD resolution also called for obtaining data regarding “members’ concerns about dental carriers’ actions against members, including but not limited to inappropriate claim delays and denials” and asked for this data to be used to address benefits-related issues and opportunities for CDA advocacy.

The task force’s mission and its key findings led the members to create the Dental Benefit Issues Submission form, which allows members to communicate their challenges with claim delays, denials and other relations with insurance companies. As CDA members, we have help. We have the opportunity for CDA staff to look into why these challenges are occurring and provide us a solution. We have this opportunity 24 hours a day, seven days a week. CDA staff reports that though it varies based on each situation, the average time to close a case in the last six months is three days. Extended turnaround times may result when staff has to reach out to the insurance company and wait for its response, of course.

Most members who have submitted the form have been most satisfied at its accessibility. The form is online and accessible 24 hours a day, seven days a week. Members have also noted the quick follow-up and resolution of issues. But most of all, we can appreciate the opportunity for education — the opportunity for the lightbulb moment that helps us realize how to get the water into the crow’s beak. This is not
a novel initiative for CDA. Years ago, CDA created the Practice Support Center – a library of resources, guides and templates. CDA has continued to honor its mission statement over the years: It “is committed to the success of our members in service to their patients and the public.”

The HIPAA-protected Dental Benefits Issues Submission form on cda.org does more than just help us help our patients with reimbursements. It also helps to identify emerging trends. It helps to identify common plan errors. It helps to identify opportunities for training our staff. It helps us identify unfair practices and issues where dental benefit plans are breaking the law or contracts so that CDA advocacy staff and its legal team can pursue these incidents.

Within six months, CDA staff helped 774 members. So there is help out there. Because we are CDA members, we do not have to be crows trying to decipher how to get water out of a pitcher. Dr. Suess said, “I floated 12 days without toothpaste or soup. I practically almost had given up hope. When someone high shouted, ‘Here, catch the rope.’ Then I knew that my troubles had come to an end. And I climbed up the rope calling ‘Thank you my friend.’”

We should not hesitate to accept help. But even though this resource has been available since April 2019, many members do not know about it. Not knowing where the rope is when we are stuck is a rampant problem. For example, many of my local dental society’s members did not know they had the opportunity to get free online C.E. through the dental society, although it had been announced at meetings and in newsletters and emails. Many of my neighbors did not know our local library gives us free museum passes, free online magazine access and free notary services — although it has been publicized for years and years.

There is always a way. It takes members less than two minutes to fill out the Dental Benefits Issues Submission form online. CDA staff will take it from there. They will hold members’ hands, work with them through the process and coach them to avoid the frustrating back and forth with insurance companies. We are lucky; help is a click away. Visit cda.org and reach for that rope you need to climb out, my friend.

Ruchi K. Sahota, DDS, CDE, practices family dentistry in Fremont, Calif., and serves on the CDA Board of Trustees. She is also a certified dental editor, a consumer advisor for the American Dental Association, past president of the Southern Alameda County Dental Society and a fellow of the American College of Dentists, International College of Dentists and the Pierre Fauchard Academy.

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No Comparison

As a dentist editor who is interested in history, I read with interest Dr. Brian Shue’s November 2019 editorial on comparisons of World War II German and American “concentration” camps and the facilities now used to house migrant aliens along the U.S.-Mexico border.

While the conditions in any facility used to house a lot of people are not desirable, it would indeed be preferred for those housed to have personal care items like simple toothbrushes, toothpaste and other toiletries. It indicates a lack of knowledge to state that these conditions are similar to the concentration camps in Germany, such as Auschwitz, or even like the ones in the U.S. at the same time period.

I’d suggest should anyone doubt Dr. Shue’s comparisons to search Google pictures of the wartime German concentration camps at the time of their rescue. I have seen pictures from the current detention centers at our southern border and I do not see any comparison. As Army General Sherman said during the Civil War, “War is hell.” Certainly any detention is hell — just at different levels.

I would like to see the conditions improve for these detainees, and I’m sure Dr. Shue would as well. However, that is not what he is trying to point out.

As a fellow member and former president and a former editor-in-chief of the American Association of Dental Editors and Journalists, I proudly congratulate Dr. Shue on his editorial and will not be surprised at all if it garners another journalistic award for the Journal of the California Dental Association.

Daniel Jenkins, DDS, CDE
Editor, Tri-County Dental Society

You Lost Me at Toothbrushes

I was left scratching my head after reading Dr Shue’s November 2019 editorial about toothbrushes and concentration camps and wondered what the heck it was doing in CDA’s Journal. It had nothing to do with dentistry. As I attend the CDA House of Delegates, I marvel about what a diverse crowd we are. Different ethnic backgrounds, different religious beliefs, different alma maters — and yet we are friends and colleagues with a common code of ethics and dedication to our profession. In today’s hyperpolarized political climate, there are many who would read Dr Shue’s article and get “triggered” by one extreme view or the opposite. Are detainees getting adequate treatment or maybe even better than they deserve? Is the separation of families and the use of icebox rooms a form of torture? Who is Alexandria Ocasio Cortez? She isn’t a CDA trustee. She represents a district in New York City. Please! Leave politics out of CDA. Dentistry is my safe place.

Joan Dendinger, DDS
Yuccaipa, Calif.

Compelling Accounts of Our Past

As a longtime (and lifetime) member of CDA, I have very much come to appreciate and look forward to reading the editorial in each issue of our CDA Journal.

Our editorial staff has received many well-deserved awards in past years and has been an excellent source, bringing interesting topics forward. The November 2019 issue featured Dr. Brian Shue. His story entitled “Toothbrushes and Concentration Camps” once again hit it out of the park. The story of a Jewish first-year dental student, Benjamin Jacobs (Bronk Jakubowicz), who survived the Auschwitz Death Camp because he was a dental student was fascinating to me. Jacobs even provided dental treatment to his Nazi captors. These skills no doubt kept him alive as an asset to this death camp.

As a forensic dentist, I am intrigued by stories of our dental colleagues who did extraordinary things during their time in history.

Whether it was Paul Revere identifying the remains of a fallen American patriot weeks after a Revolutionary War battle by recognizing a partial denture he had fabricated or George Washington’s many sets of ill-fitting dentures or the use of dental records to confirm the identities of presidential assassins John Wilkes Booth and Lee Harvey Oswald or the establishing of positive postmortem identifications of World War II Nazi hierarchy or the retelling of Dr. Ben Salomon’s heroics during the World War II Battle of Saipan, I have loved these compelling accounts of our past.

Once again, I wish to commend Dr. Brian Shue and all the editorial contributors who produce an excellent Journal of the California Dental Association.

Stephen M. Lojeski, DDS
CDA Trustee
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Impressions

Conventional Fillings? Not Always Best

The FiCTION trial, a three-year study comparing three different treatment options for tooth decay in children’s teeth, found no evidence to suggest that conventional fillings are more effective than sealing decay into teeth or using prevention techniques alone in stopping pain and infection caused by tooth decay in primary teeth. The study, led by dentists from the Universities of Dundee, Newcastle, Sheffield, Cardiff, Queen Mary University of London and Leeds, was published in the Journal of Dental Research in November 2019.

The trial also found that 450 children who took part in the study experienced tooth decay and pain regardless of which kind of dental treatment they received.

During the study, more than 1,140 children between the ages of 3 and 7 with visible tooth decay were recruited by dentists working in one of 72 dental clinics throughout the country. One of three treatment approaches was then chosen randomly for each child’s dental care for the duration of the trial, which was up to three years.

The first approach avoided placing any fillings and aimed to prevent new decay by reducing sugar intake, ensuring twice-daily brushing with fluoridated toothpaste, application of fluoride varnish and placing of fissure sealants on the first permanent molar teeth.

The second option involved drilling out tooth decay, which was based upon what has been considered the standard “drill-and-fill” practice for more than 50 years together with preventive treatments. The third treatment strategy was a minimally invasive approach where tooth decay was sealed in under a metal crown or a filling to stop it progressing, together with preventive treatments.

The main trial findings found no evidence to suggest that any of the treatment strategies were better than the other in terms of making a difference in the children’s experience of pain or infection, quality of life or dental anxiety between groups. All three ways of treating decay were acceptable to children, parents and dental professionals.

“Our study shows that each way of treating decay worked to a similar level but that children who get tooth decay at a young age have a high chance of experiencing toothache and abscesses regardless of the way the dentist manages the decay,” said lead author Nicola Innes, PhD, chair of pediatric dentistry at the University of Dundee. “What is absolutely clear from our trial is that the best way to manage tooth decay is not by drilling it out or sealing it in — it’s by preventing it in the first place.”

Learn more about this study in the Journal of Dental Research (2019); doi.org/10.1177/0022034519888882.
E-scooters Result in More Craniofacial Trauma

Researchers from the Texas A&M College of Dentistry found that 60% of patients who visited the emergency department in Dallas from July 2018, when e-scooters became available in the area, to February 2019 had head and face injuries. The study was published in November 2019 in the Journal of Oral and Maxillofacial Surgery and featured in a DrBicuspid.com article.

The research team calculated results for all variables, including incident notes, patient interviews, diagnostic tests, treatment and contributing factors such as the use of alcohol and protective equipment. Results showed that 52 of the 90 patients who went to emergency departments with e-scooter-related injuries experienced injuries to their head and face. They experienced many types of craniofacial trauma, including cuts, bruises, concussions, intracranial hemorrhage and Le Fort II and III fractures. Of the craniofacial injuries, 58% were considered severe.

Approximately 20% of all scooter-related trauma admissions involved alcohol use and no riders reported wearing helmets, although e-scooter rental companies make users sign disclosures requiring them to wear protective gear and refrain from drinking alcohol, according to the study authors.

Though the results were telling, the study had some limitations. The researchers only studied emergency visits associated with e-scooter use at a single trauma center in a metropolitan area with four Level I trauma centers. Also, the trauma reported likely was an underrepresentation of all injuries related to e-scooters because the results were limited to those riders who sought medical attention, according to the authors.

Read more about this study in the Journal of Oral and Maxillofacial Surgery (2019); doi.org/10.1016/j.joms.2019.12.004.

Chewing Sugar-Free Gum Slows Caries Progression

Chewing sugar-free gum may be a supplement to preventive oral health routines in children, according to a systematic review conducted by researchers from King’s College London, Guy’s Dental Hospital and published in the Journal of Dental Research Clinical & Translational Research in November 2019.

The review found that chewing sugar-free gum produces effects in reducing the advancement of dental caries comparable to other interventions, such as supervised toothbrushing programs and oral health education, according to the authors.

In recent years, chewing sugar-free gum has emerged as a possible adjunct to existing caries prevention strategies. Scientists have found that chewing gum that doesn’t contain sugar increases saliva flow, which can act as a natural barrier to protect teeth. Also, sugar-free gum can act as a carrier for antibacterial ingredients, including xylitol and sorbitol.

King’s College London researchers analyzed studies published between 1946 and 2018, identifying a dozen that explored the effects of chewing sugar-free gum and the intervention outcomes on oral health conditions — specifically, dental caries in adults and children. Most of the subjects in the studies analyzed were children ranging in age from 4 to 14. A grant from Mars Wrigley and the Wrigley Oral Healthcare program funded the research.

Sugar-free gum was found to reduce caries advancement, with a preventive fraction of 28%, according to the authors. There were no reports of adverse events in any of the studies analyzed. However, clinicians should exercise care when generalizing the results for patients other than children and young people, because only one of the 12 studies analyzed included adult participants.

The authors plan to do further research to determine the acceptability and feasibility of using this method in public health. “With consideration of cost and patient preference, this information could help to develop national policy directives on caries prevention and dictate the direction of future clinical research,” the authors wrote.

Learn more about this study in Journal of Dental Research Clinical & Translational Research (2019); doi.org/10.1177/2380084419887178.
Toothbrushing Associated With Reduced Heart Failure Risk

A recent study found that frequent toothbrushing was associated with lower risks of atrial fibrillation and heart failure. The study was published in the European Journal of Preventive Cardiology in December 2019.

Brushing teeth at least three times per day was associated with a 12% reduced risk of heart failure and a 10% lower risk of developing atrial fibrillation, according to researchers from the Ewha Womans University College of Medicine in South Korea. These study results were independent of several variables, including age, gender, socioeconomic status, exercise frequency, alcohol consumption and other behaviors that can damage the heart.

The study included about 161,000 people between the ages of 40 and 79 who had no histories of atrial fibrillation or heart failure and had participated in the Korean National Health Insurance System. They underwent medical examinations and dental checkups between 2002 and 2003, and the researchers collected and analyzed information about the participants’ height, weight, lab test results, medical conditions, lifestyle choices and oral hygiene habits.

When checkups were completed about 10 years later, the researchers found that 4,911 of the participants developed atrial fibrillation and 7,971 developed heart failure. Frequent toothbrushing, defined as at least three times per day, was significantly associated with attenuated risks of atrial fibrillation and heart failure.

Though the mechanisms behind the relationship between toothbrushing and the reduced risks of these heart conditions were not investigated, the authors noted one potential reason for the connection: Frequent toothbrushing decreases bacteria in the subgingival biofilm, which prevents it from relocating to the bloodstream.

The authors pointed out that the large group of participants and the long period in which they were examined strengthened the findings. However, researchers looked at only one country with an Asian population, so the study could not be generalized to all ethnicities.

Learn more about this study in the European Journal of Preventive Cardiology (2019); doi.org/10.1177/2047487319886413.

Cellphone Use Leads to Head, Neck Injuries

The number of head and neck injuries related to cellphone use has increased steadily over a recent 20-year period, according to a study published in the JAMA Otolaryngology – Head & Neck Surgery in December 2019 and reported in an article on DrBicuspid.com.

Distractions, such as texting while walking, led to most of the injuries, many of which were not serious. However, some injuries showed potential for long-term complications.

With the regular daily use of phones and the number of head and neck injuries, researchers from the Rutgers New Jersey Medical School in Newark set out to discover whether a link existed between the two. They conducted a cross-sectional study of cellphone-related head and neck injury cases reported to the National Electronic Injury Surveillance System database, which is operated by the U.S. Consumer Product Safety Commission and collects data about emergency department visits from approximately 100 U.S. hospitals.

Between January 1998 and December 2017, approximately 2,500 patients went to emergency room departments with head and neck injuries related to cellphone use. The estimated weighted U.S. total was about 76,000 patients, according to the study. In 2007, a sharp increase occurred at about nine new cases per 1 million people. By 2016, the numbers peaked to about 29 new cases per 1 million people.

About 33% of patients with cellphone-related injuries experienced head injuries, and another approximately 33% had injuries to their faces, including the eye and nose areas. About half of the injury diagnoses were cuts and bruises, but about 18% experienced internal organ injuries, according to the study.

“Growing dependence on cellphones in modern life may require that steps be taken to educate and promote safe practices for using these devices,” the authors wrote.

Read more of this study in the JAMA Otolaryngology – Head & Neck Surgery (2019); doi.org/10.1001/jamaoto.2019.3678.
Cosmetic Dentistry: Conservative Approaches, Confident Smiles

Nicholas C. Marongiu, DDS

Let us always meet each other with a smile, for the smile is the beginning of love.
— Mother Teresa

Cosmetic dentistry, the art and science of dentistry, dates to the 1920s when a California dentist, Dr. Charles Pincus, used temporary acrylic veneers on actors’ teeth for movie shoots. The proceeding three decades of dental research produced the benefit of acid etching teeth by Dr. Michael Buonocore, which became the foundation of dental bonding systems. This foundation led to the development of predictable porcelain bonding techniques in the 1980s by Dr. John Calamia, igniting the practice of cosmetic dentistry.

As material science and techniques evolve, the practice of cosmetic dentistry continues to evolve. What was once considered elective, unnecessary or aggressive dental treatment has shifted focus to preserving healthy tooth structure and minimal intervention to create conservative cosmetic restorative outcomes to restore the smiles and self-confidence of our patients. The advances in ceramic systems allow the creation of natural, beautiful smiles while the advances in etching/bonding allow the conservation of natural tooth structure and the conservative goal of cosmetic dentistry.

In everyday dentistry, we seldom treat ideal cases. Patients are in our chairs because there is a problem and they are looking to us to fix it. Learning to identify, predict and manage less than ideal cases produces predictable outcomes with happy patients. The first article by John F. Weston, DDS, demonstrates the management of compromised single anterior implant cosmetics through application of white and pink ceramics.

The following two articles exemplify conservative cosmetic dentistry and the importance of communication between the clinician, ceramic technician and patient. No-prep veneers, as presented in the article by Adamo E. Notarantonio, DDS, in treating deficient laterals demonstrates the ability to restore confidence in the smile without any sacrifice of healthy tooth structure. The article by Jeffrey W. Lineberry, DDS, discusses the treatment modalities and considerations when treating peg laterals and demonstrates the conservative additive treatment approach of a single tooth to enhance the smile.

The last article, by David J. Clark, DDS, introduces injection molding in direct dentistry as a means to manage black triangles in the smile line. This direct technique is extremely conservative, providing an excellent solution for patients desiring minimally invasive treatment options to address spaces at the gumline.

Together, these articles represent the conservative focus in cosmetic dentistry to restore the beauty and confidence in our patients’ smiles.

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Compromised Anterior Single Implant Restoration Using Pink Ceramic

John F. Weston, DDS

**Abstract** As dental implant surgical procedures have become streamlined to a single procedure in many cases and 3D radiology has improved the ideal position of fixtures in the bone, implants are the best option in most cases. We can now predictably offer success rates of nearly 99% over 10 years\(^1\) and 96% over 15 to 20 years\(^2\).

Dental implants have become the standard of care for functional and aesthetic replacement of missing teeth. From single-tooth to multi-tooth and even full-arch replacement, implants can be an ideal choice and considered a predictable treatment plan for most of our patients’ edentulous areas. It was not that many years ago most dentists offered implants as a “second” choice over fixed or removable bridge work. As dental implant surgical procedures have become more streamlined to a single procedure and 3D radiology has proven to offer predictable guidance for the ideal position of fixtures in the bone, implants are now the best recommendation in most cases. We can predictably offer survival rates of nearly 99% over 10 years\(^1\) and success rates of up to 96% over 15 to 20 years\(^2\).

However, any clinician who has restored anterior implants has come across cases where sufficient bone is not available at the site, therefore they are faced with the associated lack of proper soft tissue contours. Having enough bone is important but having ideal soft tissue profiles can make the difference between an unacceptable aesthetic result and totally seamless integration of implant restoration to the surrounding natural teeth and gums. There are multiple reasons that boney deficiencies may be present around implant sites, ranging from previous localized infection around a failing tooth, traumatic dental alveolar events and postsurgical bone loss around existing implants. Because we know that soft tissue contours follow bone contour, soft tissue grafting alone may not always be successful long term\(^3\). There are cases where a perfectly integrated implant is located in a spot where the ideal soft tissue is not present, and even with modern grafting procedures, surgical correction to generate ideal “pink” contours may not be possible. It’s always amazing to see how one small missing or asymmetrical papillae can make or break an anterior implant case. Maintaining or creating the ideal “pink and white balance” with an implant case is often the most critical factor to aesthetic success with restorations in the “aesthetic smile zone.”\(^4\)
Thankfully, there are alternative options using artificial “pink” as a replacement when soft tissue grafting is not successful or results are less than expected. These techniques do not rely on biology but rely on proper treatment planning, excellent lab communication and artistry. When soft tissue is deficient, using pink ceramic can be a viable option and can literally save a case and change it from being a complete failure aesthetically to a successful and potentially life-changing result.5,6

It is often difficult to establish ideal bone contours when there is significant infection around a failing implant site. Often the soft tissue defects associated with infection and bone loss around failing implants can be extremely difficult to repair and “chasing” the defects surgically to build bone can sometimes result in larger defects. This case presentation is an example of how using pink porcelain around an ideally integrated replacement implant created a successful aesthetic outcome when a significant unplanned loss of hard and soft tissue occurred. Using an aesthetic risk assessment and understanding how and when to use pink porcelain can help when planning for a successful outcome when surgical procedures have run their course.7

The patient is a male college student who moved to California from the East Coast and presented for evaluation of one anterior implant in position No. 8. He said, “My doctor told me I’m ready for the permanent crown on my implant.” The patient is a healthy 30-year-old with no medical contraindications to routine dental treatment or implant placement. The patient had an implant placed in No. 8 position secondary to a traumatic event as a child. The patient reported that the tooth previously received unsuccessful root canal therapy, developed an infection then received apical surgery with subsequent extraction and loss of the central incisor tooth.

Initial examination revealed a direct provisional on the No. 8 endosseus implant. The tissue was red and inflamed around the implant soft tissue interface, and there was class 2 to 3 mobility and yellow exudate on palpation of buccal tissue. The 2D periapical radiograph showed the implant placement was spaced well in proximity to the adjacent teeth but lateral bone loss was present in the incisal and middle one-third. A 3D radiographic exam was completed mainly for documentation reasons and revealed a total lack of supporting buccal plate bone. It was obvious that restoring the current implant was not a viable option as requested by the patient (FIGURES 1-3).

The patient in this case had a provisional crown on the implant and said the temporary was attached the same day the implant was placed. We elected to make a preliminary impression to fabricate some kind of a provisional, but upon retrieval of the impression, the implant and provisional came out with the impression. The patient was informed that stability of anterior implants can sometimes become compromised for a number of reasons. While not a rare phenomenon, anterior implant failure can occur due to the loss of buccal bone after surgical placement. This can happen if the implant is placed too close to the buccal plate or placed without proper grafting of new buccal bone in the buccal implant space at the time of surgery. Immediate loading either with a provisional or permanent crown can also have an effect on the stability of the buccal plate8,9 (FIGURE 4).

After careful evaluation by our oral surgeon, the resulting defect was determined to be too large to predictably...
restore with traditional calcified particulate graft material, so a treatment plan was formulated that included bone morphogenetic proteins (BMP) grafting, stainless mesh and connective soft tissue grafting with six to nine months’ minimum healing. The initial existing condition was deceiving, and surgical excavation of the site revealed a very large exudate-filled, active three-wall defect that included severe bone loss on the lateral sides as well as buccal surfaces. The palatal lingual bone was fully intact. The surgical treatment plan was completed without incident by our team's oral surgeon and a vacuum-formed clear Essix tray was fabricated to hold a composite tooth in the missing tooth area. This style of tooth-supported single-tooth provisional was initially delivered immediately after surgery, which allowed for minimum-required aesthetics without adding pressure to the graft site. One of the side effects of using BMP grafting is postoperative soft tissue swelling that can prohibit the use of a tissue-supported provisional, such as a resin-based removable partial denture or flipper\(^{10,11}\) (FIGURE 5).

Approximately four weeks later, a bonded provisional was placed for the remainder of healing. After nine months, 3D radiography evaluation determined that sufficient bone replacement had taken place to allow for a new implant to be placed. 3D virtual implant planning commenced with plans for placement of a new Straumann 4 mm by 12 mm tapered bone-level endosseus implant in the No. 8 tooth site. If at all possible, CBCT scans should be used to facilitate ideal placement of implants in the anterior region.\(^{12}\) As healing progressed, it became obvious that even with an ideal abutment choice and placement, the pink aesthetic score (PES) would end up being very low due to significant vertical bone loss and associated papillae soft tissue loss. PES is a system used to reproducibly evaluate peri-implant soft tissue around single-tooth implants.

Seven soft tissue variables were graded using a 0–1–2 score with 2 being the best and 0 being the worst.\(^{13}\) Additional hard and soft tissue grafting procedures were presented, however, discussion with the patient revealed a concern to limit the number of surgeries and the patient was unwilling to try another grafting event. An initial plan to consider using pink ceramic to make up for the missing tissue volume was offered as a possible alternative to end the long surgical process already undertaken (FIGURES 6–9).

The first step after implant healing progressed successfully was to complete 2D digital smile design planning on facially oriented smile and lip retracted images. This allowed for initial planning of tooth proportions for the veneers on teeth Nos. 7, 9 and 10 as well as the implant crown on No. 8 including initial design outline of pink substructure.\(^{14,15}\)

To create a natural appearance in this case, papilla extensions would extend partially onto the adjacent tooth/root surface areas. One of the concerns when
using a pink substructure is making sure the underlying tissue areas are smooth, allowing for proper hygiene and adaption of the pink substructure to the surface. It was decided to veneer the adjacent teeth, covering the tissue-recessed root areas with ceramic to protect all exposed tooth surface areas. This design would eliminate the chance for plaque to be in contact with root areas as any potential buildup of bacterial plaque under the pink ceramic extensions would be contained between ceramic layers (FIGURE 10).

An intraoral “test drive” was completed and approved by the patient. This is a procedure that allows the planned smile to be placed over the patient’s existing teeth using silicon templates of the 3D design and printed models. This allows the clinician and patient to view the planned changes prior to any permanent tooth reduction or alterations. Preparation guides were then used to complete minimal reduction veneer preps on teeth Nos. 7, 9 and 10 adjacent to the implant. A digital impression was completed for fabrication of the veneers that included an opposing arch scan and bite scan. A custom shrink-to-fit, spot-bonded provisional was fabricated on teeth Nos. 7, 9 and 10. This type of provisional is fabricated using a silicone template of the final design that is filled with provisional material and seated over the preps and allowed to cure completely. The provisional is then carefully trimmed at the margins, polished and occlusion verified. The implant on tooth No. 8 was provisionalized separately using a screw-retained temporary abutment (FIGURES 11-13).

Shade reference images were made showing dentin shades and comparison to adjacent teeth along with gingival shades to natural surrounding tissue. It was very helpful in this case to restore adjacent teeth next to the implant with conservative veneers. This allowed for better shade matching and idealization of soft and hard tissue contours. The patient was instructed to “bristle floss” the provisional with chlorhexidine while waiting for lab fabrication of the ceramic veneers. It was determined that lithium disilicate was the best choice for restorative material for the veneers with all functional surfaces (IPS e.max, Ivoclar Vivadent AG, Schaan, Liechtenstein) and a cut-back layered design on the facial surfaces (FIGURES 14 and 15).

Once lab work was completed, the patient returned for insertion of the final veneers on teeth Nos. 7, 9 and 10. Local anesthesia was placed; using a high-speed electric handpiece, sagittal cuts were made in the facial surface of the provisional veneers. The BisGMA prototypes were then split and removed. The small areas of etched “spot bond” were removed using a dry diamond bur on low speed. The surrounding tissues were cleaned and disinfected with peridex. Using a latex-free lip retractor (OptraGate, Ivoclar Vivadent AG), a dry try-in was completed to verify the restorations’ seat passively when viewed under magnification. A total etch, fourth-generation bonding resin (Scotch Bond Multi-Purpose) was chosen for its established high bond values and reliable long-term success.  A wetting agent of glutaraldehyde (Gluma, Kulzer GmbH, Hanau, Germany) was used after total etch to reduce sensitivity and improve bond strengths. A “rapid-seating” technique was applied where all restorations were bonded at once to support each other and save time. After initial resin clean-up and margin curing, an air barrier of water-based, water-soluble lubricant was placed to seal margins followed by 40 seconds of dual buccal and lingual light curing. Final clean-up of the margins was completed with a No. 12 blade, and the lingual margins were blended, finished and polished using a red-stripe diamond football-shaped bur and rubber-tipped high-speed polishers (Shofu Dental Corp., San Marcos, Calif.). Separation
and cleaning of the interproximal areas was accomplished using a hand-held interproximal saw (Ceri-Saw strips, DentMat, Lompoc, Calif.) and yellow perforated diamond strips until flossing was smooth on all proximal surfaces. After the veneers were delivered, a scanbody (Straumann Scanbody, Institut Straumann AG, Basel, Switzerland) was placed on the tooth No. 8 implant and a digital scan was made that recorded the implant position, depth and rotation as well as its orientation to the adjacent veneer surfaces. These digital files were sent to the lab with a prescription for a custom zirconia abutment and cementable e.max crown to match the veneers. The pink ceramic was attached to the crown to fill in the areas of missing tissue. The ceramist utilized the stereolithography (STL) files for accurate and predictable digital planning, design and fabrication of a custom zirconia abutment and e.max crown. Shade reference images that included tooth shade tabs (Vita classical, Vita North America, Yorba Linda, Calif.) and pink shade tabs were recorded for the ceramist to use for final layering of the lithium disilicate frameworks. A custom, screw-retained provisional was fabricated and attached to the implant for final evaluation of the aesthetic area (Figures 16-18).

The crown and pink ceramic wings were fabricated using an e.max framework and layered with creation porcelain to mimic the natural shades of the adjacent veneers and surrounding gingival tissue. The pink ceramic “wings” were designed to slide over the top of the adjacent veneered tooth structure and rest on top of ceramic veneered areas only. Note, none of the pink areas rest on or over soft tissue. The design allows floss to safely pass in between the ceramic layers for easy cleansing. This required a strong framework (lithium disilicate) to support the delicate aesthetic layering porcelain that was used externally to match the gingival shade of the surrounding tissues. The abutment was seated and screw tightened by hand and the crown was dry seated to confirm a passive path of insertion of crown and wings over the top of the adjacent teeth. The abutment was then torqued to 35nC with a fresh screw and Teflon tape packed into the access. The crown was then cemented with a very light coat of resin cement self-etching adhesive (RelyX Unicem2, 3M ESPE, St. Paul, Minn.) to eliminate the chance of any excess cement at the crown/implant margin (Figures 19-22).
Any time you have a site where an implant failure has occurred and a new implant is being placed, there is some reservation as to the long-term success of the second implant. When pink ceramic is utilized, there is an added layer of potential complication for the clinician, ceramist and patient. All factors must be addressed, such as patient biology and health as well as local factors like occlusion and framework design as it relates to soft tissue periodontal health. Addressing all factors and having good lab communication will provide the best success in these compromised cases. The final images of this case reveal beautiful anatomical contours and shape matching of tooth and tissue revealing an ideal example of how using artificial pink can be an attractive and predictable replacement for missing natural gingiva when additional surgery is no longer an option (FIGURES 23 and 24).

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Minimize Preparations for Maximum Results

Adamo E. Notarantonio, DDS

ABSTRACT Public awareness has resulted in patients requesting more minimally invasive cosmetic options. The old adage of extension for prevention has been replaced with minimal to no-prep dentistry, risk assessment and conservative treatment. This article focuses on prepless veneers as an excellent, yet conservative aesthetic option that can yield outstanding results.

With more access to information online and increased public awareness, our patients are more inclined to do less than more. With readily available images of overly prepped teeth, patients have been more inclined to say, “I do not want my teeth shaved for veneers” or other cosmetic procedures. With the movements of biomimetic dentistry and responsible aesthetics, high-end aesthetic options have arrived that are minimally to noninvasive. The old model of drill and fill, mechanical retention and extractions has been replaced with risk assessment, preventive care and adhesive dentistry. An article by Ericson defines minimally invasive dentistry as “a systematic respect for the original tissue.” This implies that the dental profession realizes that an artifact is of less biologic value than the original tissue. Furthermore, the American Academy of Cosmetic Dentistry has built its educational pillar and accreditation process on the concept of “responsible aesthetics.” That being said, high-level aesthetics can be achieved with minimal amounts of dentistry. Whereas porcelain veneers used to be the gold standard for cosmetic dentistry, more conservative approaches, such as composite resin and prepless veneers, are becoming more appealing to both the patients and the dental practitioner.

Case Study

A 29-year-old female presented to the office following three years of Invisalign. Her chief complaint was simple. She was unhappy with her “small outer two front teeth.” An intraoral exam revealed tooth size discrepancies of teeth Nos. 7 and 10 as compared to the rest of the anteriors (FIGURES 1–3). Although the gingival heights of the lateral incisors were more apical than desired, the patient’s low lip line and her affirmative
“no” answer when I mentioned returning to orthodontics to extrude them, the decision was made to leave the teeth where they were as the gingival zeniths were only visible in a retracted view.

For many cosmetic cases, a diagnostic wax-up would be performed, and utilizing a matrix fabricated from this wax-up, the restorations would be tried in with a bis-acrylic material, such as InstaTemp (Sterngold Dental LLC, Attleboro, Mass.) or Luxatemp (DMG America, Englewood, N.J.). This is helpful for two reasons. One, it gives the patient a chance to see the desired final outcome as well as experience the new shape, size or position of the teeth prior to final restorations, prior to beginning treatment. Secondly, it allows us to use the final outcome as a prep guide to ensure minimal preparation and removal of tooth structure, if preparation is indeed necessary. Figure 4 is an excellent example of this, showing the provisionals overlying the teeth with depth cuts marked in pencil to help visualize removal. Because the decision was made, in conjunction with my ceramist, to go completely prepless, a different mock-up was performed. The initial 1:1 photo was imported into Photoshop and by utilizing the Liquify filter, a virtual mock-up was completed and presented to the patient. (Figure 5).

From photo retouching to artistic effects, the Liquify filter is a powerful tool for every Photoshop user. This filter allows us to push, pull, rotate, reflect, pucker and bloat the pixels of any image. From a dental perspective, it allows us to alter an image without excessive distortion, creating an extremely natural look to what sometime can be an unrealistic or artificial result in other programs.

As mentioned previously, the central dominance and slightly palatal position of the lateral incisors gave way to the decision of prepless veneers. This allows the final restorations to be 100% in enamel. An article published by Galip Gürel, DDS, stated that veneers bonded to dentin were 10 times more likely to fail than those bonded to enamel. Following approval from the patient, the treatment of the case began.

Digital impressions were taken with an iTero scanner (San Jose, Calif.) and sent to the laboratory along with all initial photos, photos with corresponding shade tabs in color and black and white as well as a polarized photo to aid in characterization.

The patient presented a few weeks later for insertion. The veneers were razor thin in the area of the body, with a majority of the porcelain in the areas to be added to (Figure 6). The veneers were tried in with water and the decision was made to place a wedge on the mesial of tooth No. 7 to ensure an easy and passive insertion. (Figure 7). The intaglio surface of the veneers (lithium disilicate) were treated with 9% HF acid, rinsed, dried with air and silanated with two-part silane. No anesthetic was administered, and careful placement of a rubber dam with absolute isolation was completed. (Figure 8). The surfaces to be bonded

![Figure 1. Preoperative smile 1:3 view.](image1)

![Figure 2. Preoperative retracted 1:3 view.](image2)

![Figure 3. Close-up 1:1 of the upper anteriors.](image3)

![Figure 4. Provisionals shown over existing teeth with blue pencil marking depth cuts.](image4)

![Figure 5. Photoshop virtual mock-up of before and after.](image5)

![Figure 6. Final restorations.](image6)
to were air abraded with a prep start utilizing 50-micron aluminum oxide. This helps ensure the most ideal surface to bond to. Following air abrasion, the enamel was etched with 35% phosphoric acid with BAC (Bisco Dental Products, Schaumburg, Ill.) for 15 seconds. The etch was only placed half way up the facial surface because the infinity margin on the veneer did not extend past this area. The etch was then rinsed and dried (FIGURE 9). Two coats of All-Bond Universal (Bisco Dental Products) were applied and dried with warm air for 30 seconds. Prior to a 10-second light cure, a piece of Teflon tape was placed on the distal of tooth No. 8 to avoid bonding the contact together (FIGURE 10). The veneers were bonded with Choice 2 cement (Bisco Dental Products). This cement is a light-cure resin cement. Prior to placing the cement in the veneers, the cement was preheated in a composite warmer. The reason behind this is that because the veneers were so thin and the chosen cement on the thicker side, heating the cement will make the material less viscous and minimize the chance the thin porcelain shell fracturing upon insertion. The veneers were carefully placed, the cement tack cured for three seconds and the excess material removed with a rubber tip stimulator and floss in the contact areas (FIGURE 11). The excess cement was cleaned and polished utilizing porcelain polishing discs and points. FIGURE 12 shows the final restorations immediately after insertion. The patient returned four weeks later for final photos and was ecstatic with the outcome of her procedure (FIGURE 13).

The concept of less is more is used to express the view that a minimalist approach to artistic or aesthetic matters is more effective. In cosmetic dentistry, specifically in the longevity of veneers, the less removal of tooth structure and the more enamel to bond to, the increasingly greater chance of survival the practitioner has. With the improvement of materials in conjunction with the artistic skill of many laboratory technicians, not only can we ensure longevity, we can also deliver natural unrivaled beauty.

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Treatment Planning and Managing the Peg Lateral Incisor

Jeffrey W. Lineberry, DDS

ABSTRACT Spacing and gaps in the anterior segment create an aesthetic dilemma for many patients. It is not uncommon for the underlying cause of spacing to be secondary to microdontia or smaller than normal teeth. Peg laterals are a common issue when it comes to microdontia, and this can create spacing and gaps along with impacting other teeth position in the arch, leading to poor aesthetics. A case study is presented on the management and treatment of a peg lateral.

AUTHOR Jeffrey W. Lineberry, DDS, has been a practicing dentist since 2000 and practices general dentistry focusing on complex cosmetic dentistry, restorative dentistry and TMJ/TMD care. He is an accredited fellow of the American Academy of General Dentistry.

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One of the most common aesthetic concerns that patients see dental professionals about is the spacing between their front teeth. Spacing between one or multiple teeth can be a result of a multitude of reasons, including smaller tooth size and proper proportions. Microdontia, a term used to describe teeth that are smaller or undersized compared to normal-sized teeth, can lead to a Bolton discrepancy, especially when it is present in one arch. Bolton discrepancy is an analysis developed to determine ratios of mesiodistal widths of maxillary and mandibular teeth and helps identify malocclusions. Microdontia can be generalized but more often than not is localized, involving only one or a few teeth. One of the most common situations that we see in dentistry involving microdontia and the anterior segment is the lateral incisor, also known as the “peg” lateral. Peg laterals or malformed laterals are a subclass of a genetic mutation of oligodontia and hypodontia. Fortunately, this condition accounts for less than 2% of the general population and is often linked to genetic phenotypes, however, it can be prevalent (as high as 40%) in those families affected. Peg laterals are more prominent in females (1.35 times greater than males), found more often on the left side and with a higher occurrence rate in the Mongoloid population (3.1%) versus black (1.5%) and white (1.3%). Peg laterals are usually found unilaterally; bilateral presentation is extremely rare.

When it comes to the management and long-term treatment success of peg laterals, there are many aspects that dental professionals must consider. In this article, different options and treatment considerations while managing peg laterals are discussed as well as highlights from one case that was managed based upon limitations of the patient’s desires.

In order to successfully manage and treat peg laterals, dental professionals need to first consider the patient’s final wishes and limitations for the outcome they desire. This begins with the initial patient consultation and interview to find out and clarify the patient’s desired outcome. Once the patient has shared their desires, the dentist can then proceed with the examination process,
When smiling, how much of the patient's teeth show, including gingival levels? Is the tooth that needs to be restored in the proper position or does it need to be moved or do the tissue levels need to be managed?

Is it possible to provide an aesthetically pleasing restoration based on the current position and length-to-width ratio of the current tooth? How does it correlate to adjacent teeth, how will it correlate to the contralateral tooth, and can we achieve an ideal result?

Is the current tooth position acceptable to the patient or is this something that will need to be changed?

If chosen to treat the tooth in its current position, can it be done in a way to minimize tooth preparation?

Is the patient happy with their current shade or do they desire to change it?

In the management of the peg lateral, and especially when the tooth is in a poor position or the gingival or "pink aesthetics" is compromised, it has been suggested that an interdisciplinary approach is key to optimum outcome.6,7 An interdisciplinary approach in case management will include working with an orthodontist to facilitate proper 3D positioning — mesially distally, buccally lingually and apically gingivally — in order to create ideal contours and a periodontal surgeon to manage any gingival architecture discrepancies in the smile zone to allow the restorative dentist to create a restoration that is natural in appearance and undetectable. If the peg lateral is treated in a less than ideal position, an acceptable outcome may be possible and could be simply achieved with additive direct resin bonding, but it is imperative for the restorative dentist to convey the possible less than ideal outcome to the patient before treatment.

The dental professional can then create a diagnostic wax-up that will allow for visualization of the end result, which is an ideal way of finding out if the patient’s current desires and goals align with the tooth position at hand. The wax-up allows both patient and dentist to determine if the final result
will be aesthetically pleasing and can be used to either create a provisional for the final porcelain restoration or can be used to create a putty stent that can be used for a direct bonded restoration.

In selecting the final restoration, the clinician has dental material choices to manage the peg lateral: direct resin restoration and indirect porcelain restoration. Each one has risks and benefits, and both can serve as excellent long-term restorations and should be adequately shared and described for the patient to be able to make an informed decision. Direct resin restorations can serve as excellent long-term restorations, but are more clinically challenging for the restorative dentist because the final outcome is totally dependent on the individual clinician. An excellent outcome requires a high level of skill and artistry in order to achieve ideal form, function and aesthetics. Additionally, resin restorations minimize preparation of the peg lateral tooth because they do not require a path of insertion that may be needed for an indirect restoration. Resin restorations can discolor over time versus a porcelain restoration but can be repolished and finished. Furthermore, repair of direct resin restorations over time is possible and appears to be a viable treatment modality.

Composite resin material will continue to evolve and may overcome many of the current issues of chipping and discoloration in the future. Nevertheless, composite resin can be contraindicated in patients who have a sensitivity to resin-based products. Indirect restorations may require more tooth preparation in order to create a path of insertion and adequate restorative room for the dental ceramist to achieve ideal results. Indirect ceramic restorations tend to maintain their overall surface texture and polish over time and may stain less than direct resin restorations, but this is a questionable benefit. Ultimately, indirect restorations shift much of the focus of the creativity and blending of the final restoration to the ceramist versus the restorative dentist. Another concern with the selection of direct versus indirect restorations is the overall cost of the final restoration for the patient, which is typically less when a direct restoration is placed because it does not require an additional lab cost for the restoration.

It is important to ensure that the peg lateral is in an ideal position to create an emergence profile in the final restoration to support the surrounding papilla as well as be easy to maintain and clean by the patient. Otherwise, poor initial positioning may lead to overhangs on the final restoration making tissue health and maintenance difficult and ultimately leading to long-term failure. Another vital portion of the final restoration when developing the peg lateral into a normal-sized tooth is that the clinician and/or lab needs to pay particular attention to lateral and protrusive movements. Interferences and restriction of the movement of the lower cuspid, which moves through these embrasure spaces, can occur when changing the shape and length of the peg lateral along with altering the overall incisal embrasures on the mesial and distal incisal aspects. This can lead to unforeseen forces and pressures on the restored peg lateral, especially in patients with parafunctional habits.

Because the tooth is already undersized and if it is in the proper position to be restored, minimum preparation of the peg lateral will be needed as the final
restoration is additive in nature. Any removal of tooth structure other than to define preparation finish lines will weaken the tooth further. Keeping the preparation in enamel maximizes the overall strength of the tooth as well as the final bond of tooth to restoration, whether it be direct or indirect in nature because enamel bonding is still the gold standard when it comes to predictability and long-term stability.

Clinical Case Review

In this clinical case, the patient presented with a chief complaint of “I don’t like my small tooth. Can you fix it?” (Figures 1–6). Her medical history was noncontributory, and a comprehensive exam was completed and a series of photos and mounted models were taken. It was noted that the patient had existing crowding and spacing and that functional wear was present on the anterior segment of teeth and existing decay in some of the posterior teeth. Multiple options were discussed with the patient including orthodontics to correct the crowding and to redistribute the spacing, whitening, to help enhance the color of the existing dentition, carries control and then restoration of the peg lateral. Restorative options for the peg lateral included a direct bonded and an indirect porcelain bonded restoration. Risks, benefits and options were discussed at length, and the patient decided that all she desired was whitening of her existing dentition and restoration of the peg lateral with an indirect porcelain restoration.

Upper and lower whitening trays were fabricated and the patient was sent home with 10% whitening gel (Opalescence, Vivadent AG, Schaan, Liechtenstein) to remove any residual cement and then thoroughly rinsed. The tooth received an application of 35% phosphoric acid for 20 seconds and was rinsed thoroughly and dried. A copious amount of a light-cured self-priming dental adhesive (Prime & Bond NT, Dentsply, Milford, Del.) was applied, lightly air-dried to remove the excess and cured. The final restoration was seated using Variolink resin cement base (Ivoclar Vivadent, Schaan, Liechtenstein) only and the excess cement was removed. The restoration was tacked in place using a curing light (Valo, Ultradent) for a few seconds. Any remaining excess cement was removed and the tooth was cured on the facial and lingual aspect for 40 seconds. Occlusion was checked and verified. The patient returned a few weeks later for final photos (Figures 7–12) and was very happy with the end result, as it exceeded her expectations.

Obtaining ideal results in the treatment of the peg lateral can be very predictable and straightforward if the dental professional takes the time, information and proper records and develops an appropriate treatment plan prior to treating the patient.

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Treatment of the Dreaded Black Triangle: A Case Report and an Introduction to Injection Molded Composite Dentistry

David J. Clark, DDS

Traditional composite placement for aesthetic rehabilitation of open gingival embrasures, or black triangles, has historically been viewed with skepticism by many restorative dentists, orthodontists and periodontists. Many patients are told there is no healthy option. Patients are often told that either nothing should be done or are offered aggressive and physiologically costly procedures such as crowns, veneers or physiologically inappropriate interproximal reduction (IPR) in conjunction with orthodontic treatment (Table 1). The problem should not be underestimated, as one-third of adults suffer the aesthetic and functional dilemmas associated with black triangles.

The etiologies of black triangles are decreased interproximal bone height from periodontal disease, attachment loss, periodontal surgery or trauma; excessive embrasure space and deficient papilla form affected by root angulation, interradicular distance, crown form and distance between alveolar bone and interproximal contact; a patient’s biologic width and inherent or thinning gingival biotype; and age including patient habits, iatrogenic issues and adult orthodontics.

A full-mouth black triangles case originally treated in 2012 (Figures 1) is shown at six-year follow-up in Figures 2. Note the infinity-edge tooth-restoration interface (TRI) allows for graceful color blending of the composite to tooth and has also retained its shine and resisted stain. Traditional hand-manipulated composite bonding is typically limited to certain regions of the tooth and then marginated. With this technique, the entire tooth is covered in composite then quickly sculpted and finished with a specific polishing technique. This marginless approach yields stubborn resistance to stain accumulation.

Case Presentation

The patient presented with a desire to treat the black triangle between teeth Nos. 8 and 9 (Figure 3A). After a comprehensive evaluation and photographs (Figure 3B), the patient agreed to a more comprehensive approach involving injection overmolding involving the four maxillary incisors and elimination of three black triangles. The patient also wanted to brighten his teeth by using shade B-1. He did not want removal of any healthy tooth structure and accepted the treatment plan to add fullness to the teeth, approximately 1 mm, to mask the dark bands on the central incisors.

The Bioclear Smile Design gauge (Bioclear, Tacoma, Wash.) helped to show the tooth size discrepancy between his central incisors (Figures 4). The patient opted to forgo restorative orthodontics to move the midline.
Injection molding requires attention to the four cornerstones of the method:

- A thorough preparation of the tooth surfaces before acid etching is critical to avoid staining or debonding. Nonsurgical tooth preparation is achieved with an air/water/abrasive slurry of aluminum trihydroxide. This procedure removes the biofilm. Inattention to biofilm removal is a leading cause of stain and debonding. Application of phosphoric acid alone does not properly address biofilm removal. Phosphoric acid selectively removes the mineral component of dentin and enamel. Biofilm is mostly organic and will therefore not be removed with phosphoric acid.

- Matrix selection, contact management and proper seating.

- Injection molding with uncured adhesive as a surfactant, heated flowable composite, followed immediately by heated paste composite. The three resins are then light cured together. The combination of flowable and regular paste composite can be compared to the use of light-body impression material followed by heavy-body impression material. Some clinicians perform the technique with flowable composite alone. However, most paste composites have better shine retention than their flowable counterparts. Therefore, the ideal restoration today should reach a 95% ratio of paste to flowable composite in aesthetic and load-bearing areas.

- The polish. The reader is encouraged to learn the simplified two-step polishing process by watching online videos. A prerequisite for long-term polish retention is dependent on the elimination of voids and bubbles often introduced with hand manipulation of composites. Injection-molded composite has a high degree of integrity without the bubble and voids of traditional bonding.

**TABLE 1**

Conventional Solutions for Open Gingival Embrasures

- Orthodontic extrusion to coronally reposition interproximal bone and subsequent enameloplasty or restoration.
- Orthodontic repositioning of divergent roots or widely spaced roots along with enameloplasty to narrow the embrasure space and encourage gingival adaptation.
- Interproximal bone graft.
- Soft tissue graft or papilla reconstruction.
- Subtractive porcelain restorations or composite bonding (white and/or pink).
- Removable prosthesis in severely compromised cases.

**FIGURE 1A.** Preoperative (A), immediate postoperative (B) and six-year follow-up (C) photographs of a full-mouth black triangle case. The composites used were heated Filtek Supreme Ultra Body Shade (B-1) and a small amount of Filtek Supreme Flowable composite. This flowable comes in the same Body shade, which allows an ideal match between the different viscosity resins.

**FIGURE 2.** Preoperative [A] and six-year radiographs [B] of the case in Figure 1. After viewing the radiographic integrity and the long-term favorable soft tissue response, most periodontists and orthodontists feel comfortable with this method as a conservative, permanent and healthy option.
Composite Heating

Composite warming is not new. However, it was rarely viewed as a necessary component of composite dentistry before the advent of injection molding and injection overmolding. The injection method utilizes Filtek Supreme Ultra (3M ESPE, St. Paul, Minn.) in the Body shades, plus the color-matched Filtek Supreme Ultra flowable composite. 3M has recently completed an extensive analysis of the safety of heating the above-mentioned composite and 3M’s Filtek One Bulk Fill and Bulk Fill Flowable for posterior teeth. Their resins can safely be heated for more than an hour in the appropriate heater without degradation of the resins. Other studies showing the safety of heated composite are in TABLE 2.

Can All Resins Be Heated?

We have observed two resins that should definitely not be heated and others that cannot be heated for very long. Clinicians can either use the 3M material or check with the manufacturer of their resins.

Case Presentation and Technique Summary

Before the rubber dam is placed, the TruContact sanders (Bioclear) are used to smooth, remove calculus and lighten the tension of the contact areas and allow the matrices to seat fully (FIGURE 5A). Once the rubber dam is placed, disclosing solution is applied to highlight biofilm and then blasted with an air/water/abrasive slurry of aluminum trihydroxide (FIGURE 5B). Nowhere is this more critical than the interproximal area where access to traditional scaler and prophy cups is difficult.

Next, the black triangle gauge is inserted buccal-lingually below the contact to assess the mesiodistal size of the black triangle (FIGURES 6). The gauge will bind at one of the four colors. In this case, the gauge was binding between the yellow and green areas of the gauge. The patient preferred a complete elimination of the black triangle. Therefore, the green-colored matrices that have more curvature than the yellow-colored matrices were chosen. Next, a pair of size-appropriate correspondingly color-coded Bioclear black triangle matrices are tried in for each embrasure. Although we measure and pair the matrices for each embrasure, the injection molding is performed one tooth at a time to allow for a monolithic, stain-resistant outcome.

Tooth No. 8 is injection molded first. The green matrices are placed at the midline (FIGURES 7-10). The other embrasures have smaller black triangles. The pink-colored matrices, which are the least curvaceous of the four colors, are used in the other embrasures. “Shield” matrices (inactive matrices that shield the neighboring teeth) are placed on the neighboring teeth on either side of the tooth and will later be used as active matrices. These shield matrices help maintain the embrasure shape as the active matrix system becomes pressurized during injection molding. The matrixed tooth No. 8 is acid etched, rinsed and dried. Scotchbond Universal adhesive (3M ESPE, St. Paul, Minn.) is placed on enamel, massaged into dentin for 20 seconds, air thinned but not light cured. Then heated Filtek Supreme Ultra Flowable (3M ESPE) is injected into the active matrices followed with heated Filtek Supreme paste.

Injection molding using heated composite with the Bioclear method has similarities to industrial injection molding. In dentistry, the sides (mesial and distal) of the tooth are well-contained all the way to the bottom of the sulcus. In the center of the tooth, there is a gap that allows injection of the composite. This distinct injection zone is often referred to as the umbilical cord or umbilicus of the restoration.
TABLE 2

Recent Research Validating Heating of Specific Composite Resins

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<th>Benefits of heating</th>
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<td>This study concerns leaching of chemicals out of the composite. A comparison was performed to evaluate the relative amount of material extracted from warmed or nonwarmed, light-cured, resin-based composite material in three separate solvents to help determine the potential safety of warming techniques in composite use. There was no statistical difference between the room temperature and warmed samples at most extraction times.</td>
<td>Dunbar T, et al. Gravimetric Extraction of Warmed and Room Temperature Experimental Composite. J Dent Res vol. 98A, abst no. 1877, 2019. 5</td>
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<td>Fracture toughness was increased for Filtek One Bulk Fill when specimens were preheated.</td>
<td>Abdulmajeed A, et al. Fatiguing and Preheating Effect on Mechanical Properties of Composite Resins. J Dent Res vol. 98A, abst no. 1879, 2019. 6</td>
</tr>
<tr>
<td>Heated composite is safe to the pulp. In the study, the extent of the increase in pulpal temperature with heated composite was only 0.8 C. In contrast, a 5 C intrapulpal temperature rise was seen for all groups during photopolymerization.</td>
<td>Daronch M, Rueggeberg FA, Hall G, De Goes MF. Effect of composite temperature on in vitro intrapulpal temperature rise. Dental Mater 2007 Oct;23(10):1283–8. Epub 2007 Jan 2. 7</td>
</tr>
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With industrial injection molding, the remnant of the injection zone is referred to as a “vestige.” When casting dental gold restorations, there is a “sprue” that connects the casting to the melted gold mass. It is purposeful excess that sits above the controlled contour that is later cut back and blended to the restoration surface. With dental injection molding, the umbilicus can be prone to voids. Therefore, it should be maintained as 1 mm to 3 mm of excess, light cured and then cut back to the grade of the matrix containment zone. The supragingival excess in the umbilicus is maintained as to not disturb the composite.

The matrices are massaged back to shape with the unique paddle instrument, and any flowable composite in the gingival area is blotted away with dry brushes. Little to no hand manipulation of the composite is the goal with injection molding. Once thoroughly light cured, the shield matrices and the active matrices are removed. The excess areas are quickly removed with a dry coarse flame bur (Komet, Lemgo, Germany). Then the tooth is taken to 80% of the final shape with the 3M Sof-Lex coarse disc (3M ESPE) (FIGURE 10). The process

FIGURE 5A. FIGURE 5B.

FIGURES 5. The teeth are isolated with a heavy rubber dam (A), dried, then disclosed with the dual-color disclosing solution (B). The contacts are sanded in sequence to lighten the tension of the contacts. This will in turn allow full seating of the matrices. A secondary benefit is to remove hard and soft biofilm, which are common to the peri-contact area.

FIGURE 6A. FIGURE 6B.

FIGURES 6. The Bioclear Black Triangle Gauge (patent pending) is shown in two of the three embrasures that will subsequently be treated. Color-coded matrices will subsequently be utilized that match the colored area of the gauge where it binds when viewed from the incisal.
is repeated one tooth at a time (FIGURES 11 and 12). The single porcelain veneer on tooth No. 7 was removed and replaced with the same basic injection overmolding process used on the other teeth. Because the original porcelain veneer was very conservative, no dentin was exposed. Another aid was the fact that the contacts were still present in enamel, which is very helpful to the clinician as the matrices are stabilized nicely.

**The Final Step: The Polish**

First, the pre-polish is completed with a worn SoFlex XT disc (3M ESPE) to create a matte finish and to remove any deep scratches left by the diamond bur. Next comes the two-step polish. Magic Mix (Bioclear) is used in a disposable cup to create omnidirectional super-fine scratches. Next, the Magic Mix is completely removed with air-water spray. Finally, a diamond impregnated cup (RSP Polisher, Bioclear) is used with light pressure. Care should be taken with any polisher used without water spray coolant, as it can create heat. Then the same diamond impregnated cup is used with copious air-water spray and heavy pressure to achieve the ultra-glossy appearance. This process sets the injection molded restoration apart from the often-grainy finish of “bonding.”

The immediate postoperative photograph (FIGURE 13) demonstrates immediate and complete black triangle closures. The matrices are specifically

**FIGURE 7.** At the midline area, the gauge was between yellow and green. The patient wanted absolute closure of the black triangle, so the green matrices were used. For a slightly open embrasure, the yellow matrices would have been utilized. The other embrasures were restored with the pink matrices. The “large” matrices from the “large” tub were utilized for this case. The “small” matrices are commonly used for lower incisors.

**FIGURE 8.** A high-magnification view of the aggressive curvature of the black triangle matrices and tight gingival seal is demonstrated. If the contacts are not appropriately lightened with the sander mentioned previously, the operator may see a gingival gap. This indicates that the matrix is not fully seated, the matrices should be removed, the contact sanded more aggressively and then matrices reinserted.

**FIGURE 9.** The first tooth has been overmolded and matrices removed. Note the orange color along the incisal edge where the adhesive was transported to.

**FIGURE 10.** The excess or “umbilicus” has been quickly amputated with a dry coarse diamond bur, the tooth is then taken to the 80% completion state with a SoFlex XT Coarse disk (3M) before moving on to the next tooth.

**FIGURE 11.** The left central incisor is overmolded. The “shepherd” matrix on the mesial of the lateral is currently inactive but will later be used as an active or “aquarium” matrix.

**FIGURE 12.** The mesial is treated with the pink matrix and the distal is treated with the Bioclear A-102 matrix from the original Bioclear System in the HD thickness. Because the contacts were all naturally occurring in this case, the slightly thicker HD matrices can be used. The HD version of Bioclear Mylar at 75 microns is significantly stronger and stiffer than the 50-micron version. Each thickness version is used depending on the clinical situation.

**FIGURE 13.** Immediate postoperative view. Note the ultra-glossy finish imparted by the polish. Monolithic injection molded composite holds real promise as the structural and optical integrity of the composite, Filtek Supreme Ultra, is maximized.
gingival embrasures designed to put the apical extent of the contact area within 5 mm of the bone level. This distance is the Tarnow guideline: The maximum distance from crestal bone to contact area to achieve a papilla in 100% of cases is 5 mm.

Pre- and postoperative radiographs (FIGURES 14) demonstrate evidence of the smoothness and healthy contours of a large black triangle closure of the central incisor embrasure.

Aesthetic transformation is not a new concept in restorative dentistry (FIGURES 15). However, injection overmold with heated multiviscosity resins in precise matrices with an exquisite gingival seal and without cutting the tooth to accommodate indirect ceramics is new. The reader can contact 3M Oral Care or Bioclearmatrix.com for more information.

REFERENCES

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From facial recognition software to personal identification numbers, countless protections are in place to safeguard our private financial data. In the dental office, data encryption, anti-virus software and firewalls are the go-to preventive measures, not to mention the classic lock-and-key methods for securing hardware and other items of value.

Unfortunately, smart thieves can, and have, found ways to outwit many of the most advanced security systems. In one case reported to The Dentists Insurance Company’s Risk Management Advice Line, a thief broke into a dental office and made off with the credit card terminal, resulting in $11,000 in charges from the dentist’s account.

The dentist became aware of the theft after finding his glass office door broken. Upon reviewing the video footage, he witnessed the suspect, who was wearing a bandana, enter the office and take the credit card terminal. The entire incident took less than 60 seconds. The dentist reported the incident to his bank.

The bank initially refunded the money, but then the dentist received a letter from the bank stating that the bank wanted the money back. Apparently, the criminal used the terminal to post credits from the dentist’s merchant account to prepaid credit cards. The credits were small, ranging from $300 to $400 each, totaling $11,000. The prepaid credit card company also demanded repayment. Luckily, the dentist had reported the machine as stolen and the charges were made after it was taken from his office.

Credit card processors will typically refund fraudulent charges to a victim’s account as long as the victim reports the crime immediately and follows the protocols laid out in their contracts.

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Dental practices may also want to consider alternative methods of accepting credit card payments. For example, mobile card readers, such as Square, plug directly into your smartphone or tablet and transfer data via an app. Virtual card readers operate similarly, connecting to a computer and processing transactions through a web-based platform.

While credit cards remain the gold standard in merchant payments, peer-to-peer payments are grabbing a stronghold as well. These payment methods, which include companies such as Venmo, PayPal and Zelle, allow users to transfer funds directly from bank accounts or credit cards to merchants.

On-demand payments are certainly becoming the norm, as transactions can be made within seconds from any smartphone. While accepting such payments is convenient for patients, there are some considerations for dental offices, including fees and processing times. In addition, not all of them offer the same level of fraud protection and conflict resolution services offered by credit card companies.

One of the biggest concerns for dental practices with regard to peer-to-peer payments is privacy. Depending on the provider, transactions can be open to the public; in fact, some, including Venmo, allow users to connect with “friends” and allow transactions to be viewable to everyone in the network. Privacy settings can override this function, but it is up to the user to change their settings. And while financial data is encrypted on most peer-to-peer apps and servers, user identity isn’t, which can open the door to liability claims stemming from potential HIPAA violations.

Every dental practice owner wants to make the payment process as fast and convenient as possible. But with convenience often comes risk. Taking a few steps to ensure the security of financial data can help mitigate those risks. Using security technology, following basic security best practices and offering alternative payment methods can protect your patients and your practice from fraud and theft.

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Role of the Infection Control Coordinator

CDA Practice Support

No dental practice wants to experience an infection control breach, especially one that necessitates patient notification or draws media attention. Despite annual mandated Cal/OSHA bloodborne pathogens training for staff and dental licensees’ biennial obligation to complete a two-hour infection control course, infection control breaches continue to occur. How can a dental practice do better?

One way is to implement an administrative procedure recommended by the Centers for Disease Control (CDC) but not required by regulation — designate an “infection control coordinator.” This individual, trained in infection control, could coordinate and monitor the dental practice’s implementation of infection control procedures. This individual should be well-versed in the dental board’s infection control regulation, Cal/OSHA bloodborne pathogens regulation, state medical waste management law and CDC recommendations for infection control in dental settings. A printed version of the board’s regulation and Cal/OSHA’s regulation must be available to all staff in the dental practice. California’s Medical Waste Management Act is easily found on the internet, and CDA summarizes its requirements for dental practices in a sample medical waste management plan found on cda.org/practicesupport.

The CDC has an infection control checklist available both in print and as a mobile app. The checklist delineates the agency’s infection control recommendations for dental settings, from administrative measures to dental unit water quality. The infection control coordinator can use the checklist periodically to assess dentist and staff compliance with standard precautions and to provide feedback. The checklist can help identify deficiencies and lapses, and the infection control coordinator should attempt to determine why lapses occur and to correct the lapses by, for example, retraining staff. Both the checklist and app allow completed forms to be kept for tracking and review purposes.

Key to assuring compliance with infection control procedures is for the office to have written policies and procedures required by the Dental Board of California and Cal/OSHA. The infection control coordinator can be assigned to develop and to regularly review and update the Cal/OSHA-required exposure control plan and the dental board-required protocols for instrument processing, operatory cleanliness and management of injuries. A dental benefit plan may have additional requirements, so the infection control coordinator should check the provider handbook of each of the dental plans with which the dental practice is contracted.

The infection control coordinator should ensure necessary supplies are adequate and available for staff to comply with standard precautions. Standard precautions and the necessary supplies include:

- Hand hygiene — soap, antibacterial and hand lotion.
- Use of personal protective equipment — gloves (appropriate sizes), masks, eyewear, gown/jacket appropriate for procedure.
- Respiratory hygiene/cough etiquette — reminder sign, masks for patients.
- Sharps safety (engineering and work practice controls) — sharps container, single-hand needle recapping device, single-hand needle removal device, sharps with engineered sharps protection, for example.
- Safe injection practices — disposable needles and syringes and single-dose medicines.
- Sterile instruments and devices — instrument cassettes, cassette wraps, sterilization pouches, ultrasonic cleaning solution, spore test strips, for example.
- Clean and disinfected environmental surfaces — cleaner, disinfectant, towels or cloths and utility gloves.

Infection control coordinators will need to familiarize themselves with respective products’ instructions for use and ensure staff follow them. Surface disinfection products take various forms — spray, wipes and concentrate, for example — and not following manufacturer’s instructions may place employees and patients at risk because products may not work as expected. “Disinfectants are not interchangeable, and incorrect concentrations and inappropriate disinfectants can result in excessive costs,” according to the CDC. To ensure products work as expected and to protect employees and patients, an infection control coordinator should check a disinfectant’s expiration date and that staff are applying disinfectant to a surface for at least the minimum recommended contact time. Another example of the need to review equipment instructions is that certain sterilizers require that

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<td>Infection Control Breaches That Have Occurred</td>
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<td>Instruments not properly processed.</td>
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<td>Single-dose vials used for more than one patient.</td>
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<td>Spore tests not processed appropriately.</td>
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<td>Reuse of single-use devices.</td>
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instruments and cassettes be dry prior to sterilization because those sterilizers are not designed to remove excess moisture from packaged instruments. Wet, sterile instrument packages do not remain sterile for very long.

It is a best practice to establish regular evaluation of a dental practice’s infection prevention program and of staff’s understanding and adherence to minimum standards of infection control. Having an infection control coordinator in a dental practice can be key to ensuring compliance and to reducing risk of an infection control breach. ■

REFERENCES
**Incredible practice opportunity**

**Pamela Carroll-Gardiner**

- **SALINAS GP**
  - Large & stable patient base. Seasoned and dedicated staff. Practice with an emphasis on Restorative treatment. 4 doctor days & 5 hygiene days per week. Average GR $910K. Retiring owner asking $583K.

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- **SOUTH SAN FRANCISCO GP**
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- **SAN MATEO GP**
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- **SAN JOSE PROSTHODONTIC PRACTICE**
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- **PENINSULA PROSTHODONTIC PRACTICE**
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- **MONTEREY COUNTY GP**
  - Gorgeous practice in scenic Monterey Bay peninsula in ample seller owned building with state-of-the-art equipment. $300K+ average annual gross receipts with 4 doctor days. Asking $678K.

- **CAPITOLA GP**
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- **SONOMA COUNTY GP**
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**UPCOMING:**

Santa Cruz County GP, San Francisco GP, Redwood Shores GP, Oakland GP & North Bay Oral Surgery Practice

![Mike Carroll](image1)
![Pamela Carroll-Gardiner](image2)
![Mary McEvoy Carroll](image3)

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NEW! Santa Barbara County: $270,000 | 3 ops
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N. Santa Barbara County: $1,437,000 | 9 ops
Santa Barbara County: $179,000 | 4 ops
Santa Barbara: $122,000 | 4 ops
Santa Maria + RE: $360,000 | 4 ops
N. San Luis Obispo County: $1,475,000 | 6 ops
San Luis Obispo: $861,000 | 3 ops
Central Coast: $485,000 | 4 ops
Central Coast: $548,000 | 5 ops
Central Coast: $390,000 | 3 ops
Central Coast Endo: $950,000 | 5 ops
San Luis Obispo County: $650,000 | 4 ops
San Francisco: $979,000 | 4 ops
San Jose: $200,000 | 4 ops
Watsonville + RE: $491,000 | 5 ops
San Anselmo: $230,000 | 2 ops
Bakersfield: $200,000 | 4 ops
Bakersfield: $275,000 | 3 ops
Fresno County: $343,000 | 4 ops
Davis: $1,700,000 | 6 ops
Folsom: $330,000 | 6 ops
Sacramento: $270,000 | 6 ops
Rancho Cordova: $225,000 | 4 ops
Sacramento Area: $315,000 | 5 ops
Roseville: $315,000 | 5 ops
Shasta County: $135,000 | 5 ops
S. Lake Tahoe: $225,000 | 3 ops
California City: $350,000 | 6 ops

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- R. Bishop, DDS

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A situation occurred recently that is not unusual in the office. A patient had a toothache in an upper first molar and wanted me to do the endo. I carefully explained that some things are beyond my abilities and endodontic therapy on an upper first molar is definitely one of them. I told him that he would get a more predictable result much faster and with less stress if a specialist did the treatment. Tongue in cheek, I said that, after all, that’s why God made specialists: to help out us poor GPs.

When I was much younger, I did almost every endo that came my way. In fact, I toyed with the idea of going back to school to become an endodontist. After spending lots of time looking for the second mesiobuccal (MB2) canal, I learned my lesson and stuck with the stuff I’m good at. Although it’s good to learn new skills and keep improving, I’ve learned to trust my “gut.” When it’s telling me I’m reaching beyond my skill level, it’s time to step back and reconsider. From my many years with Peer Review, I’ve seen lots of GPs who do specialty treatment that meets the standard we’re all held to, namely to perform to the same level as the specialist. To them I say, more power to you. Your patients certainly appreciate your skills and that they don’t have to leave your office to receive the care they need. However, I have also seen cases where the treatment clearly does not meet that standard, and there is the problem. We have an ethical duty to recommend to the patient that which in our judgment will offer them the best treatment or any reasonable alternatives. If that means referral, then so be it. (CDA Code of Ethics, Section 9, Consultation and Referral) This can also be a practice builder if it’s put correctly. If the patient is told that you are looking out for their best interest by recommending a course of treatment that has the greatest chance for success, chances are they will appreciate your honesty and concern for their welfare. There are other advantages to referral. If the patient hears the same diagnosis from two different dentists, that helps them to accept it. In the case of periodontal treatment, follow-up and behavior modification are crucial to long-term success. My experience has been that those specialists have very solid programs in place to help with that. I have also found that building a solid relationship with the specialists I refer to gives me someone I can call when I need advice or help with a difficult situation.

For me personally, it’s impossible to be everything for everybody. After 41 years in practice, I have come to appreciate the specialists I work with more and more. I consider them an invaluable asset to my practice who help to make my professional life much more pleasant.

Henrik Hansen, DDS, is a general dentist practicing in Fairfield, Calif. He currently serves on the CDA Judicial Council and is a past chair of the Council on Peer Review as well as a past member of the ADA Council on Dental Benefit Programs.

Have an ethical question you’d like to have addressed by the Judicial Council?
Email lori.alvi@cda.org.
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BAY AREA CONTINUED

DG-1078 SARATOGA Ortho: One-of-a-kind, modern, high-tech orthodontic boutique practice! ~1400 sf w/ 5 Ops $980K
DG-1081 SAN JOSE: Located in popular retail shopping center. Spacious 2800 sf office w/ 8 fully equipped ops $395K
DN-1031 CUPERTINO: This remarkable practice awaits only your talent and skill! 1500sf w/ 3 ops + 1 add'l. $1.25M
DN-1032 PLEASANTON: The perfect place to live, practice & raise a family! 1400sf w/4ops. Includes CS/Scan $185K
DN-1041 SAN JOSE: This stunning practice is an excellent opportunity for new grads! 1207sf w/ops + 1 add'l. Reduced! $175K
DN-1003 PLEASANTON: This is an excellent opportunity for a graduate or a dentist seeking a Satellite location. 1000sf w/3 ops. $68k
DN-1046 SANTA CRUZ AREA: Opportunities like this does not come along, except once in a lifetime! Office 2050 sf w/ 5 ops. Total sq ft 3880. $595K/Real Estate: $1.1ml
DN-1067 CASTRO VALLEY: Conservative treatment & compassionate philosophy delivered in a warm environment. 1498sf w/3ops. $650k/Real Estate: $675k

NORTHERN CALIFORNIA

EC-1018 WEST SACRAMENTO: All new leaseholds & top of the line PC EQ in 5 ops! 6 ops currently in use. 10 ops total available! $795k
EG-910 MIDTOWN SACRAMENTO: A thriving practice does not come along very often! ~1107 sf w/ 2 + 1 add'l. Reduced $210k
EG-988 SACRAMENTO: Desirable, mid-town neighborhood, w/ ample parking in garage! ~1527 sf w/ 5 Ops. Reduced $480k
EG-1012 EAST SACRAMENTO: A practice like this one does not come available very often! ~2900 sf w/ 8 ops. $2.5M
EG-1016 LINCOLN: Look no further than this growing community to springboard into your success! ~1800 sf w/4 Ops Reduced $560k
EG-1039 EL DORADO HILLS VICINITY: The ideal opportunity to practice in this community! ~1100 sf w/ 4 Ops. $350k
EG-1061 SOUTH AUBURN VICINITY: Come live, play and practice in the heart of this pristine town! ~1100 sf w/ 4 Ops. $350k
EN-1055 ROCKLIN Facility: Build your own success here in this family-oriented community! 1650 sf w/ 4 ops + 1 add'l. $95k
EN-1077 DAVIS: Imagine living and practicing here! Hesitate and you may miss out on your dream! 1100sf w/ 5 ops. $575k
FC-650 FORT BRAGG: Family-oriented practice. 5 ops in 2000 sf $350k for the Practice & $400k for the Real Estate
FN-961 EUREKA: Where the quality of life can’t be beat! 1400sf w. 4 ops. Practice Reduced! $395k/Real Estate Available! $395k
FN-855 NO. HUMBOLDT: Seller relocating! Long-established, 100% FFS practice! 1600 sf w/3 ops + 1 add’l. $190k/Real Estate Available
GN-1071 REDDING: Streamlined policies & loyal patient base, this quality practice is your springboard to success! 2264sf w/ 4 ops. $525k
GN-1073 BUTTE CO: Quality, fee-for-service practice with a stellar reputation! 1800sf w/ops. $375k/Real Estate Available
HG-1053 GRASS VALLEY: Well-established practice of 40+ years, known for its quality dentistry! ~1200 sf w/ 3 ops $420k

NORTHERN CALIFORNIA CONTINUED

HG-1068 LAKE TAHOE AREA: Imagine living and practicing in the majestic Sierra Nevadas and lake community! ~2500 sf w/ 3 Ops. $315k/Real Estate Available
HG-815 TRUCKEE AREA: Amazingly priced at 50% of Collections! ~1000 sf w/ 3 ops $165k/ Real Estate Available
HG-983 GRASS VALLEY: Newly remodeled office in highly desirable neighborhood! ~1250 sf w/ 3 ops. Reduced Price $185k/Real Estate Available
HG-987 LAKE TAHOE AREA: LIVE THE DREAM! The mountains are calling you to this Alpine Paradise! ~3,400 sf w/ 6 Ops $785k/Real Estate Available
HN-879 SONORA: Great Cash-Flow for Only 3 Days a Week! 2950 sf w/ 3 ops Reduced Price $265k
HG-934 GRASS VALLEY: Underworked PT base should support larger production numbers! ~1200 sf w/ 3 Ops Reduced $168,750/Real Estate Available
HN-991 PLACERVILLE: Quality, conservative and compassionate practice! Will consider work back. 1,654 + 473 sf w 5 ops. $675k

CENTRAL VALLEY & SOUTHERN CALIFORNIA

IC-975 MODESTO: Established 33 years. 1,100 sf w/ 3 ops $225k
IG-881 TURLOCK: Long established has unsurpassed quality care. ~3500 sf w/ 10 Ops (shared). Reduced. $295k
IG-1007 GREATER MODESTO AREA: Combines a quality learning environment with relaxed rural living. ~3000sf w/ 6 ops. $645k
IG-1019 TRACY: This opportunity is waiting for you to sink your roots down and invest your future here! ~1200sf w/ 4 ops. $745k
IN-1069 STOCKTON: Well-established & fully equipped w/ modern equipment, this is an excellent opportunity! 1450sf w/3 ops +1 add’l. $260k
IC-811 FRESNO COUNTY: Seller willing to consider Associateship for qualified DDS w. intention to Buy In! Considerable Goodwill in Community! 3,000 sf w/ 6 ops $350k
IC-823 LOS BANOS: Heavy emphasis on hygiene. 1000 sf w/3 ops $80k
IC-1054 VISALIA: Practice AND REAL ESTATE! Prof Bldg on major thoroughfare. 2,260sf w/ 6 ops $275k/Real Estate $517k

SPECIALTY PRACTICES

BG-843 WALNUT CREEK Perio: Priced at 50% of collections! ~1085 sf w/ 4 ops $390k
BG-1024 WALNUT CREEK Prosth: Stellar reputation for providing the highest level of treatment! ~2138 sf w/ 6 ops $750k Real Estate $995k
DN-1044 FOSTER CITY Pedo: Shared Space Situation. Conveniently located within walking distance of major corporations. 830sf w/ 3 ops. $195k
GG-940 NORTH OF SACRAMENTO Pedo: Practice is on track to collect more than $1,000,000 in revenues this year! ~4300 sf w/ 5 ops. $660k
JG-757 VISALIA Perio: Incredible Giveaway at this price! Collections over $800k! ~2000 sf w/ 5 ops Steal at $150k

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Withings Thermo ($99.95, Thermo)

Withings Thermo measures body temperature by scanning the temporal artery with its 16 infrared sensors, which take over 2,000 measurements per second. Setting up the smart thermometer is done through either the Withings Thermo or Withings HealthMate mobile app for iOS or Android and requires a free Withings account. After account sign-in, a short step-by-step walk-through guides the user to pair the device to their smartphone with Bluetooth and add it to their account. Users can optionally configure the device directly to a home Wi-Fi network to upload their measurements to the cloud without the need to sync with their smartphone. The thermometer supports up to eight different profiles with each Withings account.

To measure temperature, users remove the protective cap, press the single button on the thermometer and scan across the forehead with the device. The thermometer vibrates when the measurement is complete and the result shows on the display. Sliding a finger up or down the touch area of the display cycles through the different users and a subsequent press of the button assigns the measurement to the corresponding profile. A color LED next to the display indicates whether the person has a fever based on the age of the user profile and ranges from green to yellow to red to indicate severity.

A timeline of body temperature measurements can be viewed through the mobile app, where users can add additional notes, medicines taken or symptoms under the specific measurement. The mobile app also automatically provides valuable health advice based on the data and can direct users to Thermia, a service offered by Boston Children’s Hospital, for more insights and recommendations. Users have the option of connecting their profiles to Apple Health or Google Fit, which combines health data from various sources to provide an overall picture of their health. The thermometer utilizes two replaceable AAA batteries that last up to two years. Withings Thermo is remarkably easy to use with its single button operation and simple-to-assign measurements to profiles, making it a welcome addition to quickly and accurately measure body temperature in a household.

— Hubert Chan, DDS

Pixel 19-Inch Bi-Color Ring Light ($109, PIXEL)

Professional photo lighting equipment can be important for taking good clinical photographs; after all, improper lighting can skew the appearance of case outcomes, especially when lighting is inconsistent from before-and-after photographs. Thankfully, as LED technology improves, user-friendly, portable and affordable alternatives are arriving in the consumer market. While they still fall short of professional fixed studio-lighting rigs in terms of durability, they mimic the capabilities of their premium brethren admirably. Could these technologies, like the Pixel 19-inch ring light, be potential lighting solutions for small private practices looking to standardize their photography? This review utilized a Nikon D3200 with a Sigma macro lens to evaluate the Pixel’s effects on extraoral and intraoral photographs.

The Pixel 19-inch ring light package comes with the light itself, a carrying bag, a power supply, a stand, a cellphone holder and a cold shoe adapter for larger cameras. The light is easy to assemble and operate, which is fortunate because the included instructions are sparse. A host of tiny LED bulbs is at the heart of the device, producing 55 watts of light that can have its color temperature modified with a knob. Placed approximately 3 feet from the patient, the Pixel eliminates most shadows when photographing in a darkened room. In a room full of ambient light, the results are consistently shadow-free. Settings can be saved so that operators can go back to their favorite presets, allowing them to recreate previous lighting. Because of its affordability, ease of operation and good results, the Pixel 19-inch ring light appears to be a viable product for practitioners looking to improve and standardize their clinical photographs.

— Alexander Lee, DMD

Would you like to write about technology?

Dentists interested in contributing to this section should contact Andrea LaMattina, CDE, at andrea.lamattina@cda.org.
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