OF THE CALIFORNIA DENTAL ASSOCIATION

Journal

AUGUST 2010

No-Prep Veneers

Implant Verification Cast

Achieving Gingival Harmony

STEP BY STEP DENTISTRY

Ziv Simon, DMD, MSc

Vol 38 No 08

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Alexander B. Waldman, DMD, MMSC

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The New Word of Mouth

RUCHI K. SAHOTA, DDS, CDE

So it finally happened. She took the plunge. She bit the bullet. Six months ago, my mother signed up for Facebook. We filled out her information. We posted pictures of her and our family. We entered her hometown, school, and professional information. And then … the friend requests began to pour in. Friends from dental school. Cousins from India. And friends with whom she had lost contact along the way.

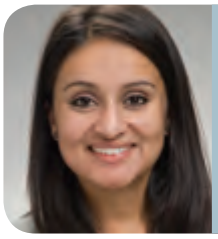
That's right. Facebook. The 200 million people who log onto their Facebook page every day have an average number of 130 friends on this social networking website. More than 8 billion hours are spent on Facebook monthly. And the fastest growing demographic on the site is not the millennial generation (those born between 1977 and 1998). It is actually women 55 and older.[1] It is the millennials that have popularized the phenomenon.

The author of *Socialnomics: How Social Media Transforms the Way We Live and Do Business*, Eric Qualman, believes, "Social media isn't a fad; it is a fundamental shift in the way we communicate."

Ninety-six percent of millennials have a Facebook account.[2] The millennials are essentially the patients of our present and our future. And this generation maintains that "people" are among the two or three "best" sources of ideas and information.[3]

Malcolm Gladwell's popular book, *The Tipping Point*, illustrates how these "people" disseminate their valuable knowledge. Gladwell reveals that new trends, new inspirations, and new notions are introduced, spread, and accepted throughout our population by special clusters.

Gladwell cites social personality types into groups: the mavens, the connectors, and the salesman. In every social group, we know people who know a lot about



Gladwell cites social personality types into groups: the mavens, the connectors, and the salesman.

a few things in particular. These are the mavens. They do their homework, so we trust them to provide good information. Mavens become the authority in these groups so we seek their opinion. Each maven has his own area of expertise or area of interest.

Connectors share the information. They are social butterflies with hundreds of contacts in their cell phones. They bring different circles of societies together. The connectors transfer the knowledge they have received from a maven from one social cluster to another. They are the central hub of a variety of social networks. In a way, they are the roots of community collaboration.

Salesman plug. When driven, especially by passion, necessity, and/or genuine interest, they can sell to anyone and everyone. They have that character, charm, or charisma to persuade others around them to choose, act, and buy.

Gladwell's "star" personality is the maven. Everyone trusts them. Everyone goes to them for advice. And mavens want to help others make good knowledge-based decisions. Though the connectors know a lot of people and continue to make new relationships, it is the mavens who have repeat contacts seeking advice.

Who are the mavens in your life? Who are the connectors in your social circle? Do Gladwell's personalities appear in our offices? Referral lists in dental practices often see the same name associated with multiple new patients. Is a project manager in a company with many new consultants then a maven who everyone looks to for advice? Is the connector the soccer mom who also is a PTA volunteer?

I look at the patient population in our office. Our practice has been in Fremont since 1984. Our patients are my brother's soccer teammates and their families. Our patients are the other South Asian folks around the Bay Area who, in the 1980s like my mother, could not find in Fremont the whole cloves and coriander needed for their traditional cooking. Our patients are the friends and family of people with whom I attended high school and college. Our patients are the young families that I have met at the library, the gym, or hole-in-the-wall restaurants I frequent enough to have become a part of a family there. Our patients are the Silicon Valley engineers who chose Fremont as their home during the computer industry's boom. But almost all of them found their way to our dental home via another one of our patients. You, I am sure, have the same story.

So while the connectors of the '80s, '90s, and '00s could be found on the soccer fields, grocery stores, and "family hangouts," where will we find the connectors of tomorrow? And where will the mavens of tomorrow find their information?

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ASSOC. EDITOR, CONTINUED FROM 533

If social media is indeed the new form of communication, how then will the traditional "word of mouth" referral process transform in the future?

Qualman defines social media networking as "listening first and selling second." His effective and popular YouTube video, "Social Media Revolution 2," drives Qualman's point home: "We don't have a choice on whether we do social media, the question is how well we DO it." Only 14 percent of the population trusts advertisements, while 78 percent of consumers trust recommendations from friends and family.[2] He forecasts that the return on investment of social media outreach will continue to be present in five years.[2]

So here lies the difference between the '80s, '90s, '00s, and the future. The friends and family who used to pick up the phone to relay their suggestion for a good dentist may now send a message on Facebook.

The Internet seems to be the new version of the MCI octopus-style friends and family network. It may even be the new style of *Consumer Reports*. More and more online doctor rating websites are being utilized.

Healthgrades.com is a physician-rating site that allows patients to grade a doctor on everything from "office cleanliness to a physician's listening skills."[4] The founder of another website, Angie's List (which grades everything from hair salons to roofing companies), Angie Hicks points out that online ratings are only "one data element among many" for patients to learn more about their potential doctors. Hicks believes these websites bring "the over-the-back-fence kind of recommendation" that our patients desire.[5]

Television news networks like CNN recognize the trend. CNN.com recently published an article about utilizing online rating websites titled, "How to Find Doctors Online." It offers patients five tips: Determine what kind of doctor you need and what factors will affect your decision; read as many reviews as possible; look for specifics, rather than derogative, personal comments; look for similar sentiments, i.e., five similar comments are "statistically more meaningful" than five comments on disparate issues; look for other objective information as well.[4]

If social media is indeed the new form of communication, how then will the traditional "word of mouth" referral process transform in the future?

However, a 2008 study funded in part by the Robert Wood Johnson Foundation found that only about 11 percent of patients base their choice of doctor on online rating websites whereas more than 50 percent of patients rely on the traditional word-of-mouth method of asking their friends and family for a recommendation.[6]

In California, many of us have been reviewed on doctoroogle.com, yelp.com, and ratemds.com.[7] Those who are happy with their care will refer friends and will post positive comments. Those who are not satisfied with their treatment may post negative comments openly. It may be the result of miscommunication or the result of personalities not working well together. Thus, effective communication between everyone involved in treatment, including the patient, staff, the doctor, and specialists, is important.

According to a TDIC *RM Matters* article, it may not be best to publicly respond or refute the claim on a website. "There is a common misconception that once the patient has divulged private information, his disclosure protects you from violating the patient's privacy rights if or when you reply," warns author and TDIC risk management analyst, Carla Christensen.[7]

Making a professional business page on a social networking website involves a different thought process than making a personal page. It is essentially a business decision. Social media can be another business tool. Thus, we may have much to learn about social media. Many attended the *CDA Presents* Anaheim continuing education course, "Five Simple Tips to Utilize Social Media in Marketing Yourself and Your Practice" on May 15. Though new dentists may be more likely to have a Facebook page, many may not know how to present their professional self online, so many attended the ADA New Dentist Conference's session on "Utilizing Social Media Effectively" in San Diego on June 24.

We are all trying to figure it out. How does this new form of communication work? Where do we fit in? How do we navigate through the twists and turns of negative and positive online reviews? Do our offices have to take the plunge, bite the bullet, and dive into the world of social media, or at least make a Facebook page? ■■■■

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Address comments, letters, and questions to the editor to kerry.carney@cda.org.

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Reader Takes Exception to Article

This is in response to "Implementation Strategies for Incorporating New Technologies Into the Dental Practice," (*Journal of the California Dental Association* 38(5):337-41, May 2010).

Ethical behavior is at least lawful behavior. Is the provider who cuts 30 crowns a month and is thinking of rebranding his/her practice in order to increase that number engaged in ethical behavior? One measure of that is informed consent. The molar with the large MOD amalgam can be restored with another amalgam, a resin, a cast gold restoration, a PFM, and a milled restoration. Is there a signed, dated, and descriptive document showing this? Preop images? Or rather, is it like the *New Yorker* magazine cartoon that shows a married couple reading the fine print on a bottle of medicine in a drug store: "The active ingredient is marketing"?

I would have preferred that this article be written on an ethical scaffolding. It isn't that marketing per se is bad, because it's not. But the questions of ethics should permeate: Does the marketing perspective espoused comport with ethical practice? For example, 30 was the number given as the number of restorations that can be converted per month to CAD/CAM. Converted how? By informed consent or by marketing sans consent? Thirty crowns per month is 360 crowns per year. The average patient load is about 2,000 per practice, which means 18 percent get a crown per year. At this rate, within six years, all of the practice's patients on average would get one crown. Then, start over again. Does this activity come from existing pathology or from a business model? And this just comes from the restorations that can be converted and says nothing about the others that can't. The implicit assumption is that the process is completely ethical. If that is so, then why not state at the article's beginning that lawful and ethical standards were applied, similar to the peer-reviewed articles that explicitly state that patient consent was garnered prior to the study. By its silence, it sets a standard of business, not a standard of care.

Ethical consideration introduces conflict and thought, which may result in better behavior. The arrow of causality clearly moves from consent to profit loss. The antagonism between ethics and marketing, were it introduced in this article, is my preference.

RICHARD T. FURZE, DDS
Fresno, Calif.

Author Responds to Letter

A point of advice I offer to my students or audiences during C.E. presentations is to be wary of any new technology becoming their "hammer." That is, to a hammer, everything must look like a nail.

The danger of spending a large sum of money on a piece of equipment is that the purchaser may run the risk of unwittingly pursuing justification for the dollars spent. In other words, all teeth may start to look like they need a milled indirect restoration if the doctor is sitting on an expensive CAD/CAM system, or all frenum may seem to need a frenectomy after the purchase of the latest hard-/soft-tissue laser.

New technology implementation must first and foremost advance oral health care delivery and improve outcomes. However, if such improvement is inversely proportional to practice profitability, it is naïve to expect adoption.

The example of 30 converted restorations for the sake of an ROI analysis was not implying that these were teeth not needing an indirect restoration. It was simply a variable plugged in for calculation demonstrations. In other words, what is the cost analysis if these crowns are milled in house versus being lab-fabricated? In fact, the strong suggestion was made to input numbers below existing monthly procedural averages for the sake of decision confidence. The decision may just as likely be to not go forth with purchase once an analysis is performed but the calculation is simply a tool. It possesses no ethics, personality, or ulterior motive.

A hypothetical article titled "Does the Justification of Expensive Technologies Introduced Into Practice Cloud Practitioner Ethics?" would certainly be interesting to both the reader and myself.

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Matt Mullin

People With Moebius Syndrome Show Improved Adjustment to Facial Disorder

BY PATTY REYES, CDE

A scowl, a grin, and even a mouth agape with widened eyes are emotional billboards on our faces. These facial expressions not only convey our feelings and reactions, they can bridge language barriers and play a role in social interaction.

Does this mean those with Moebius syndrome, which causes bilateral facial paralysis, are at a disadvantage? Not so, according to a new study recently published in *The Cleft Palate — Craniofacial Journal*.

New research has found that those who have Moebius syndrome are better adjusted now than previously reported. The authors attributed the departure from the original study due to a more varied and larger sample as they were able to conduct the study online with subjects participating across the country and nearly 40 individuals with the neurological dis-

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Survey: Parents Unaware of Proper Infant Oral Care

A tickle. Cooing. Funny faces. These are things parents do to make their baby grin from ear to ear. However, according to a recent American Academy of Pediatric Dentistry survey, a stupefying 97 percent of parents are poorly informed about how critical at-home care and dental visits are to their infant's healthy smile.

"Oral health is absolutely critical for overall health," said William C. Berlocher, DDS, MA, AAPD president. "Parents know the value of early visits to the pediatrician, but it's alarming to learn how few parents understand that infants need to see the pediatric dentist before their first birthday, even before baby teeth appear."

Ninety-seven percent of those surveyed didn't know their children should have gone to a pediatric dentist before they blew out their first birthday candle, leaving the infants susceptible to tooth disease and decay, which can start as early as age six months when the first teeth typically surface.

Teeth can be destroyed, lead to needless pain and suffering, infection, loss of function, increased health care costs, and lifelong health consequences if the teeth are left untreated, the AAPD said.

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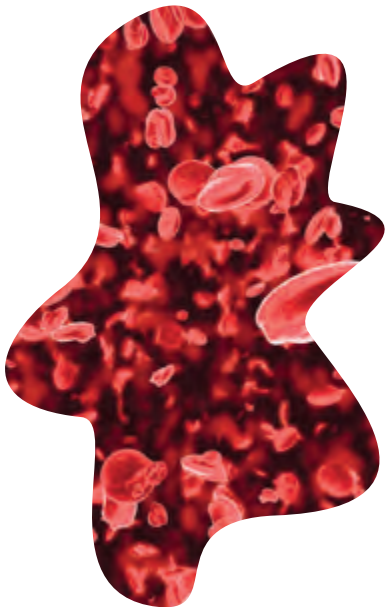


Platelet-Rich Plasma Hastens Healing, Bone Growth

Rapid healing and formation of bone seem to be the result when platelet-rich plasma is used following tooth removal, according to an article in the *Journal of Oral Implantology*.

Radiography techniques were used to determine bone changes in patients following the surgical removal of molars, in particular, the bilateral mandibular third molar. In each patient, one extraction site was treated with PRP, the other was not and was used as a control. In this study, three patients received PRP on the right side; three on the other side. Early radiographs showed a major increase in bone density in the sites treated with PRP.

"The PRP treatment had a positive effect on bone density immediately following tooth extraction," the authors said, further commenting that the control sites had a decrease in bone density during the first week after surgery and after two weeks, both sites had relatively parallel increases in bone density.

"It took approximately six weeks for the control sites to reach the same bone density that the PRP-treated site had reached by week 1," authors said. "The immediate start of bone formation seen with PRP treatment is of clinical relevance because it is the initial two weeks following bone-manipulation oral surgery that are important."

Additionally, patients did not report significant differences in their perception of pain, bleeding, numbness, facial edema, or temperature between the different sites, according to the study. What's more, patients who need immediate dental implants or prostheses could benefit from the higher rate of bone formation since the current wait of four to six months could be cut to two to four months when PRP is used.

While there are some reports that PRP doesn't have an effect on bone formation, other studies have found otherwise. In the article, Rutkowski et al. hypothesized that it is in the preparation and what time points used for measurements that have an effect on the results of bone formation.

Burgeoning Demographic Using More Dental Services

With the United States on a swift trajectory where one in five residents will be 65 and older, there's a concern this will challenge the entire health system, including dental care.

In an issue of the *New York State Dental Journal*, Drs. H. Barry Waldman and Mary Rose Truhlar said many dental practitioners have had limited formal predoctoral and continuing education courses specifically emphasizing the care of geriatric patients. And when it comes to the particulars of dental services for older people, there are many preconceptions that must be overcome.

According to the authors, edentulism has declined by 10 percent in each of the past three decades and the periodontal condition of the remaining teeth has improved, with declines in gum recession, pocket depth, and attachment loss in all demographic groups of senior citizens. Root caries has dropped too.

Additionally, Waldman and Truhlar noted that despite this older generation's limited coverage by dental insurance, they are using more dental services than ever before. The median annual expenditure for general dentistry visits for older adults was $240 in 2004, compared to $188 for people under the age of 65.

"Dental care for the increasing older population (more than half of which currently seek oral health services) is potentially too multifaceted to rely solely on "tried and proven" past efforts when partial and full dentures were the endpoint of the most frequent treatment planning options," the authors said.

MOEBIUS SYNDROME, CONTINUED FROM 539

order. Data was compared to an age- and gender-matched control group.

It is difficult to estimate how many new cases are diagnosed a year since not all people contact the foundation, said Vicki McCarrell of the Moebius Syndrome Foundation, adding the organization had 113 new contacts in 2009: 97 from parents of children with the disorder; 16 of them adults with the condition. McCarrell said the foundation has 1,200 individuals on their mailing list, approximately 1,000 of them living in the United States, and an estimated 2,000 cases worldwide identified at this point.

The cause of the disorder is underdevelopment of facial nerves. Genetics are suspected and research continues in the hope of identifying the genes. All individuals with Moebius syndrome have sixth and seventh cranial nerve involvement but not all have limb involvement. "By definition all people with Moebius syndrome have bilateral or unilateral facial paralysis, lack of lateral eye movement, and lack of blinking," McCarrell explained. "About half have hand/arm/feet/leg involvement and half of babies born with Moebius syndrome are born with club feet."

Some of the characteristics are an infant's inability to suck and smile, a child's inability to track an object with one eye, an absence of facial expressions, and crossed eyes, according to the National Craniofacial Association.

A rare, nonprogressive disorder that emerges early on in prenatal life, Moebius syndrome can cause weakness or malformation of the tongue. Speech problems and difficulties with gross motor skills stemming from Moebius syndrome typically are treated through speech and physical therapy.

Other health issues range from breathing difficulties, an inability to hear well or being overly sensitive to noise, and from eye sensitivity to bright lights, and delayed milestones such as crawling and walking because of inadequate muscle tone.

Early Exposure to Antibiotics May Lead to Early Childhood Caries

An increased risk of early childhood caries has been found in children taking systemic antibiotics in their first year of life.

In a study, published in *Oral Health*, authors Sumer M. Alaki, DDS; Brian A. Burt, PhD, MPH, BDSc; and Susan L. Garetz, MD, MS, said that after the child's first year, those who took systemic anti-biotics at age 13 to 18 months demonstrated a considerable increase in the risk of early childhood caries compared to their counterparts who did not take the medication.

Among the explanations is children on this medication are not as healthy as children not on antibiotics. Additionally, some medications have a high sugar content, the authors said, adding another possibility for the increased risk is these antibiotics may cause environmental and ecological changes in the mouth from consistent exposure to sugar contained in the medications, thus paving the way for the colonization of mutans streptococci.

Earlier research had included those with comparable afflictions such as Bell's palsy and concluded that those with the rare congenital condition were anxious, suffered from depression, and felt unsatisfied with their life in comparison to a control group. However, new research looked at the factors of anxiety, depression, and social skills as they relate to Moebius syndrome.

"Many people with the condition live professionally and personally successful lives," the authors said.

While those with the condition demonstrated a decreased ability socially, they were on par with their counterparts in the control group in the areas of depression, anxiety, or their satisfaction level with life, according to the new study. Researchers said that individuals with Moebius syndrome correctly identified emotions in others at the same rate as those without the condition. They also were able to compensate for their lack of facial expression by "using eye contact to display confidence and prosody, body language, and verbal disclosure to express emotion," said authors.

McCarrell said it varies at what age a person is diagnosed. "More and more babies are being diagnosed at birth but not all. I still get emails from parents whose children are diagnosed at age 3 and older. We've had adults contact us who just realized what they have after seeing something on TV or reading an article in a magazine or newspaper.

"Thanks to the Internet and more interest by the media, people with Moebius syndrome are more easily able to find information," McCarrell said. The foundation recently held its ninth annual Moebius Syndrome Conference in Denver. More than 400 people from all over the world attended to hear presentations from physicians, researchers, and therapists who work with people with Moebius syndrome.

The National Craniofacial Association advocates treatment by a qualified craniofacial medical team. There currently are 32 such teams in 20 states, and the District of Columbia, as well as in Canada.

To see the entire article, "Living With Moebius Syndrome: Adjustment, Social Competence, and Satisfaction With Life," go to www2.allenpress.com/pdf/cpcj47.2FNL.pdf.

Third Annual World Oral Health Day Held

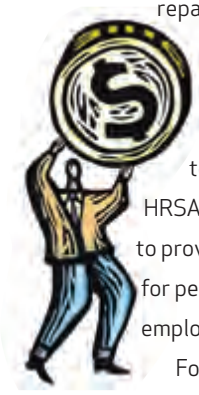
The FDI World Dental Federation will celebrate its third annual "World Oral Health Day" on Sunday, Sept. 12, in an effort to boost oral health awareness and the effects oral diseases have on one's health and well-being.

Caries is common and rampant, especially among the underserved population and children. One of the consequences of untreated dental disease is unnecessary suffering and pain. Difficult pregnancies, other ailments, and diabetes has been associated with periodontal diseases.

Sept. 12, was chosen as the celebration date to honor the birthday of Dr. Charles Godon, FDI founder, as well as commemorate oral health days around the world that already were in place, and the anniversary of the groundbreaking World Health Organization's International Conference on Primary Health Care, which took place Sept. 12, 1978, in Alma Ata, Kazakhstan.

Government Loan Repayment Program Now Available

The Health Resources and Services Administration will select degree-trained professionals with underprivileged backgrounds to serve on the faculty of accredited universities and colleges. In exchange for two years' service, the individuals will receive up to a $40,000 loan repayment on their student loans.



This program is the government's way to recruit health professionals to serve tomorrow's practitioners. HRSA has $2.5 million available to provide loan repayment awards for pediatric dentists who are employed as faculty members.

For more information, call the HRSA call center, 800-221-9393; to obtain the application, go to: hrsa.gov/loanscholarships/repayment/faculty.

UPCOMING MEETINGS

2010	
Aug. 20-21	World Congress of Minimally Invasive Dentistry 11th annual conference, San Diego, wcmidentistry.com.
Sept. 2-5	FDI Annual Dental World Congress, Salvador, Brazil, congress@fdiworldental.org.
Sept. 9–11	*CDA Presents The Art and Science of Dentistry*, San Francisco, 800-CDA-SMILE (232-7645), cdapresents.com.
Oct. 9-12	ADA 151st Annual Session and World Marketplace Exhibition, Orlando, ada.org/goto/session.
Oct. 24–27	National Primary Oral Health Conference, Kissimmee/Orlando, nnoha.org/conference/npohc.html.
Nov. 7–13	United States Dental Tennis Association, Grand Wailea, Hawaii, dentaltennis.org.
2011	
May 12-14	*CDA Presents* the Art and Science of Dentistry, Anaheim, 800-CDA-SMILE (232-7645), cdapresents.com.
Sept. 22-24	*CDA Presents* the Art and Science of Dentistry, San Francisco, 800-CDA-SMILE (232-7645), cdapresents.com.
Sept. 22-24	United States Dental Tennis Association, Palm Desert, Calif., dentaltennis.org.

To have an event included on this list of nonprofit association continuing education meetings, please send the information to Upcoming Meetings, CDA Journal, 1201 K St., 16th Floor, Sacramento, CA 95814 or fax the information to 916-554-5962.

Gene in Cleft Lip, Palate Identified

Researchers have identified a gene that is key in cleft lip and cleft palate cases and recently published their findings in *Human Molecular Genetics*.

"The American Association of Orthodontists Foundation is pleased to have helped sponsor this ground-breaking research. Its findings have the potential to lead to the prevention or improved treatment of cleft lip and cleft palate, which affects thousands of infants annually all over the world," said Stephen E. Hershey, DDS, MA, MS, president of the AAOF. "We are particularly pleased that two AAO members have played pivotal roles in this research."

Andrew Lidral, DDS, PhD, an AAO member and professor of orthodontics at the University of Iowa College of Dentistry, was the senior author of the study and Lina Morena, DDS, PhD, an AAO member who serves as an assistant professor in the Department of Orthodontics at UI was the study's co-leader, which involved a team of international scientists on four continents.

Morena received a three-year award from the AAOF. "The AAOF Board of Directors felt Dr. Morena's proposal was strong and warranted our support. This is tangible evidence that our mission to support education and research is contributing to the greater good of humanity," said Hershey.

Grants from the March of Dimes, the Cleft Palate Foundation, and the National Institutes of Health also funded the research.

UI researchers had previously identified a segment of the human genome, called chromosome 9, as the location of an important genetic cause of cleft lip and cleft palate, according to a news release. With additional analysis and research from affected families, researchers identified a single gene on chromosome 9 as a root cause of these common birth defects. Known as FOXE1, this gene seems to contribute to cleft lip with or without cleft palate, and to isolated cleft palate. These two forms of clefting originally were thought to occur from different genetic abnormalities.

While it is known that FOXE1 has a role in the formation of the thyroid, more needs to be discovered how FOXE1 abnormalities cause clefting and its role in the formation of the palate and lip.

CDA JOURNAL, VOL 38, Nº8

AAP Calls for Evaluation of Periodontal Health in the United States

The American Academy of Periodontology recently provided testimony on periodontal disease to the Centers for Disease Control and Prevention's Division of Oral Health. This testimony, a component of the strategic planning process for 2011-2014, demonstrates a longtime collaboration of the two agencies' effort to create a program that clarifies the frequency of periodontal disease in the United States.

Current data indicates periodontal disease may be two to three times higher than earlier estimates.

"Periodontal disease is a serious public health issue that may have a significant impact on the overall wellness of the U.S. population," said Samuel Low, DDS, MS, associate dean and professor of periodontology at the University of Florida College of Dentistry, and president of the American Academy of Periodontology. "Therefore, the AAP greatly appreciates the opportunity to provide this testimony to the CDC. We look forward to continued collaboration with the CDC Division of Oral Health to assess the prevalence of periodontal disease, and optimistically, to increase public awareness of the importance of healthy teeth and gums."

The AAP recommended the CDC prioritize resources to study and confirm the results of the 2009-2010 National Health and Nutritional Examination Survey, which includes self-report questions on periodontal health as well as a complete periodontal examination, according to a news release. The information is crucial in creating a baseline of the country's perio health status, especially since research has linked the disease to conditions such as diabetes and cardiovascular disease.

Additionally, the AAP also recommended, that to promote public awareness of periodontal disease and its effect on one's overall health, partnerships with other stakeholder agencies should be formed.

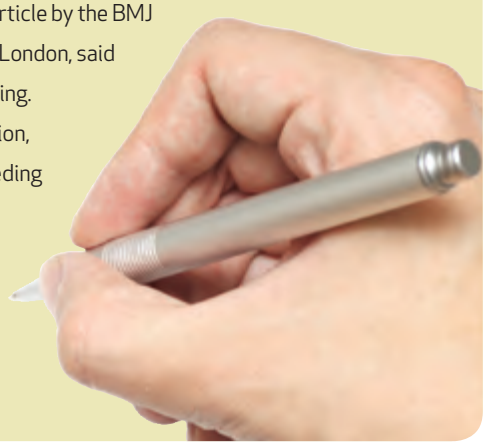
Prominent Wellcome Centre to Close, Petition to Save Facility Launched

Allegations of mismanagement and quibbling over financial support have felled the world-renowned Wellcome Trust Centre for the History of Medicine at the University College London, (UCL), which also includes the themes of dentistry.

In an April 15 statement, the UCL and the Wellcome Trust said they had settled "with regret" to "work toward" closing the center by Sept. 30, 2012. The mutual decision came on the heels of "discussions between the senior staff of both organizations and consideration by the board of governors of the Wellcome Trust."

The trust and UCL announced on March 31 that they had intended to withdraw funding from the center. No formal reasons were given by the trust for the closure, however, an article by the BMJ Group, which publishes the *British Medical Journal*, and is located in London, said there were allegations of mismanagement and arguments over funding.

An online petition is calling for the trust to re-evaluate its decision, restore the independent peer-review process, and allow any succeeding center to remain located in the Wellcome building. "We call upon UCL to maintain the history of medicine as a visible entity within College serving both historians and medics," according to the petition, Save History of Medicine at UCL, which is posted at petitiononline.com/WTCHOM/petition.html.



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THE ART AND SCIENCE OF DENTISTRY

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Please note **new** days: Thursday – Saturday, September 9 – 11, 2010

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HIGHLIGHTS

HAPPY HOUR

The show has new days (Thursday - Saturday) and we're hosting a party to celebrate.

SPEAKERS

Drs. Henry Gremillion, DeWitt Wilkerson, Sascha Jovanovic, and Bill Blatchford will spark your curiosity and expand your mind.

MOMA PARTY

Designed by famed architect Mario Botta, SFMOMA provides the ideal backdrop to enjoy a delectable buffet before you peruse the museum's current exhibits.

SF ATTRACTIONS

If the food, art, music, and culture aren't enough to lure you to San Francisco, remember, there's always the fabulous shopping.

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EXHIBIT HALL INFORMATION

Visit cdapresents.com to maximize your tradeshow experience.

CDA Presents will feature more than 400 exhibiting companies showcasing the latest in dental technology, products and services. Stay ahead of the curve by checking out the innovative new products being launched in the exhibit hall.

Please note **new** days: Thursday – Saturday, September 9–11, 2010

To celebrate our new convention days, we are hosting a happy hour in the exhibit hall on Thursday, 4:30–6 p.m. Complimentary refreshments will be served.

Grand Opening

Thursday, 10 a.m.

New Exhibit Hall Days and Hours

Thursday, Sept. 9, 10 a.m.–6 p.m.
Friday, Sept. 10, 9:30 a.m.–5:30 p.m.
Saturday, Sept. 11, 9:30 a.m.–4 p.m.

Exhibit Hall Happy Hour

Thursday, 4:30–6 p.m.

Family Hours

Daily, opening of exhibit hall until noon.

EXHIBITORS LIST

1-800-DENTIST 1143
3M ESPE Dental Products 1426
A. Titan Instruments 1935
Accutron, Inc. 1010
Acteon North America 1434
ADA Members Retirement Program 612
A-dec 1108
Afghanistan Dental Relief Project 406
Air Techniques 1010
ALCO Professional Supplies 1443
AllPro 2030
Almore International Inc. 1212
AMD LASERS 2316
American Eagle Instruments 1735
American Express OPEN 609
Anthem Blue Cross 1640
Aribex Inc. 2040
Art 4 Your Practice 944
Aseptico 1302
Ashtel Dental 1543, 2410
Associated Dental Dealers 1326
AXIS Dental 1811
Back Designs/Salli Systems/Health By Design 2226
Banc of America Practice Solutions 920
Bank of America Card Services 918
Beaverstate Dental Inc. 621
Bell Dental Products LLC 2219
Belmont Equipment 1820
Best Instruments USA 2143
Bien Air Dental 1836
BioHorizons 2038
BIOLASE Technology Inc. 1842
Biotec Inc. 1307
Bisco Dental Products 2026
Blatchford Solutions 515
Bosworth Company 1322
BQ Ergonomics LLC 2409
Brasseler USA 1216
Brewer Design 1613
Burbank Dental Laboratory 2402
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California Bank & Trust 527
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California Dental Association 802
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Central Data Storage 514
Centrix Inc. 818
CIT Small Business Lending 2118
ClearCorrect Inc. 736
Clinician's Choice Dental Products Inc. 1340
COBE Construction Inc. 942
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Comlite Systems 1636
Common Sense Dental Products 1337
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Consult-Pro 1444
ContacEZ 844
Cosmedent Inc. 1320
Cosmetic Dentist 411.com 2228
Cranberry USA Inc. 1635,1933
CRYSTALMARK Dental Systems 535
Curaprox USA 509
CustomAir 1028
D4D 1726
Danville Materials/Engineering 814
Darby Dental Supply LLC 2016
Datacon Dental Systems 1631
DCI Equipment 1712
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DentalXChange - EHG Inc. 916
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Dentrix - Henry Schein Practice Solutions 1725
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Dent-X 2216
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Designs for Vision Inc. 925, 2019
DEXIS Digital X-Ray 1520
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Disposabowl 2408
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DMG America 1243
Doc's Duds 838
DOCS Education 2210
DoctorBase 740
Doral Refining Corp. 1210
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Henry Schein Financial Services 1726
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OraPharma Inc. 2120
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PDT Inc./Paradise Dental Technologies 817
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Progeny - A Midmark Company 532
Proma, Inc. 1307
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PureLife Dental 734
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Quantum Inc. 402
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RF America 2017
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Ribbond Inc. 605
RNO Sales Associates 2128
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S & R Precision System 2419
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Second Story Promotions 836
Septodont Inc. 1932
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Shofu Dental Corporation 1626
SharperPractice 543
Sikka Software 843
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Smile Brands Inc. 544
Smile Reminder 603
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Soluna Medical LLC 833
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Suni Medical Imaging Inc. 2308
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SurgiTel/General Scientific Corp. 1940
Suter Dental Mfg. Co. Inc. 1922
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Vident 1236
Vista Dental Products 718
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VOCO America Inc. 640
Water Pik Inc. 1512
Wells Fargo Health Advantage 1915
West Coast Precious Metals Inc. 937
Western Practice Sales 711
Willamette Dental 728
XDR Radiology 2325
Yaeger Dental Supply 1326
Yodle 716
Zila, a TOLMAR Company 1328
Zimmer Dental 1541
Zions National Real Estate 513

HEADLINING SPEAKERS

Victoria L. Wallace, CDA, LDA (Roundtable)

Assistant Programs	Team FABULOUS!	Thursday workshop
	Totally Bonding! Simple and Easy Tips for a Great Adhesive Restoration	Friday morning lecture
	Tooth Whitening at Its Best? Absolutely!	Friday afternoon lecture
	White Done Right With Custom Fit Trays ... Let's Make Some Whitening Trays Workshop	Saturday workshop


Brian P. LeSage, DDS, FAACD; Edward A. McLaren, DDS

Esthetic Dentistry	Esthetic Continuum Workshop	Thursday and Friday two-day workshop

Sascha Jovanovic, DDS, MS

Implants	Hands-on Porcine Workshop: Optimal Implant Placement and Bone and Soft Tissue Grafting	Saturday workshop


Henry A. Gremillion, DDS; DeWitt C. Wilkerson, DMD

Occlusion	Two-Day Continuum Lecture: The Dynamics and Function of the Masticatory System: The Multiple (Inter)Faces of Occlusion	Thursday and Friday two-day lecture

John A. Svirsky, DDS, MEd

Oral Pathology	Cases Only a Mother Could Love	Thursday and Saturday morning lecture
	Drugs I Have Known and Loved for Diseases That We Catch	Thursday afternoon lecture
	Great Cases With New Faces	Saturday afternoon lecture

Jane A. Soxman, DDS

Pediatric Dentistry	Managing the Developing Dentition	Friday morning lecture
	Clinical Techniques in Pediatrics	Friday and Saturday afternoon lecture
	Becoming the Pediatric Alpha Pup	Saturday morning lecture

Robert C. Fazio, DMD

Periodontics	Antibiotics in Dentistry	Thursday morning lecture
	Medicine and Dentistry	Thursday afternoon lecture
	Periodontitis and Peri-implantitis: The Good, the Bad and the Ugly	Friday lecture

Harold L. Crossley, DDS, PhD

Pharmacology	Street Drugs Exposed: What Your Patients and Your Kids Are Not Telling You!	Friday lecture
	Avoid Liability: Know Your Patients' Medications and Their Impact on Dental Treatment	Saturday lecture

William Blatchford, DDS

Practice Management	Leadership Challenge: Playing Your "A" Game	Friday lecture
	Conversations With Patents That Work	Saturday morning lecture
	Growth Strategies — Marketing, Acquisitions and Transitions	Saturday afternoon lecture

Mark A. Latta, DMD, MS

Restorative Dentistry	Essentials for Creating Stratified Anterior and Posterior Direct Composites	Friday lecture
	Direct Anterior Composite Veneers/ Posterior Resin Restoratives	Saturday workshop

Schedule at a Glance

Thursday, September 9, 2010

		BLDG.	ROOM		CE/CAT	
Required Courses						
California Dental Practice Act (001)/$20	7-9 a.m.	MS	305/307	R. Thomason	2.0/C	D, H, A
Infection Control (002) /$20	7-9 a.m.	MS	306/308	E. Cuny	2.0/C	D, H, A
Corporate Forums						
Invisalign Clear Essentials I (051)/$1,695	8 a.m.-5 p.m. (Break noon-1 p.m.)	MS	206	R. Sterental	8.0/C	D, H, A
Understanding Cone Beam Computer Tomography by PracticeWorks	10 a.m.-noon	MS	301	D. Gane	2.0/C	D, H, A ,O
Express Lectures						
The Nuts and Bolts of Record-Keeping and Documentation: From Patient Care to Procedure Coding	8:30-10 a.m.	MS	304	S. Balikov	1.5/C	D, H, A, S, O
Risk Management in Cosmetic Dentistry	10:30 a.m.-noon	MS	304	B. Ray	1.5/%	D, H, A
Treating Obstructive Sleep Apnea and TMJ Disorders	1-2:30 p.m.	MS	304	D. Shirazi	1.5/C	D, H, A, S, O, M
Creating a "World Class" Practice by Providing "World Class" Services in Hygiene	3-4:30 p.m.	MS	304	W. Briggs	1.5/%	D, H, A, S, O
Workshops						
Intraoral Impression Scanning – Demonstration and Workshop (013)/$145	9-11:30 a.m.	MS	256	P. Feuerstein	2.5/C	D, S, L
Exodontia Techniques Workshop – A.M. (007)/$250	9:30 a.m.-12:30 p.m.*	MS	236/238	J. Alonge	3.0/C	D
Never a Dull Moment – Periodontal Instrument Sharpening Workshop – A.M. (009)/$85	9:30 a.m.-12:30 p.m.*	MS	250	N. Andrews	3.0/C	H, A
Everyday Smile Makeovers: Two- Day Continuum (011)/$850	9:30 a.m.-5 p.m. (Break 12:30-2 p.m.)	MS	228/230	B. LeSage, E. McLaren	6.0 Th./C 6.0 Fr./C	D
Team FABULOUS (012)/$45	10 a.m.-4:30 p.m. (Break 12:30-2 p.m.)	MS	300	V. Wallace	5.0/%	D, H, A, O, S, M
New Technology for the Dental Practice – Demonstrations and Workshop (014)/$85	12:30-3 p.m.	MS	256	P. Feuerstein	2.5/C	D, H, A, S
Exodontia Techniques Workshop – P.M. (008)/$250	2-5 p.m.*	MS	236/238	J. Alonge	3.0/C	D
Never a Dull Moment – Periodontal Instrument Sharpening Workshop – P.M. (010)/$85	2-5 p.m.*	MS	250	N. Andrews	3.0/C	H, A
Lectures						
Sugar-Savvy Training	9-10 a.m.	MS	302	D. Fujii	1.0/C	D, H, A, S
Cases Only a Mother Could Love	9:30 a.m.-noon	MS	306/308	J. Svirsky	2.5/C	D, H, A, S
Software on Steroids: Taking IT to the Chair	9:30 a.m.-noon	MS	309	C. Levato	2.5/C	D, H, A, S, O
Understanding the Concept of Endodontics	9:30 a.m.- 4 p.m. (Break noon-1:30 p.m.)	MS	303	R. Wong	2.5/C 2.5/C	D, H, A, S

Thursday, (lectures continued)

		BLDG.	ROOM		CE/CAT	
Two-Day Continuum Lecture: The Dynamics and Function of the Masticatory System; The Multiple (Inter)Faces of Occlusion	9 a.m.-4:30 p.m. (Break noon-1:30 p.m.)	MS	310	H. Gremillion, D. Wilkerson	3.0/C 3.0/C	D, H, A, S, L
Antiobiotics in Dentistry	10 a.m.-12:30 p.m.	MS	305/307	R. Fazio	2.5/C	D, H, S
Neck, Back and Beyond: Preventing Pain for Peak Productivity	10:30 a.m.-1:30 p.m.	MS	105	B. Valachi	3.0/%	D, H, S
From My Side of the Chair	10:30 a.m.-5 p.m. (Break 1-2:30 p.m.)	MS	106	S. Pace	2.5/C 2.5/C	D, H, A, S, L, O
Implant Dentistry 'Expected Not Experimental' Your Role as a Co-therapist	10:30 a.m.-5 p.m. (Break 1-2:30 p.m.)	MS	100	L. Wadsworth	2.5/C 2.5/C	D, H, A, S, O
The 13 Components of a Thriving Practice in This Economy	10:30 a.m.-5 p.m. (Break 1-2:30 p.m.)	MS	101	K. Behrendt	none	G
Drugs I Have Known and Loved for Diseases That We Catch	1:30-4 p.m.	MS	306/308	J. Svirsky	2.5/C	D, H, A, S
Software on Steroids: Value-Added Software Applications	1:30-4 p.m.	MS	309	C. Levato	2.5/%	D, H, A, S, O
Medicine and Dentistry	2-4:30 p.m.	MS	305/307	R. Fazio	2.5/C	D, H, S
Fighting Plaque With a Healthy Back: Musculoskeletal Health for the Dental Assistant	2:30-5:30 p.m.	MS	105	B. Valachi	3.0/%	A

Friday, September 10, 2010

		BLDG.	ROOM		CE/CAT	
Required Courses						
California Dental Practice Act (003)/$20	7-9 a.m.	MM	Salon 7	R.Thomason	2.0/C	D, H, A
Infection Control (004)/$20	5-7 p.m.	MS	306/308	N. Andrews	2.0/C	D, H, A
Workshops						
CAMBRA Workshop: Taking Your Practice to the Next Level (015)/$60	8:30 a.m.-12:30 p.m.	MS	206	D. Gerger, M. Hurlbutt, B. Novy	4.0/C	D, H, A
Intraoral Impression Scanning – Demonstration and Workshop (025)/$145	9-11:30 a.m.	MS	256	P. Feuerstein	2.5/C	D, S, L
Embezzlement: For Your Eyes (and Ears) Only (016) DDS/$50 (017)/DDS and spouse/$75	9 a.m.-noon	MS	250	S. Gunn	3.0/%	D, M
Establish the Office of Your Dreams (020)/$75	9 a.m.-3:30 p.m.	ICH	Telegraph Hill	Industry Speakers	none	D
Esthetic Provisionals – A.M. (021)/$185	9:30 a.m.-noon*	MS	232/234	S. Pace	2.5/C	D, A, S
Good Intentions – Bad Outcomes (023)/$50	9:30 a.m.-12:30 p.m.*	MM	Nob Hill	B. Kodama, A. Curley	3.0/%	G
Understanding the Concepts of Endodontics – Hands-on Workshop (019)/$385	9:30 a.m.-4 p.m. (Break noon-1:30 p.m.)	MS	236/238	R. Wong	5.0/C	D, A, S

KEY

Audience	**A** Assistant | **D** Dentist | **G** General | **H** Hygenist | **L** Lab Tech | **M** Misc (accountants, specialists, spouse) | **O** Office Staff | **S** Dental Student
Building	**DSD** Dugoni School of Dentistry | **ICH** Inter Continental Hotel | **MM** Marriott Marquis | **MS** Moscone South Convention Center
CE/Cat.	* Course Repeats | % = 20% | C = Core

Friday (workshops continued)		BLDG.	ROOM		CE/CAT	
Two-Day Continuum: Everyday Smile Makeovers (011)/$850	9:30 a.m.-5 p.m. (Break 12:30-2 p.m.)	MS	228/230	B. LeSage, E. McLaren	6.0 Th./C 6.0 Fr./C	D
New Technology for the Dental Practice – Demonstrations and Workshop (026)/$85	12:30-3 p.m.	MS	256	P. Feuerstein	2.5/C	D, H, A, S
Esthetic Provisionals – P.M. (022)/$185	1:30-4 p.m.*	MS	232/234	S. Pace	2.5/C	D, A, S
Advanced QuickBooks in Your Practice (018)/$140	1:30-4:30 p.m.	MS	250	S. Gunn	3.0/%	D, H, A, S, L, O, M
Good Intentions – Bad Outcomes (024)/$50	2-5 p.m.*	MM	Nob Hill	B. Kodama, A. Curley	3.0/%	G
Lectures						
5 Reasons Why You Should Not Overlook Long-Term Care Insurance	7:30-8:30 a.m.	ICH	Laurel Hill	M. Carlson, P. Trehub	none	D
The Practice's Annual Exam	9 a.m.-noon	MS	302	S. McKenzie	3.0/%	D, H, A, O
Two-Day Continuum Lecture: The Dynamics and Function of the Masticatory System; The Multiple (Inter)Faces of Occlusion	9 a.m.-4:30 p.m. (Break noon-1:30 p.m.)	MS	304	H. Gremillion, D. Wilkerson	3.0/C 3.0/C	D, H, A, S, L
Changing Incidence, Risk Factors and Screening Modalities for Oral Cancer – A.M.	9:30 a.m.-noon*	MS	301	M. Cruz, D. Wong	2.5/C	D, H, A, S
Cosmetic Hygiene "From Now to Wow"	9:30 a.m.-noon	MS	100	S. Pietrantonio Lodding	2.5/%	D, H, A, S, O
Software on Steroids: Complete Web-Based Practice Management	9:30 a.m.-noon	MS	300	C. Levato	2.5/%	D, H, A, S, O
The 12 Most Effective Dental Marketing Tactics for the Exceptional Practice	9:30 a.m.-noon	MS	101	K. Behrendt	none	G
Third-Party Payer Administration of Patients' Benefits and Reimbursement	9:30 a.m.-noon	MS	270-276	G. Alterton, G. Dougan	2.5/C	D, O
Totally Bonding! Simple and Easy Tips for a Great Adhesive Restoration	9:30 a.m.-noon	MS	306/308	V. Wallace	2.5/C	D, H, A, S
Neck, Back and Beyond: Preventing Pain for Peak Productivity	9:30 a.m.-12:30 p.m.	MS	105	B. Valachi	3.0/%	D, H, S
Essentials for Creating Stratified Anterior and Posterior Direct Composites	9:30 a.m.-4 p.m. (Break noon-1:30 p.m.)	MS	106	M. Latta	2.5/C 2.5/C	D, S
Periodontitis and Peri-implantitis: The Good, the Bad and the Ugly	9:30 a.m.-4 p.m. (Break noon-1:30 p.m.)	MS	310	R. Fazio	2.5/C 2.5/C	D, H, S
Street Drugs Exposed: What Your Patients and Your Kids Are Not Telling You	9:30 a.m.-4 p.m. (Break noon-1:30 p.m.)	MM	Salon 7	H. Crossley	2.5/C 2.5/C	G
Protecting Your Practice...and Your Patients	10-11 a.m.	ICH	Laurel Hill	J. Caluza, P. Nelle	1.0/%	D, O, M
Day-to-Day Technology to Improve Your Practice – Or at Least Make You Geekier – A.M.	10 a.m.-12:30 p.m.*	MS	303	J. Flucke	2.5/C	D, H, A, S
Managing The Developing Dentition	10 a.m.-12:30 p.m.	MS	305/307	J. Soxman	2.5/C	D, H, A, S, O
Will You Still Need Me? Will You Still Treat Me When I'm 64? – A.M.	10 a.m.-12:30 p.m.*	MS	220-226	L. Niessen	2.5/C	D, H, A, O

Friday (lectures continued)

		BLDG.	ROOM		CE/CAT	
Leadership Challenge: Playing Your 'A' Game	10 a.m.-4:30 p.m. (Break 12:30-2 p.m.)	MS	309	W. Blatchford	2.5/% 2.5/%	D, H, A, O
Practice and Life Transitions – Estate Planning Basics – A.M.	10:30-11:30 a.m.*	ICH	Twin Peaks	B. Hoffman	none	G
Peer Review – a Membership Benefit	1-4 p.m.	MS	302	M. Thomas	3.0/C	D, H, A, O
Changing Incidence, Risk Factors and Screening Modalities for Oral Cancer – P.M.	1:30-4 p.m.*	MS	301	M. Cruz, D. Wong	2.5/C	D, H, A, S
Cosmetic Hygiene "From Now to Wow" Part Two: Technology	1:30-4 p.m.	MS	100	S. Pietrantonio Lodding	2.5/C	D, H, A, S, O
Eight Steps to Inspire Your Team to Sell More Dentistry	1:30-4 p.m.	MS	101	K. Behrendt	none	G
Software on Steroids: 3-D Diagnostic, Planning and Clinical Applications	1:30-4 p.m.	MS	300	C. Levato	2.5/C	D, H, A, S, O
Tooth Whitening at Its Best? Absolutely!	1:30-4 p.m.	MS	306/308	V. Wallace	2.5/C	D, H, A, S
Clinical Techniques in Pediatrics	2-4:30 p.m.	MS	305/307	J. Soxman	2.5/C	D, H, A, S, O
Day-to-Day Technology to Improve Your Practice – Or at Least Make You Geekier – P.M.	2-4:30 p.m.*	MS	303	J. Flucke	2.5/C	D, H, A, S
Will You Still Need Me? Will You Still Treat Me When I'm 64? – P.M.	2-4:30 p.m.*	MS	220-226	L. Niessen	2.5/C	D, H, A, O
Fitness 101 for Dental Professionals: Secrets for Comfort and Career Longevity	2-5 p.m.	MS	105	B. Valachi	3.0/%	D, H, S
Practice and Life Transitions – Estate Planning Basics – P.M.	2:30-3:30 p.m.*	ICH	Twin Peaks	B. Hoffman	none	G

Saturday, September 11, 2010

		BLDG.	ROOM		CE/CAT	
Required Courses						
Infection Control (006)/$20	7-9 a.m.	MS	306/308	N. Andrews	2.0/C	D, H, A
California Dental Practice Act (005)/$20	4-6 p.m.	MS	305/307	A. Curley	2.0/C	D, H, A
Workshops						
CPR – Traditional Renewal (027) Session 1/$70	7-9:30 a.m.*	MS	250	D. Barksdale	4.5/C	D, H, A, O, M
Good Intentions – Bad Outcomes (048)/$50	8-11 a.m.	ICH	Grand Ballroom C	B. Kodama; A. Curley	3.0/%	G
Direct Anterior Composites Veneers (040)/$375 (042) Full Day/$600	8:30 -11:30 a.m.	MS	236/238	M. Latta	3.0/C	D, S
Hands-on Porcine Workshop: Optimal Implant Placement and Bone and Soft Tissue Grafting – A.M. (036)/$325	8:30-11:30 a.m.*	MS	206	S. Jovanovic	3.0/C	D

KEY

Audience	**A** Assistant | **D** Dentist | **G** General | **H** Hygenist | **L** Lab Tech | **M** Misc (accountants, specialists, spouse) | **O** Office Staff | **S** Dental Student
Building	**DSD** Dugoni School of Dentistry | **ICH** Inter Continental Hotel | **MM** Marriott Marquis | **MS** Moscone South Convention Center
CE/Cat.	* = Course Repeats | % = 20% | C = Core

Saturday (workshops continued)		BLDG.	ROOM		CE/CAT	
Practice Transition Track (046) Junior Dentist/$75	8:30 a.m.-2 p.m.	ICH	Laurel Hill	W. van Dyk et al	none	D, S
Practice Transition Track (047) Senior Dentist/$75	8:30 a.m.-2 p.m.	ICH	Cathedral Hill	A. Wiederman et al	none	D
Head and Neck Anatomy With Dissection (035)/$595	8:30 a.m.-4 p.m. (Break 11:30 a.m.-1 p.m.)	DSD	Anatomy Lab	H. Gremillion, A. Budenz	6.0/C	D, H
Mini-Implants for the Edentulous Mandible (038) Participant/$1,295 (039) Observer/$495	8:30 a.m.-4 p.m. (Break 11:30 a.m.-1 p.m.)	DSD	Clinic B	G. La Barre	6.0/C	D, S, L
Changing Incidence, Risk Factors and Screening Modalities for Oral Cancer – Hands-on Workshop -- A.M. (031)/$325	9-11:30 a.m.*	MS	256	M. Cruz, D. Wong	2.5/C	D, H, A, S
Soft Tissue Lasers: Science and Substance – and a Shootout – A.M. (033)/$195	9-11:30 a.m.*	MS	232/234	J. Flucke, M. Jablow	2.5/C	D, H, A
Crown Lengthening Workshop (043)/$450	9 a.m.-3:30 p.m. (Break 11:30 a.m.-1 p.m.)	DSD	Laboratory	W. Lundergan, G. Bruce, F. Martinez	5.0/C	D
White Done Right With Custom-Fit Trays... Let's Make Some Whitening Trays Workshop – A.M. (044)/$45	9:30 a.m.-noon*	MS	228/230	V. Wallace	2.5/C	D, H, A, S
CPR – Traditional Renewal (028) Session 2/$70	10 a.m.-12:30 p.m.*	MS	250	D. Barksdale	4.5/C	D, H, A, O, M
Changing Incidence, Risk Factors and Screening Modalities for Oral Cancer – Hands-on Workshop – P.M. (032)/$325	1-3:30 p.m.*	MS	256	M. Cruz, D. Wong	2.5/C	D, H, A, S
Soft Tissue Lasers: Science and Substance – and a Shootout – P.M. (034)/$195	1-3:30 p.m.*	MS	232/234	J. Flucke, M. Jablow	2.5/C	D, H, A
Hands-on Porcine Workshop: Optimal Implant Placement and Bone and Soft Tissue Grafting – A.M. (037)/$325	1-4 p.m.*	MS	206	S. Jovanovic	3.0/C	D
Posterior Resin and Glass Ionomer Restoratives (041)/$375 (042) Full Day/$600	1-4 p.m.	MS	236/238	M. Latta	3.0/C	D, S
White Done Right With Custom-Fit Trays... Let's Make Some Whitening Trays Workshop – P.M. (045)/$45	1:30-4 p.m.*	MS	228/230	V. Wallace	2.5/C	D, H, A, S
CPR – New Format: Cognitive Online, Skills Check On-Site (029) Session 3/$45	2-4 p.m.*	MS	250	A. Lee, J. Brellis	4.5/C	D, H, A, O, M
CPR – New Format: Cognitive Online, Skills Check On-Site (030) Session 4/$45	4:30-6:30 p.m.*	MS	250	A. Lee, J. Brellis	4.5/C	D, H, A, O, M
Lectures						
Don't Add Insult to Injury: Tips to Better Manage Workers' Comp Claims	8:30-9:30 a.m.	ICH	Twin Peaks	A. Searcy	1.0/%	D
How to Effectively Deal With the Media	8:30-9:30 a.m.	MS	220-226	A. Malaby	none	D
WELLNESS TRACK: Prescription Drug Abuse and Addiction: Drug-Seeking Patients	8:30-11:30 a.m.	MS	304	P. Sammon	3.0/C	G
National Health Care Reform: How Will It Affect Your Practice?	9-10 a.m.	MS	302	D. Gonzalez	1.0/%	G

Saturday (lectures continued)

		BLDG.	ROOM		CE/CAT	
Cases Only a Mother Could Love	9-11:30 a.m.	MS	305/307	J. Svirsky	2.5/C	D, H, A, S
Practical Oral Surgery for General Dentists – A.M.	9-11:30 a.m.*	MS	310	J. Alonge	2.5/C	D
A Day in the Life of Your Practice: A Case Study	9:30 a.m.-noon	MS	301	K. Fornelli, R. Thomason	2.0/%	D, H, A, O
Bacterial Busters – 'Hygiene, the CSI of the Mouth'	9 a.m.-noon	MS	100	S. Pietrantonio Lodding	3.0/C	D, H, A, S, O, M
Becoming the Pediatric Alpha Pup	9:30 a.m.-noon	MS	106	J. Soxman	2.5/C	D, H, A, S, O
Conversations With Patients That Work	9:30 a.m.-noon	MS	309	W. Blatchford	2.5/%	D, H, A, O
Dentistry for Children and Adults With Special Needs – A.M.	9:30 a.m.-noon*	MS	270-276	S. Perlman	2.5/C	D, H, A, S
Get Paid What You Deserve From Dental Insurance – A.M.	9:30 a.m.-noon*	MS	303	O. Zahrebelny	2.5/C	D, H, A, S, O
Prosthetic Management of Implants in the Esthetic Zone	9:30 a.m.-4 p.m. (Break noon-1:30 p.m.)	MS	300	V. Ramos, Jr.	2.5/C 2.5/C	D, L
Avoid Liability: Know Your Patients' Medications and Their Impact on Dental Treatment	10 a.m.-4:30 p.m. (Break 12:30-2 p.m.)	MS	306/308	H. Crossley	2.5/C 2.5/C	D, H, A, O, S, M
Increasing Access While Preserving What Works	10:30-11:30 a.m.	MS	302	D. Davidson	1.0/%	G
Practical Oral Surgery for General Dentists – P.M.	1-3:30 p.m.*	MS	310	J. Alonge	2.5/C	D
Great Cases With New Faces	1-3:30 p.m.	MS	305/307	J. Svirsky	2.5/C	D, H, A, S
WELLNESS TRACK: Pain Management for the Dental Professional	1-3:30 p.m.	MS	304	J. Tracy	2.5/C	D, H, A, O, M
Clinical Techniques in Pediatrics	1:30-4 p.m.	MS	106	J. Soxman	2.5/C	D, H, A, S,O
Dentistry for Children and Adults With Special Needs – P.M.	1:30-4 pm..*	MS	270-276	S. Perlman	2.5/C	D, H, A, S
Get Paid What You Deserve From Dental Insurance – P.M.	1:30-4 p.m.*	MS	303	O. Zahrebelny	2.5/C	D, H, A, S, O
Growth Strategies – Marketing Acquisitions and Transitions	1:30-4 p.m.	MS	309	W. Blatchford	none	D, H, A, O
Maximizing Social Media Marketing for Your Practice, Minimizing the Risk	2-3:30 p.m.	MS	301	C. McNulty	none	D

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Audience	**A** Assistant | **D** Dentist | **G** General | **H** Hygenist | **L** Lab Tech **M** Misc (accountants, specialists, spouse) | **O** Office Staff | **S** Dental Student
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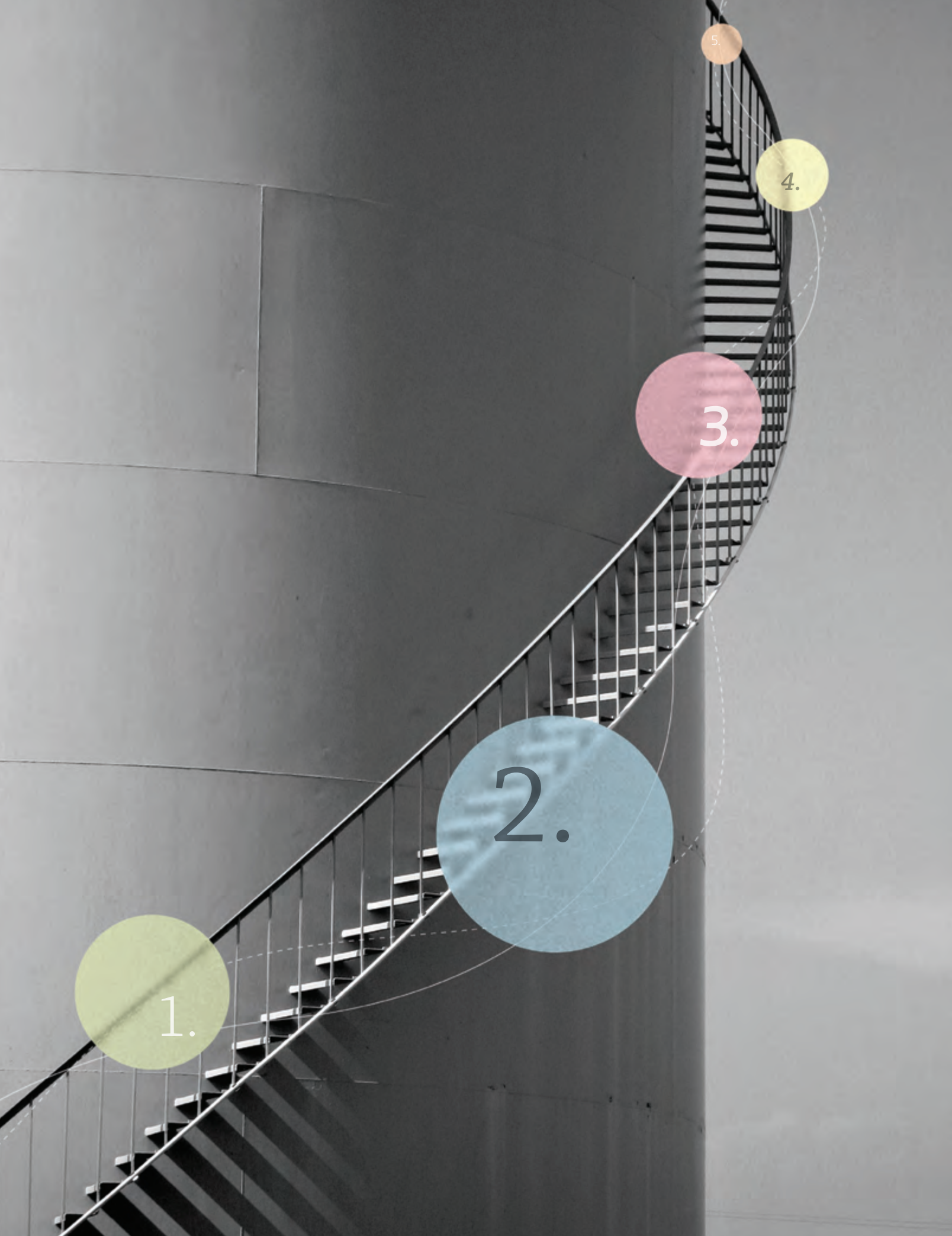
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CDA JOURNAL, VOL 38, Nº8

Step-by-Step DENTISTRY

ZIV SIMON, DMD, MSC

GUEST EDITOR

Ziv Simon, DMD, MSC, is a diplomate of the American Board of Periodontology and a fellow of the Royal College of Dentists of Canada. He lectures and publishes on tissue reconstruction, implant dentistry, and esthetic periodontal surgery, and also maintains a private practice limited to periodontics and reconstructive surgery in Beverly Hills, Calif.

The phrase "knowledge is power" was stated several centuries ago by the famous philosopher, Francis Bacon. Knowledge is definitely a powerful tool that, if used effectively, can lead to great achievements. This also pertains to the dental field, which is continuously evolving with advancements in every aspect of it. Today's clinicians come across an abundance of information involving new techniques, technology, materials, and treatment modalities. At times, it seems that modern dentistry has given us tremendous knowledge but not always the means to apply it in clinical practice to address patients' concerns.

It also appears that clinicians who continuously educate themselves and use established treatment protocols time and again, are able to achieve predictable and favorable outcomes. In this special issue, readers will be exposed to the very same clinicians' work in their respective fields. The authors share their wealth of knowledge and let us take a glance into their everyday reality.

By presenting effective clinical methods in a step-by-step fashion, the articles shed light on the complex nature of different procedures and offer practical methods to address challenges. The authors in this issue did not spare any descriptions or relevant clinical photos to aid in comprehension of a particular technique. Consequently, one can appreciate their attention to detail and their commitment to share valuable information with the dental community.

As readers and hopefully lifelong learners, I hope you will benefit from this issue and find it useful to you in your practice. ■■■■

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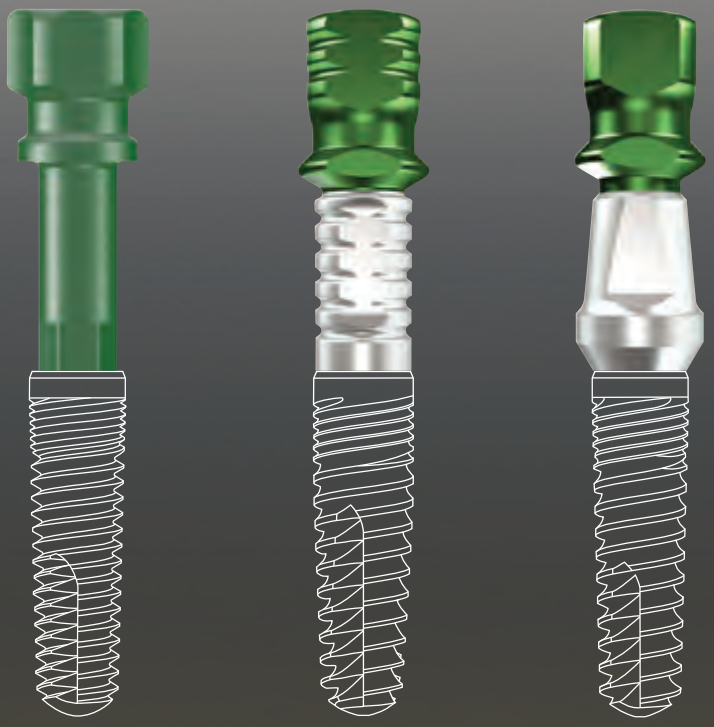

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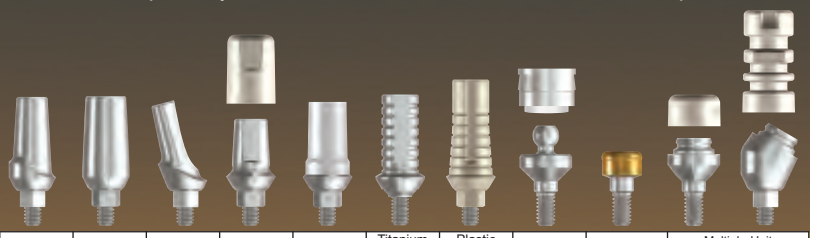

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Implant Direct	$85	$75	$85	$85	$100	$35	$35	$107	$110	$85	$100
Zimmer Dental	$158	$152	$179	$203	$180	$45	$52	$168	$118	$167	N/A
Cost Savings	46%	51%	53%	58%	44%	22%	33%	36%	7%	49%	N/A

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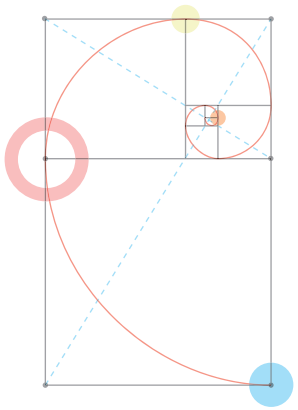
CDA JOURNAL, VOL 38, Nº8



Revisiting the Design of Minimal and No-Preparation Veneers: A Step-by-Step Technique

BRIAN LESAGE, DDS

ABSTRACT The concept of minimal preparation is more than 25 years old. Interest in conservative treatments is being revisited as dentistry embraces thinner ceramic veneers and adhesive bonding agents that keep preparations in enamel. Experience and professional knowledge help determine appropriate treatments based on patients' clinical situations and esthetic demands. This article reviews the veneer modality, its role as a conservative treatment, and the protocol to be implemented to ensure proper treatment planning and material selection.

AUTHOR

Brian LeSage, DDS, is founder and director of The Beverly Hills Institute of Dental Esthetics, a fellow of the American Academy of Cosmetic Dentistry, and an inducted member of the American Academy of Esthetic Dentistry.

ACKNOWLEDGMENTS

The author thanks Domenico Cascione from Burbank Dental Laboratory for fabricating the restorations in the case presentation and Firoozeh Rahbar, DDS, an orthodontist in Beverly Hills, Calif., for expertise in providing the orthodontic therapy in the case presentation.

Dentists and their patients today are increasingly exposed to marketing messages about no-preparation, thin, and minimal-preparation veneers. Some of this information may only be hype that is designed to entice patients into obtaining treatment or to motivate dentists to incorporate a new restorative material into their armamentarium. Regardless, the age of interest in conservative treatments and minimal intervention is being revisited and the public is demanding the preservation of their natural tooth structure.[1]

The concept of no preparation or minimal preparation is more than 25 years old.[1] Veneers were first introduced as an additive technique and designed as a conservative method of restoring teeth, providing an option other than full-coverage crowns.

In the early 1980s, Calamia introduced the innovative concept of bonding thin pieces of porcelain to teeth.[2] Treatments with this modality initially were done with no or little preparation, and with the veneers placed on the facial surface of the tooth.[3]

These original veneers were approximately 0.5 mm in thickness, tapering down to practically nothing at the margins. The newer, thin veneers available today claim thicknesses of less than 0.5 mm and can be fabricated down to a minimum thickness of 0.3 mm.[1]

Calamia and his colleagues later observed that with veneers placed without any preparation, the veneers were too thick and periodontal problems occurred as a result of the overcontoured teeth (i.e., change in emergence profile).[4] As a result, patients were notified of the need for diligent home care in order to preserve the health of gingival tissues.

However, after concluding that the veneer modality would function long term, Calamia and his team determined that, from a periodontal perspective, it made sense to use a preparation that would provide sufficient space for the laminate veneer.[1] The slight preparation developed was a 0.5 mm reduction. The 0.5 mm was restored in the porcelain thereby providing the original thickness of the tooth with the new veneer. Additionally, researchers later determined that wrapping over the incisal edge enhanced the strength, and that only preparing the facial surface of the tooth was not as strong as wrapping over the incisal onto the linguals.[5]

FIGURE 1. Preorthodontic view showing the patient biting.

FIGURE 2. Preorthodontic view of the separated teeth showing mandibular anterior crowding and lingual tipping of the posterior teeth.

FIGURE 3. Pleasing smile showing asymmetry of the central incisors both gingivally and incisally, lateral incisors that are to the facial, and apical gingival levels at tooth No. 10.

FIGURE 4. View of the patient biting.

The Influence of Materials on Preparation Design

Concurrent with the development of the veneer technique was the introduction of new materials for their fabrication. Among the first used was stacked feldspathic porcelain. Other types of porcelains (i.e., pressable ceramics) emerged, leading to challenges in terms of the technicians' abilities to create very thin restorations.[1] As a result, the minimum reduction initially required for some pressed ceramics approached 0.75 mm to 1.5 mm, which was more aggressive than the .5 mm reduction necessary for the original feldspathic veneers.[6]

This fit well with how the laboratories operated. Dental technicians were accustomed to waxing, which made the pressed restorations a good option. However, ceramists demanded more thickness to build in all of the nuances of tooth structure and color into these thin restorations.

In that regard, dentistry seemed to have shifted from the preservative ideology of the 1970s. Many clinicians believed it was easier to reduce sound tooth structure for veneers rather than devise a treatment plan in collaboration with specialists that would be less invasive to the enamel. In the esthetic zone, the relationship with porcelains and even the newer ceramics (i.e., zirconia) required as much or more removal of the tooth structure.[7,8]

This had unfortunate consequences as enamel substrates are of key importance and, when properly prepared, provide the most predictable surface on which to bond. Regardless of the lingual preparation design, porcelain veneers that stay on enamel demonstrate the highest degree of long-term success.[1,9,10]

Step-by-Step Considerations for Minimally Invasive Veneers

It's now time to come to terms with the need to be minimally invasive with approaches to cosmetic dentistry and restorative treatments and incorporate interdisciplinary collaboration into the planning process.[8] Fortunately, dentistry has come full circle and now embraces contemporary restorative materials — such as thinner ceramic veneers and adhesive bonding agents — that do not require the removal of excess tooth structure, as observed with conventional, nonadhesive crown and bridge restorations.[9,11] Dentists need not undertake aggressive preparation designs, but rather can keep their preparations in enamel.[9]

Ultimately, the experience and professional knowledge of the clinician best determine the appropriate treatment plan based on the patient's clinical situation and esthetic demands.[2] A comprehensive clinical examination and an esthetic evaluation should be performed, dental photographs and centric relation-(CR) mounted study models should be taken, and a number of factors should be addressed during the planning process.[12,13] For example, if a tooth is lengthened, regardless of whether minimal preparations were used, the length may interfere with the envelope of function. Therefore, mounting the models in CR is the author's preference in order to minimize the effects of occlusal trauma, which for most patients will increase the longevity of the restorations.

Occlusal analysis begins with an examination and palpation of the temporomandibular joint, TMJ, and the complete stomatognathic system. Precise study models should be mounted in CR on a semiadjustable articulator (SAM-3, Great Lakes Orthodontics) to allow the clinician to identify any signs of occlusal pathology, such as mobile teeth, worn

FIGURE 5. Relaxed lip position shows an appropriate reveal central incisor of 1-3 mm.

FIGURE 6. Smile view showing gingival asymmetries between the central and lateral incisors and cuspids. Immediate lateral disclusion appears probable and was confirmed clinically.

FIGURE 7. Retracted view, same as smile view.

teeth, abfraction, cracked or chipped teeth, and TMJ-related symptoms.[14]

Dental photographs, including the minimum 12 required for accreditation by the American Academy of Cosmetic Dentistry, facilitate analysis of the macro- and microesthetic principles. Some of the macroesthetic principles include the facial and dental midline, central incisor dominance, tooth shape, arrangement and color, occlusal cant, and occlusal plane, as well as gingival margin levels and buccal corridor deficiencies. Microesthetic principles consist of line angles, axial inclination, gingival margin zenith and heights of contour, maverick colors, secondary and tertiary anatomy, polychromicity, incisal translucency, and incisal halo effects.[15]

Photographs and mounted-study models enable the clinician to visualize the final outcome. With that objective in mind, the preparation design and restorative material selection can be analyzed and determined. The starting point — as there is only one place to start — follows the basic principles of medicine: with an accurate diagnosis. Once there is a diagnosis, the treatment-planning sequence must always begin with esthetics, which has been taught for many years by Spear.[16] Only with a complete understanding of esthetics, function, structure, and biology can it then be considered truly minimally invasive in the treatment approaches.

Other factors to be addressed during the planning process include:

- Midline position and whether or not it needs to be moved, how, and by how much;
- Lip fullness and the manner in which it might be affected by changes in the facial/lingual position of the teeth/alignment;
- Incisal edge position;
- Occlusion (i.e., stable centric stops, immediate anterior and lateral disclusion, and respect and understanding of the envelope of function);
- Desired color change and whether or not underlying color must be masked;
- Amount of tooth structure remaining, particularly enamel;
- Position in the arch/mouth; and
- Ability to isolate in order to realize ideal adhesive principles.

Case Description (Case No. 1)

A 16-year-old male high school student, along with his mother and orthodontist, presented for esthetic consultation while he was still in fixed orthodontic appliances. The patient demonstrated a malocclusion and a multitude of esthetic issues, including facial midline discrepancies, dental midline spacing, poor tooth arrangement, poor axial inclination, and gingival asymmetries, among others.

During the initial consultation, achieving an ideal and esthetic outcome through orthodontics — within the parameters of a stable occlusion — was discussed. As the orthodontics progressed (**FIGURES 1 AND 2**), treatment options would be eliminated or added in order to exceed the patient's and his mother's expectations. Several postorthodontic treatment options were discussed with the patient, including no restorative treatment, direct bonding on teeth Nos. 7 to 10 or teeth Nos. 6 to 11; placing veneers on teeth Nos. 7 and 10 while bonding the cuspids and/or central incisors; or placing veneers on teeth Nos. 7 to 10 or Nos. 6 to 11.

Over the next 15 months, the patient had three re-evaluation appointments (**FIGURES 3 AND 4**). During this time, discussions focused on the esthetic and functional outcomes for this patient. The canines were class 1 and the molars were class 1 relationship on the right and left. The maxillary midline was to the patient's right by more than 1 mm, and a larger space existed on the mesial and distal of tooth No. 7, creating an esthetic quagmire. In the process of making the dental midline coincide with the facial midline, the midline would be moved to the patient's left, thus making the space around tooth No. 7 even larger.

In order to gain immediate excursive disclusion with the lower teeth, the maxillary teeth required retraction, allowing some lessening of the esthetic dilemma and gaining the much-needed functional parameters. Retracting the maxillary teeth also equated to lingually positioning them to enable a "no-prep" veneer design. However, care must be taken not to impinge on the envelope of function when retracting or changing the angulation of the anterior teeth. In this case, the patient had ideal lip support and a good nasal-labial angle, which would not be affected by this minor lingual positioning in order to gain immediate lateral and protrusive disclusion. Intrusion of tooth No. 8 was also needed in order to level the gingival morphology with that of No. 9, creating symmetry of the central incisors (**FIGURES 5 THROUGH 7**).

Following several months of refinement and cooperation between the orthodontist and restorative dentist, it

FIGURE 8.

FIGURE 9.

FIGURES 8 AND 9. Gingival levels show better symmetry, but spaces are still too large around the lateral incisors.

FIGURE 10. Smile view shows macroesthetic issues have been corrected without compromising functional parameters.

FIGURE 11.

FIGURE 12.

FIGURE 13.

FIGURES 11–13. Retracted views show macroesthetic issues have been corrected without compromising functional parameters.

was determined that orthodontics accomplished 90 percent of the esthetic objectives (**FIGURES 8 THROUGH 13**). The maxillary midline was still slightly off (<1 mm), but in a vertical plane. This has been shown by Kokich to be undetectable by either orthodontists, general dentists, or lay people.[17] The space asymmetry was worked out in a diagnostic mock-up on the models and in the mouth. It was found to be undetectable using some masking techniques.

The natural dentition vary in terms of the reveal, line angles, rotation, and color. Variations in color are especially seen in the lateral incisors, which have a slightly lower value than the central incisors.[18] Therefore, such microesthetic considerations should be part of the treatment plan, with the patient's consent.

Treatment Plan

The distal, incisal, facial, and lingual surfaces of tooth No. 8 would be directly bonded using a direct composite resin (Venus Diamond, Heraeus Kulzer, South Bend, Ind.). A multilayering technique would be used to mirror the incisal translucency and incisal halo observed in the contralateral central incisor, creating a seamless tooth/restorative interface. To extend the longevity of the composite used to lengthen the anterior tooth, protrusive contact would be kept broad (i.e., flat incisal planes on the maxillary teeth that are in contact with the flat incisal planes on the mandibular incisors) and allow for slightly less (i.e., 15 micron using shimstock foil) contact on the restored tooth.

Positioning teeth Nos. 7 and 10 (i.e., the peg laterals) slightly to the lingual with orthodontics created an ideal environment for "no-prep" veneers. Other considerations for minimally invasive preparations include the correct axial inclination, line angles, proportions, and gingival symmetry.[13]

Clinical Technique

Prior to removing the orthodontic brackets, a preoperative model of the dentition was used to mock-up the case to ensure that the teeth were in the most ideal position and verify the accuracy of their alignment, arrangement, and incisal plane. The number of teeth that needed to be restored also was analyzed. Only minimally invasive procedures, including no-prep veneers on the lateral incisors and direct bonding on tooth No. 8 and potentially the canines were discussed with the patient.

After the braces were removed, the patient's teeth were bleached using a take-home whitening kit (DayWhite ACP 7.5 percent, Discus Dental, Culver City, Calif.) for two weeks. The two-week stabilization period was provided to allow for the relapse of color and ideal bondable enamel.[19]

During the first restorative appointment, the shade was selected using a spectrophotometer (EasyShade Spectrophotometer, Vident, Brea, Calif.). Colors were mapped, and tooth No. 8 was cosmetically bonded. Additionally, the prototype restorations for teeth Nos. 7 and 10 were fabricated. The spectrophotometer confirmed that the required shades taken visually using the 3D Master Shade Guide (Vident) were shade A-1 (1M1.5), shade B-1 (1M1), and shade B-1 (0.5M1) in order to reproduce tooth No. 8 from the gingiva to incisal edge.

To create the restoration for tooth No. 8, shade A-1 enamel was used as a dentin replacement, then shade B-1, and finally incisal translucency composite (Venus Diamond, Heraeus Kulzer, South Bend, Ind.) were layered (**FIGURES 14 THROUGH 18**). Typically, a

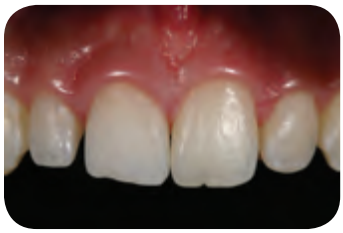


FIGURE 14. Close-up preoperative view of teeth Nos. 7 and 10, with tooth No. 8 etched in preparation for composite bonding.

FIGURE 15. The dentin replacement layer in shade A-1 (Venus Diamond, Heraeus) was placed.

FIGURE 16. The translucent layer in the Clear shade (Venus Diamond, Heraeus) was established to mirror the incisal effects in the contralateral tooth No. 9.

FIGURE 17. The enamel layer in shade B-1 (Venus Diamond, Heraeus) was placed to mirror the outline form of tooth No. 9.

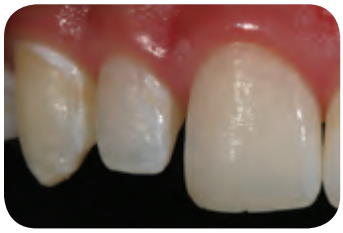


FIGURE 18. The initial bonding appointment achieved harmony and balance with a seamless direct composite technique. Microesthetic characteristics of incisal edge form and translucency were re-established in the tooth.

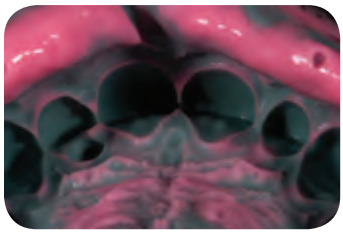


FIGURE 19.

FIGURE 20.

FIGURES 19 AND 20. Reversible hydrocolloid and PVS (FlexiTime) impressions were taken for the no-prep veneers for teeth Nos. 7 and 10.

minimum of three shades of composite are needed to build in dentinal lobes and any desired incisal edge effects.[20]

To maximize the esthetics, this author advocates two appointments for direct composite restorations. In this case, the first appointment achieved more than 80 percent of the desired outcome. Through the use of dental photography and a critical eye, necessary changes were mapped out and executed at the second appointment. A bur kit (UCLA Anterior Aesthetic Restorative Kit by the author, Brasseler, Savannah, Ga.), disc polishing kit (Bisco), polishing paste (Enamelize, Cosmedent, Inc., Chicago, Ill.), and a low viscosity liquid glaze (BisCover LV, Bisco, Inc., Schaumburg, Ill.) were used to perform the contouring, finishing, and high polishing steps and impart the appropriate luster to the direct composite restoration.

Once the composite restoration on No. 8 was complete, the prototype mock-up for the veneers was initiated chairside using a "squash" technique. This technique involved rolling a small amount of shade B-1 dentin composite (Venus Diamond) in clean, gloved hands and applying it directly to the spot-etched teeth Nos. 7 and 10. This composite was then sculpted to the desired outline form, contoured to the desired look, and light cured. The occlusion was checked in MIP and excursives.

Prototype restorations are essentially provisional restorations designed and created to the specifications of the anticipated definitive restorations. In this, as in other esthetic cases, they were used to test and verify that they accomplished the desired esthetic and functional outcomes.

The patient returned two weeks later very satisfied with the results and ready to proceed with the definitive veneer restorations. A small void was noted in the composite on tooth No. 8, so a slight repair and resurfacing were performed while final contouring and appropriate luster and polishing procedures were completed. The provisional/prototype restorations were gently removed using a spoon excavator or scaler. No preparation was needed for teeth Nos. 7 and 10 as confirmed by the prototypes, and a finishing diamond bur (No. 8863-012 Brasseler) was run very lightly across the teeth to remove aprismatic enamel and create more surface area for bonding.

A viscous paste (Expasyl, Kerr Corporation, Orange, Calif.) was used to retract the gingival tissue in order to capture the emergence profile of the natural teeth. The final impressions were taken using a polyvinyl siloxane (PVS) material (Heraeus) and reversible hydrocolloid materials (Slate maximum strength reversible hydrocolloid, Dux Dental; pink Syringe Sticks, Van-R) (**FIGURES 19 AND 20**).

Next, a "shrink wrap" technique was used to create bis-acrylic provisionals. First, a preoperative alginate impression of the approved prototypes was taken so that the provisionals could be quickly reproduced in bis-acrylic temporary material (ProTemp Garant III, 3M). Teeth

FIGURE 21.

FIGURE 22.

FIGURES 21 AND 22. Shade communication with ceramist included properly exposed and underexposed photographs with the shade tabs 1M1 and 1M2 to aid the ceramist in accurate reproduction of value and chroma. By underexposing the image, color, value, and internal maverick colors can be evaluated more easily.

FIGURE 23. Additionally, shade tab 0M3 was shown as a reference, keeping the shade tabs in the same plane as the teeth.

FIGURE 24.

FIGURE 25.

FIGURES 24 AND 25. Eventually the approved prototypes were locked on using a bis-acrylic material (Integrity, shade A1), which were used as a guide for the ceramist when fabricating the no-prep veneers for teeth Nos. 7 and 10.

Nos. 7 and 10 were spot etched, and an adhesive bonding agent (OptiBond Solo Plus, Kerr Corporation) was applied. Then, the bis-acrylic was syringed into the alginate impression (teeth Nos. 7 and 10) and placed in the mouth for two minutes. This allowed the material to shrink and conform to the teeth very well. With this technique, minimal contouring and finishing is necessary. "Shrink wrapping" the bis-acrylic to the teeth produced an esthetic provisional result.

Good communication with the dental ceramist included dental photographs (**FIGURES 21 THROUGH 23**), a detailed prescription, and a model of the approved prototypes (**FIGURES 24 AND 25**). The indirect "no-prep" veneers would then be fabricated with porcelain (Creation, Jensen Dental, North Haven, Conn.) on a refractory die by Burbank Dental Lab.

Seating Appointment

At the try-in/seating appointment, an impression of the prototypes was taken for use as a back-up in the event that the restorations were not acceptable for any restorative or esthetic reasons. The contour of the direct composite restoration on tooth No. 8 was modified minimally and brought to its final polish.

Following removal of the prototype restorations, the tooth preparations were cleaned and the final porcelain veneers were tried in (**FIGURES 26 THROUGH 30**). Photographs were taken, and the patient and his mother were given time to determine if the restorations met their expectations. After patient approval, the cementation process was initiated.

With proper isolation (i.e., preferably a rubber dam), the preparations were etched with 37 percent phosphoric acid for 30 seconds, rinsed, and dried (**FIGURES 31 AND 32**). The capacity for microretentive adhesion of porcelain to enamel is irrefutable and has been documented in the literature for more than 20 years.[21] Therefore, this is one of the primary reasons that no-prep veneers are the treatment option of choice when indicated.

The primer in the adhesive system (All-Bond 3) was applied and agitated for 30 seconds (**FIGURE 33**). The primer was air-dried and the teeth were light-cured (**FIGURE 34**). The primer has been described as a necessary contaminant, since it is essential for achieving adequate infiltration of the adhesive into the inter- and peritubular dentin, but also is a contaminant if the solvent does not evaporate completely.[22]

The feldspathic veneers were etched with 9 percent hydrofluoric acid for two minutes, rinsed, and dried. They were then silanated (Silane A & B, Bisco), allowed to air evaporate for two minutes, and then completely air-dried. A bonding agent from the adhesive system (All-Bond 3) was judiciously applied to the veneers (**FIGURE 35**), after which a composite (Herculite) of the shade of the veneers, warmed using the Calumet composite warming system, was placed as a thin film onto them (**FIGURE 36**).

The bonding agent and a ribbon of warm composite were placed onto the tooth to seat the veneers. The veneers were seated, pressure applied, and excess cement was wiped from the margins. This process is repeated until no visible cement extrudes from the margins (**FIGURE 37**). The veneers were spot-cured, and excess cement was cleaved away (**FIGURE 38**). It is recommended the gingival margins, especially if subgingival, be ideal so that no smoothing with burs is required at this appointment.

All other porcelain tooth interfaces were smoothed and polished to a seamless, undetectable margin using a sequence of coarse to fine diamonds, rubber polishing points, cups, and wheel. The composite cement was fully cured by light curing the veneers for approxi-

FIGURE 26. Close-up of teeth Nos. 7 and 10 with Expasyl placed for atraumatic gingival retraction. Notice the blanched tissues indicating subgingival retraction.

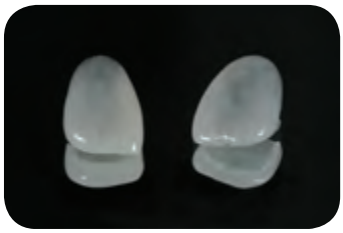


FIGURE 27. Close-up view of the veneers prior to cementation. Notice the marginal integrity and thinness of the porcelain that was achieved by Burbank Dental using a platinum foil technique.

FIGURE 28. Close-up view of the try-in of veneer No. 7 with rubber dam isolation.

FIGURE 29. Close-up of the no-prep veneer for tooth No. 7 with rubber dam isolation.

FIGURE 30. The teeth were pumiced to cleanse the surface prior to cementation. Notice the plumber tape (Teflon) to allow for easy clean-up and no sticking of the cement to the adjacent teeth.

FIGURE 31. Teeth Nos. 7 and 10 were acid-etched with 37 percent phosphoric acid.

FIGURE 32. View of the etched enamel.

FIGURE 33. The adhesive primer (All-Bond 3 A & B Primer) was applied and agitated for 30 seconds.

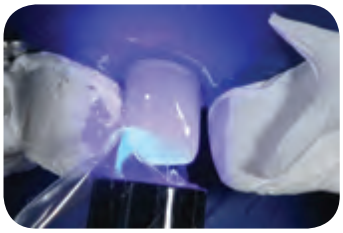


FIGURE 34. The primer was light-cured after blowing/drying to remove the solvent (necessary contaminant).

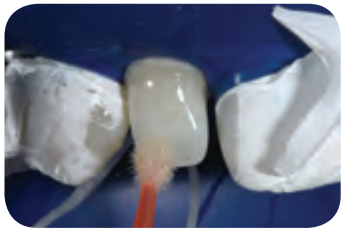


FIGURE 35. A very thin application of adhesive resin (All-Bond 3) was placed in the veneers.

FIGURE 36. A ribbon of composite (Herculite, shade A-1 dentin) was warmed to increase viscosity and applied to the veneers and tooth after which they were fully seated.

mately two to five minutes in multiple, rotated motions (**FIGURE 39**). Note that the shade of the veneer and thickness of the porcelain material help to guide the curing time.[23,24]

To ensure a successful long-term outcome (**FIGURES 40 AND 41**), it was imperative to perform a final check of occlusion in MIP/CR and protrusive and lateral excursives. All margins were also checked for excess cement and confirmed with interproximal flossing. After postoperative instructions were reviewed with the patient, impressions were taken for fabricating a sports-guard and a modified maxillary nightguard appliance (Tanner).

The patient was very satisfied with the final result and returned approximately two weeks later for a re-evaluation of the occlusion, gingival response, and the esthetic parameters (**FIGURES 42 THROUGH 44**).

Case No. 2

Similar procedures were followed in the case of a female patient in her early 40s. Following a thorough examination that included photographs, alginate impressions, and mounted study models, it was determined the patient could benefit from no-prep veneers on teeth Nos. 7 through 10 (**FIGURES 45 AND 46**).

The prototype mock-up for the veneers was carried out indirectly by the ceramist. Starting with a wax-up on the mounted study models and then using heat and pressure to cure the acrylic material, a prototype was ready for chairside try-in and delivery (**FIGURE 46**). Because the treatment in this case would be performed exclusively as an additive technique, no preparation was performed to any of the restored teeth.

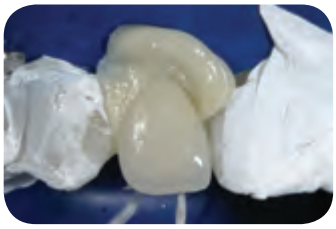


FIGURE 37. Cement extrusion was visible around all margins.

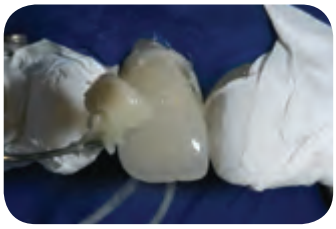


FIGURE 38. Easy clean up with an explorer was possible due to the use of warm composite as the cement.

FIGURE 39. The composite cement was light-cured.

FIGURE 40. Close-up view of the veneer on tooth No. 7 after cementation.

FIGURE 41. View of the patient smiling the day of veneer cementation.

FIGURE 42.

FIGURE 43.

FIGURE 44.

FIGURES 42–44. Twelve days after delivery, these postoperative center, right lateral, and left lateral smile views of this 17-year-old patient demonstrate harmony and balance.

The prototype restorations were designed and created to the specifications of the anticipated definitive restorations in order for the patient and dentist to test and verify they accomplished the desired esthetic and functional outcomes (**FIGURE 47**). The patient returned recently very satisfied with the results of the prototype restorations and ready to proceed with the definitive veneer restorations.

Conclusion

Since the late 1970s, minimally invasive dentistry has advanced to a significant degree. An enormous amount of research has emerged in support of adhesive bonding. Materials have improved and clinical performance has advanced to enable the use of minimally invasive porcelain veneers whenever indicated. However, it is important to note that the "no-prep" option is not indicated for all clinical situations, and it requires an additional skill set for diagnosis and, in particular, the delivery of the veneers when it comes to finishing and polishing the porcelain in the mouth.

The concept of no-preparation or minimal preparation is more than 25 years old, yet today, the interest in conservative treatments and minimal intervention is being revisited. Dentistry embraces

FIGURE 45. Close-up preoperative view of the patient's maxillary anterior dentition. Teeth Nos. 7 through 10 would be restored with no-prep veneers.

FIGURE 46. View of the four prototype veneer restorations on the model.

FIGURE 47. Close-up view of the patient's natural smile with prototype restorations in place. This treatment was performed exclusively as an additive technique, with no preparation performed to any of the restored teeth.

contemporary restorative materials — such as thinner ceramic veneers and adhesive bonding agents — that do not require aggressive preparation designs, and keep the preparations in enamel. The experience and professional knowledge of the clinician will help determine the appropriate treatment plan based on the patient's clinical situation and esthetic demands. Of paramount importance to this process is communication with the laboratory, as well as the use of prototype restorations, which are created to ensure that the ultimate final restorations meet and exceed the patient's expectations for esthetics and functionality.

This article has reviewed the history of the veneer modality, its role as a conservative and minimally invasive treatment, and the clinical step-by-step protocol that should be implemented to ensure proper treatment planning and material selection for specific minimal-preparation indications. ■■■■

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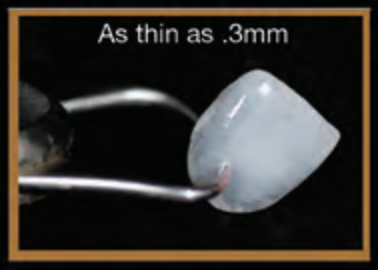

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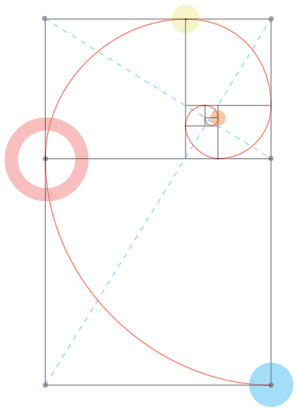

Implant Verification Cast — A Predictable Restorative System in Implant Prosthodontics

HAREL SIMON, DMD, AND CHRISTOPHER B. MARCHACK, DDS

ABSTRACT An implant verification cast is designed to provide an accurate representation of dental implant positions extraorally. It can be used by the laboratory as a trusted cast to create a passively fitting framework and by the clinician to verify framework fit prior to intraoral trial. This article discusses the treatment philosophy behind this specific cast and reviews applications, fabrication techniques and benefits of the verification cast compared to the conventional technique.

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One of the essential elements in implant prosthodontics is the precise transfer of intraoral dental implant positions to the laboratory in order to fabricate an accurate prosthesis framework.[1,2] The conventional restorative technique in implant dentistry involves making an impression and master cast on which a metal framework is fabricated. This framework is evaluated intraorally; and, if improper fit is diagnosed, it is sectioned, indexed intraorally, and sent to the laboratory for soldering. Upon return, it is re-evaluated intraorally for fit.[3] This process is repeated until an acceptable fit is obtained intraorally and only then, the prosthesis is completed.

Limitations of Conventional Restorative Technique

The conventional technique presents some limitations in capturing accurate records. While different impression techniques have been suggested, studies indicate that no impression technique is error-free.[4-7] Research has shown contradicting results regarding the accuracy of an open-tray impression compared to the closed-tray technique[4,5,7] and conflicting results as to whether splinting impression copings is superior to no splinting.[5-7] One of the possible explanations for these inconsistent results is the use of different kinds of implants and study parameters[7] (**TABLE 1**). It is possible that one technique works best under certain conditions while another tech-

TABLE 1

Different Parameters in Studies on Impression Techniques

Implant system
Tolerance of fit of components
Number of implants
Implant angulations
Levels of tissue undercuts
Implant / abutment level impressions
Impression trays
Impression materials
Splinting or no splinting of impression copings
Splinting materials
Stone materials with different degrees of expansion
Material setting times before separation
Waiting time before pouring up cast
Study designs and measurement techniques

FIGURE 1. Impression coping assembly composed of implant impression copings splinted with resin.

FIGURE 2. Gingival portion of verification jig as an impression coping assembly made on master cast to verify accuracy of implant positions intraorally.

FIGURE 3. Verification cast accurately representing implant positions made from impression coping assembly in **FIGURE 1**.

FIGURE 4. Open-tray impression copings inserted intraorally (shown on a demonstration model).

nique is superior in other circumstances.

Many dental materials and procedures have inherent errors.[8] Implant components have an inherent tolerance or freedom of fit, measured in some studies up to 100µ.[9,10] It has been shown that even simple removal and reinsertion of the same implant component intraorally results in a slightly different positioning every time.[11] This 3-D discrepancy has been documented in implants with external connections, internal connections, and press-fit connections from different manufacturers.[11] This phenomenon can introduce an error into the impression procedure.

Additional distortions occur in different treatment stages. Impression materials, acrylic resin, and dental stone undergo dimensional changes upon setting and some continue to distort with time after setting.[12,13]

The human element may introduce additional errors along the restorative process. The connection of implant analogs to impression copings with excessive torque may rotate the impression copings within the impression and cause distortion. On the other hand, connecting implant analogs too lightly to impression copings might cause them to loosen and separate while vibrating the stone in the impression, causing distortion not readily visible. Recognition of these various errors and the ability to control their magnitude will allow the clinician to obtain a clinically acceptable result.

Evaluation of frameworks intraorally for passive fit is challenging, especially with modern implant placement where the margins are subgingival and there is no direct visibility.[14] Moreover, when a large framework needs to be cut and indexed for soldering, it is hard to determine which joint to section out of the many different ones and how many sections are needed to obtain proper fit. The need to evaluate the framework once again after soldering, without certainty that it fits, is challenging and overall this process may become lengthy and frustrating to the clinician, patient, and laboratory technician. These limitations may become more prominent with increased number of implants and size of the framework.

Verification Devices

Various prosthodontic techniques have been developed in an effort to simplify this process and improve its accuracy. Verification devices have been introduced with the ultimate purpose of obtaining an accurate representation of the intraoral implant positions for fabrication of an accurate metal framework.[1,15-23] These devices are based on a familiar prosthodontic tool: the soldering index that is a rigid resin connection between multiple cast prosthetic units fixing their relative position prior to a soldering procedure.[24]

In order to shed light on the different verification devices, it is important to define the term impression coping assembly that describes implant impression copings splinted together by resin or other materials (**FIGURE 1**). The impression coping assembly can be used to fabricate a verification device.

Verification Jig

One verification device was introduced as the verification jig.[15-21] It is practically a laboratory fabricated

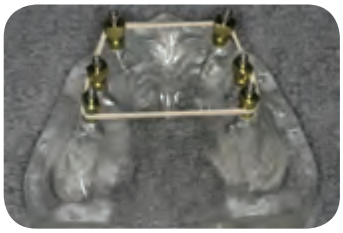

FIGURE 5. Impression copings with a rubber band scaffold.

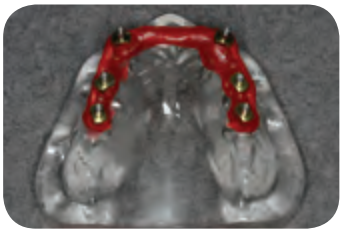

FIGURE 6. Impression copings splinted with resin.

FIGURE 7. Sectioning of impression coping assembly.

impression coping assembly splinted on the master cast (**FIGURE 2**). It may also be fabricated using different implant components such as temporary or waxing cylinders.[15,16] The verification jig is placed intraorally to verify the precision of implant positions recorded on the cast.

Balshi suggested a modified verification jig, which is virtually a screw-retained provisional restoration created intraorally. In this technique, an existing removable complete denture is converted intraorally to a fixed implant prosthesis by incorporating implant cylinders. This implant-supported provisional restoration performs as an intraoral assembly of temporary implant cylinders.[25]

The verification jig presents some limitations as a verification device. Being made of resin, it is still a resilient material compared to metal and therefore can possibly deform upon intraoral insertion due to tissue compression and produce false results.

As discussed before, dental materials and techniques incorporate distortion.[8,12,13] Since this distortion is inevitably incorporated into the master cast and the impression coping assembly, it is anticipated that a certain inherent misfit will exist between the two of them. Due to the tolerance of fit of implant components, it is also possible for this jig to fit slightly differently each time it is removed and inserted.[9-11]

In addition, intraoral trial of the jig may encounter the same difficulties of framework intraoral trial discussed before.[14] Therefore, it could be challenging to make conclusive decisions from an intraoral trial of such a jig and trust it to determine whether the cast was reproduced accurately or not.

Verification Cast

A different verification device was introduced as the verification cast. It is a cast representing the implant positions in the patient's mouth without depiction of the intraoral soft tissues[1,21-23,26] (**FIGURE 3**).

Historically it has been made after the framework trial phase from a metal framework that was sectioned and splinted intraorally.[1,22] However, preparing the verification cast at the beginning of the restorative phase can offer additional benefits.[23] The verification cast can be used by the laboratory as a trusted cast to create a passively fitting framework and can be used by the clinician to verify framework fit prior to intraoral trial. It is therefore suggested to prepare the verification cast at the impression appointment, before framework fabrication using an impression coping assembly splinted intraorally and poured up to form a cast.

Another technique for fabrication of a verification cast at the beginning of the restorative process was suggested by the authors.[26] In this approach, a removable complete denture is converted intraorally to a fixed implant prosthesis as proposed by Balshi.[25] This implant provisional restoration made by incorporating implant cylinders using a minimal amount of resin may perform as an impression coping assembly. Consequently, implant analogs are connected to this assembly to form a verification cast.[26]

The purpose of this article is to present simplified chairside techniques for fabrication of a verification cast and its use in a system that allows the clinician to pre-evaluate frameworks for proper fit prior to scheduling the patient.

Verification Cast — Fabrication

Direct Technique

Different methods are available to fabricate a verification cast prior to framework fabrication. The direct intraoral technique is outlined below.

1. *Insert impression copings:* Connect open-tray implant level impression copings (Nobel Replace, Nobel Biocare USA, Inc., Yorba Linda, Calif.) to implants intraorally. Evaluate implant angulation and line of draw. Verify fit of copings clinically and radiographically and secure them with a screwdriver (**FIGURE 4**).

2. *Splint impression copings:* Tie dental floss or a thin rubber band around impression copings to connect them. This is used to form a scaffold for the resin material that will flow over it (**FIGURE 5**).

Use autopolymerizing acrylic resin (GC Pattern Resin LS, GC America, Alsip, Ill.) to splint the copings. Wet the copings with a resin monomer to ensure proper attachment. Place the resin circumferentially around the copings and on the scaffold that will become embedded in the resin. Ensure free access to impression copings screws and wait for complete polymerization. This step will form a preliminary impression coping assembly (**FIGURE 6**).

3. *Section preliminary impression coping assembly:* Upon complete polymerization, unscrew all impression copings and remove impression coping assembly from the mouth. Use a thin separating disc (Brasseler, Savannah, Ga.) to section the preliminary impression coping assembly to segments made of individual impression copings embedded in resin (**FIGURE 7**) and ensure a

FIGURE 8. Assembly segments kept in sequential order.

FIGURE 9. Assembly segments repositioned for intraoral splinting.

thin, uniform gap between segments. Keep impression coping segments in sequential order to ensure reconnection at the same position (**FIGURE 8**).

4. Secondary splinting of impression copings: Place impression coping segments intraorally onto implants at the exact location and orientation (**FIGURE 9**). Verify accurate seating of each individual coping and tighten with a screwdriver. Due to inherent tolerance of fit of components, a microscopic rotational freedom is anticipated.[10,11] To obtain a predictable and repeatable result, use clockwise rotational pressure upon tightening (at the same direction as screwdriver locking motion) on all components throughout the restorative process.

Use the Nealon technique by picking up resin increments with a brush to perform secondary splinting and reconnect all impression coping segments: Use a brush to wet all junctions with monomer (GC Pattern Resin LS) following by additional increments of resin[27] (**FIGURES 10A-C**). Wait 17 minutes for the resin to become dimensionally stable prior to separation.[28] This is an important step as premature removal of the assembly may result in distortion.

5. Attach implant analogs: Carefully unscrew all impression copings, take out the screws and remove the impression coping assembly from the mouth. Connect implant analogs (Nobel Biocare) to each impression coping (**FIGURE 11A**). Ensure proper seating of each analog and carefully tighten with a screwdriver without applying unintentional torque to the resin assembly body, which may result in an accidental rotation of the copings within the assembly. This potential inaccuracy can be avoided by holding the analog in one hand while tightening the screw with the other without contacting any other part of the impression coping assembly (**FIGURE 11B**).

6. Preparation for plaster cast: Place impression coping assembly inside a rubber base former (Vident, Brea, Calif.) and evaluate the implant platform level in relation to the borders of the base former. The implant platform should eventually be above the level of the plaster. Prepare two to three cotton swabs to support the impression coping assembly (**FIGURE 12**).

7. Create verification cast: Prepare fast-setting plaster or stone with low-setting expansion of 0.09 percent or less (Mounting Plaster, WhipMix, Louisville, Ky.). Use a rubber bowl and mixing spatula to mix plaster with proper powder/liquid ratio following manufacturer instructions. Preweighed plaster envelopes and water measuring vials (WhipMix) ensure simplicity and accuracy in water/powder ratio. Place plaster mixture in base former and lightly tap it to flatten the mixture. No vibrator is used for this procedure.

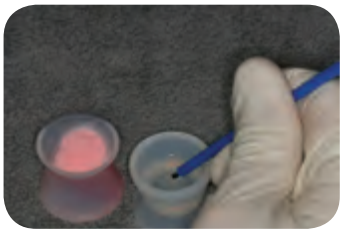

FIGURE 10A. Acrylic resin powder and liquid.

FIGURE 10B. Acrylic resin used to reconnect segments.

FIGURE 10C. Impression coping assembly resplinted.

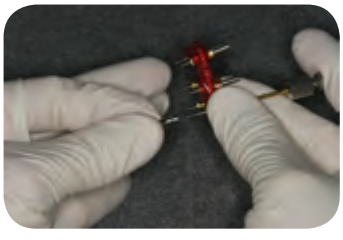

FIGURE 11A. Implant analogs connected to impression coping assembly.

FIGURE 11B. Implant analogs connected to impression coping assembly.

FIGURE 12. Impression coping assembly with implant analogs inside base former.

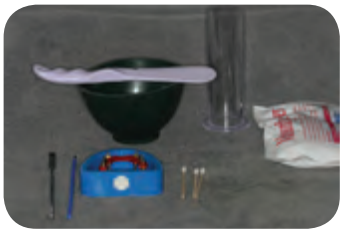

FIGURE 13A. Armamentarium for verification cast fabrication.

FIGURE 13B. Correct powder/liquid ratio is used with preweighed envelopes.

FIGURE 13C. Plaster poured into base former.

FIGURE 13D. Plaster mixture in base former.

FIGURE 13E. Supporting rods for impression coping assembly.

FIGURE 13F. Impression coping assembly inserted into plaster mixture.

FIGURE 14. Verification cast separated from impression coping assembly.

Slowly insert the impression coping assembly with the cotton swab support. Pay attention to avoid sinking the implant platform inside the plaster. Use a brush to eliminate any excess plaster covering the analog-impression coping junction. Allow plaster to set completely without any interruption (**FIGURES 13A-F**).

8. Separate assembly from cast: After final setting, inspect plaster for any excess covering impression copings and carefully scrape it off. Loosen impression coping screws and separate impression coping assembly from the completed verification cast (**FIGURE 14**).

9. Definitive impression: If planned, a definitive impression can be made by reinserting the same impression coping assembly intraorally and performing an open-tray impression. In this step, the impression coping assembly may act as a verification jig confirming the accuracy of the verification cast as described above. Proper fit of this impression coping assembly will confirm precision of previous steps. If there is any discrepancy in this step, section and remake the impression coping assembly and verification cast (**FIGURES 15A-C**).

A few modifications for this technique can be done to simplify the process. Splinting the impression copings can be done with a viscous light-activated resin gel (Triad Gel, Dentsply International, York, Pa.). This material is easier to apply, can be self-supported, and does not require floss as scaffold (**FIGURES 16A-C**). Research demonstrated similar accuracy of Triad and acrylic resin (GC Pattern Resin, GC America; Duralay, Reliance Dental Mfg Co, Worth, Ill.) when used for secondary splinting of impression coping assembly.[29]

In another approach, impression copings can be splinted using metal rods to bridge the gap between the copings. Carr and Master suggested the use of proprietary impression copings with metal "wings" (MICS; Laboratory Implant Practice Systems, Half Moon Bay, Calif.).[1] These proprietary impression copings are splinted with resin while a metal-to-metal contact is made with their wings. This method produced a significantly more accurate cast compared to that made

FIGURE 15A. Impression coping assembly replaced intraorally (shown on demonstration model).

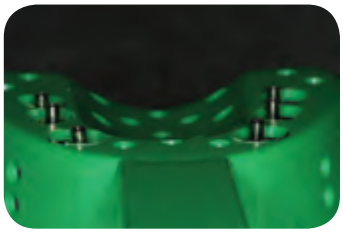

FIGURE 15B. Impression tray is adjusted to fit over impression coping assembly.

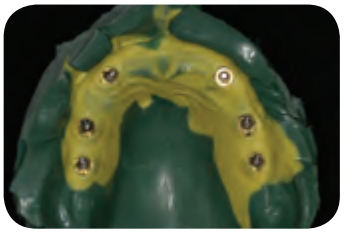

FIGURE 15C. An open-tray impression incorporating the impression coping assembly.

FIGURE 16A. Implant impression copings secured to implants.

FIGURE 16B. Impression copings splinted using light-activated resin gel.

FIGURE 16C. Impression coping assembly removed.

FIGURE 17A. Impression copings connected to implants.

FIGURE 17B. Impression copings splinted with metal rods.

FIGURE 17C. Implant analogs connected to impression coping assembly.

FIGURE 17D. Impression coping assembly used to form a verification cast.

FIGURE 17E. Verification cast completed.

from a sectioned framework without metal-to-metal contact.[1] Alternatively, modified worn burs with flattened edges can be used as connecting rods forming metal-to-metal contact (**FIGURES 17A-E**).

Indirect Technique

An additional method to fabricate a verification cast is the indirect technique utilizing the assistance of a laboratory in the preparatory steps. Although this technique requires another clinical step for a preliminary impression, the laboratory preparations render the following steps easier and faster as outlined below.

1. Make a preliminary impression of the implants with a stock tray using the simplest method of choice (**FIGURES 18A-C**).

2. Laboratory: Pour impression to form a preliminary cast with implant analogs. Prepare a sectioned impression coping assembly on preliminary cast by splinting copings with resin and sectioning them similarly to steps 2-3 in the direct technique above. If a definitive impression is planned, prepare a custom tray with opening for impression copings screws (**FIGURES 18D-F**).

3. Attach impression coping segments to implants intraorally and splint them together using resin as described in step 4 above (**FIGURES 18G-I**).

4. Remove assembly and create a verification cast as in steps 5-8 above.

5. If an impression is planned, replace impression coping assembly intraorally and make a definitive impression with a custom tray as in step 9 above (**FIGURE 18J**).

Provisional Restoration-based Technique

This approach is using an existing screw-retained provisional prosthesis or a conversion prosthesis as an impression coping assembly.[25,26] Using this method, a preliminary cast is created thus combining the benefits of the direct and indirect techniques.

1. Remove provisional prosthesis from the patient's mouth. Connect implant analogs to prosthesis. Insert the prosthesis with analogs into a mixture of quickset plaster to form a preliminary cast similarly to step 7 of the direct technique (**FIGURES 19A-C**).

2. Follow steps 2-5 of the indirect technique (**FIGURES 19D-G**).

Restorative Work Flow With Verification Cast

1. Fabricate a verification cast using one of the methods described above in addition to conventional records needed for implant prosthesis fabrication (**FIGURE 19G**).

2. Instruct laboratory to design the framework using the master cast but ensure fit of framework to verification cast (**FIGURE 19H**). In CAD/CAM frameworks, the verification cast is digitally scanned to obtain correct implant positioning.

3. Obtain completed framework from laboratory. Inspect framework on verification cast prior to scheduling

FIGURE 18A. Patient's maxilla with six implants ready to be restored.

FIGURE 18B. Closed-tray transfer impression coping connected to implants.

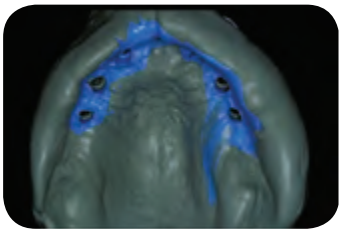

FIGURE 18C. Preliminary closed-tray impression made with VPS material (Reprosil, Dentsply).

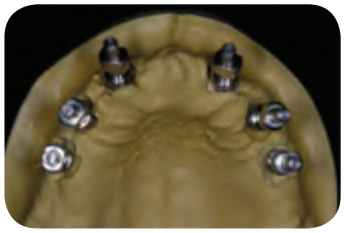

FIGURE 18D. Preliminary cast with open-tray impression copings.

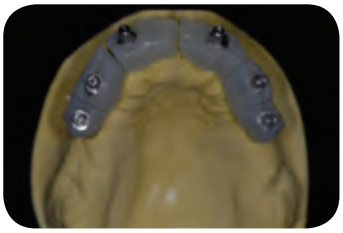

FIGURE 18E. Sectioned impression coping assembly made on preliminary cast using Triad composite resin (Dentsply).

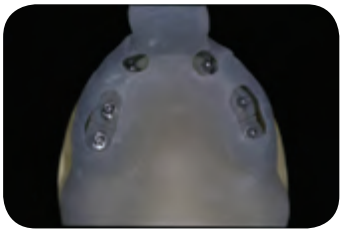

FIGURE 18F. Custom tray made on preliminary cast with impression coping assembly.

FIGURE 18G. Sectioned impression coping assembly connected to implants.

FIGURE 18H. Splinting impression coping assembly segments using acrylic resin (GC Pattern Resin).

FIGURE 18I. Impression coping assembly completed and ready for fabrication of verification cast.

FIGURE 18J. Open-tray impression picking up the impression coping assembly after a verification cast was made.

patient's appointment (**FIGURE 19H**). If the fit is unacceptable, return framework and verification cast to laboratory for correction. Repeat the process until the framework fit is acceptable and only then schedule the patient to confirm fit intraorally (**FIGURES 19I-K**). Proceed with restorative process conventionally thereafter to complete the prosthesis (**FIGURE 19L**).

Discussion

When working with autopolymerizing acrylic resin, it is important to ensure adequate polymerization. Although manufacturer's instructions indicate resin setting time of three minutes (GC Pattern Resin LS), studies have reported on continuous acrylic resin shrinkage within 24 hours.[28] It has been shown that 80 percent of autopolymerizing poly-methyl-methacrylate shrinkage occurs within 17 minutes at room temperature, at which point it may be clinically practical to consider it stable.[28]

In order to compensate for resin shrinkage in the impression coping assembly, it is recommended to section the impression coping assembly and reconnect it with a minimal layer of resin material. Sectioning relieves the stresses in the material and resplinting allows the inevitable distortion to occur over a smaller gap creating a more accurate result. The volumetric shrinkage of this resin is in the range of 7 percent and its linear shrinkage is approximately 0.4 percent.[12,28] Therefore, if this material is used to splint a gap of 250µ, it is expected to shrink by 1µ, which is 0.4 percent of the gap.[29] Studies on Triad light-activated resin demonstrated shrinkage values of 0.2-0.38 percent.[30,31]

The verification cast system is designed to provide a trusted cast at the beginning of the restorative process. This is an essential tool in CAD/CAM fabrication of titanium or zirconia frameworks, which require the computerized scanning to be done on an accurate cast and are not designed to be cut and soldered.

FIGURE 19A. Edentulous maxilla with eight implants.

FIGURE 19B. Provisional prosthesis removed.

FIGURE 19C. Implant analogs connected to provisional prostheses and inserted into low-expansion plaster to form a preliminary cast.

FIGURE 19D. Preliminary cast is used to form a preliminary sectioned impression coping assembly.

FIGURE 19E. Impression coping assembly splinted intraorally with minimal resin.

FIGURE 19F. Implant analogs attached to impression coping assembly in preparation for verification cast fabrication.

FIGURE 19G. A verification cast made from the impression coping assembly.

FIGURE 19H. The verification cast is used to fabricate framework and verify fit prior to intraoral evaluation.

FIGURE 19I. Intraoral evaluation of framework confirms proper fit.

FIGURE 19J. Radiographic evaluation of framework fit using the one-screw test.

FIGURE 19K. Radiographic evaluation of framework fit using the one-screw test.

FIGURE 19L. Definitive prosthesis inserted.

Advantages of Verification Cast

The verification cast system presents the following advantages compared to the conventional restorative technique.

Capturing: It eliminates hard- and soft-tissue undercuts with differences in path of draw that may exist between implants and tissues in contrast to conventional impression.

Controlled fabrication — on site: It can be easily made and poured up in the dental office as opposed to implant impressions that are more complex to pour and are typically sent out to a laboratory. It allows the clinician to obtain complete control of this record and absolute trust in its precision by eliminating potential errors from delegation to a third party, from off-site shipping under uncontrolled temperatures, and from using technicians with different skill levels.

Controlled fabrication — immediate: It can be made immediately after the impression coping assembly was created minimizing the effect of continuous distortion of acrylic resin over time.[28]

Controlled fabrication — no vibrator: The use of a plaster vibrator is not needed

while creating the cast in contrast to conventional impressions. Therefore, the risk of screw loosening and unnoticeable dislodgement of analogs during impression pour up on the vibrator are eliminated.

Controlled fabrication — no excessive torque: There is no need to apply high torque while tightening implant analogs to impression copings as typically done for impressions poured on a vibrator, as there is no need to resist the loosening tendency during vibration. Eliminating excessive torque minimizes distortion due to rotational movement of impression copings.

Controlled fabrication — minimal amount of plaster: The verification cast uses a minimal amount of plaster in a simple geometric form in contrast to conventional casts that feature a larger amount in more complex forms.

Prosthesis fabrication: The cast is not used for prosthesis fabrication. It does not need to be subjected to trimming, mounting, and other forms of contamination from water or foreign materials. Therefore, it will be less likely to become cracked, abraded, or distorted.

Preliminary evaluation of fit: It is used as a verification tool for framework fit prior to patient's appointment. Direct visibility of implant framework interface that is typically subgingival and lack of soft-tissue resistance to insertion make the verification cast an optimal tool for meticulous framework evaluation. There is no time limit or pressure to accept a questionable framework as the patient is not involved in this process and operatory time is not used.

Predictable try-in procedures: A reliable record facilitates the laboratory technician work, minimizes chairtime and enhances predictability of treatment as well as patient confidence.

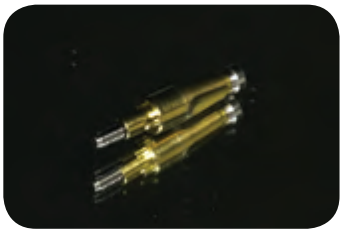

FIGURE 20A. Closed-tray impression coping with long engaging component not recommended for splinting (Nobel Biocare).

FIGURE 20B. Open-tray impression coping with a short engaging component and wider path of draw facilitates splinting (Nobel Biocare).

FIGURE 20C. Dual-purpose impression coping with parallel walled engaging component and limited path of draw (Imtec 3M, Ardmore, Okla.).

FIGURE 20D. A nonengaging waxing sleeve with short nonengaging component is advantageous for splinting in extreme angulation (Imtec 3M).

Limitations of Verification Cast

In implants placed in extreme angulations, the accuracy of verification cast may be questionable. Due to limited or no path of draw, removal of a rigidly splinted impression coping assembly from the patient's mouth may result with flexure and distortion.

It is important to understand that restorative components of different implant manufacturers differ considerably and may perform differently in challenging situations. Caution should be exercised with implant components of minimal tolerance of fit, especially with internal connection implants and components that engage a significant portion of the implant and offer a limited path of draw (**FIGURES 20A, C**).

Some implant systems provide different impression copings for open-tray and for closed-tray impressions (**FIGURES 20A, B**) while others offer only one impression coping for both techniques (**FIGURE 20C**). Dedicated open-tray copings will facilitate splinting and minimize error as they feature a shorter engaging component with a wider path of draw similar to that of external hex implants.

For these reasons, it is advised to study the implant system used carefully and choose components with minimal engaging depth and a wide path of draw prior to creating an impression coping assembly (**FIGURE 20B**). In certain situations with extreme angulation of implants, nonengaging temporary cylinders can be used to create an impression coping assembly and fabricate a verification cast (**FIGURE 20D**).

Conclusion

The use of a verification cast can easily overcome the disadvantages of the conventional technique and simplify the restorative sequence especially in large restorations. It offers a reliable implant positioning record, created by the clinician, that can be trusted throughout the restorative process. It offers a trustworthy cast for framework fabrication that can substitute intraoral sectioning and indexing.

Using this system, the framework can be evaluated on the verification cast prior to the clinical appointment and returned to the lab for correction if needed without waste of precious chairtime. It has the potential to minimize distortions related to materials and procedures and control the human errors related to them. Overall, it minimizes chairtime, simplifies the restorative process and enhances the predictability of treatment. ■■■■

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LOMA LINDA UNIVERSITY
School of Dentistry

Dentistry in the Digital Era

October 17 & 18, 2010
Sunday and Monday

Focus on cone beam technology and esthetic implant treatment

Synopsis

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Monday's presentation will focus on the next dimension in implant esthetics, facial gingival tissue stability in esthetic implant dentistry, general consideration for custom ceramic abutments, and rationale and indications for custom ceramic abutments. A lecture and demonstration on a newly developed interactive program on head and neck anatomy for dentistry will be presented.

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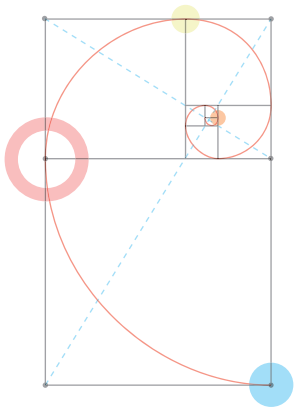

Challenges in Achieving Gingival Harmony

ZIV SIMON, DMD, MSC, AND ARI ROSENBLATT, DMD, DDS

ABSTRACT Gingival harmony is an important element in the esthetics of the smile. Clinicians need to have the essential knowledge to create an optimal soft-tissue profile around teeth and implant restorations. The goal of this article is to describe the requirements for ideal gingival architecture and techniques used to achieve them. The patient presentations in this article will demonstrate different aspects of esthetic soft-tissue surgery as well as treatment challenges and limitations.

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Providing patients with a healthy, functional and esthetic dentition is the focus of the dental profession. The surrounding soft tissues, supporting bone, and temporomandibular joints, have also gained equal attention. It is now evident that in order to achieve success in patient treatment all the different elements in the oral cavity as well as the related structures need to be considered. A significant part of this success is achieving the ultimate goal of patient satisfaction. Currently, advances in dental materials, technology, and surgical techniques allow patients to benefit from a variety of predictable and esthetic procedures.

When blending the dentist's proficiency and talent with the dental technician's mastery, a life-like restoration can be created. However, in order to achieve an ultimate esthetic outcome, as well as patient satisfaction, it is crucial to have proper soft tissues surrounding the restoration.

The goal of this article is to describe the key requirements for harmonious gingival architecture and their importance in the esthetics of the smile. The clinical case reports presented in this article will demonstrate the inherent difficulties in achieving gingival harmony as well as the limitations of such treatments.

Gingival Harmony

Proper gingival architecture is a crucial complementary element in the esthetic success of restorations. As an analogy, the gingiva is similar to a frame enclosing beautiful painting. The frame complements the painting's beauty but

FIGURE 1. Preoperative view with original fixed partial denture.

FIGURE 2. Preoperative view with provisional restoration.

FIGURE 3. Preoperative view, provisional restoration removed.

can detract from it, if unsightly. Various soft-tissue factors have been extensively described in the literature and it is the clinician's responsibility to understand them and their impact on the final outcome. A review of the literature provides an abundance of information on ideal tissue factors, specifically in relation to gingival health, quantity, quality, as well as particular positioning and symmetry.

First and foremost, presence of healthy gingivae is an essential criterion for esthetic success.[1] Periodontal health should be continuously maintained with minimal probing depths, as well as absence of edema, erythema, and bleeding on probing. Persistent gingival inflammation, in spite of meticulous oral hygiene, may indicate a flaw in the restoration design or placement. Therefore, restorative treatments should also be mindful of the attachment apparatus with proper margin placement and fit. Anatomical restorative contours, with no impingement on the biologic width, are critical for tissue health and will therefore contribute to the long-term esthetics of the gingivae.

Variability in gingival color is not always related to inflammation but can also stem from ethnic factors and different concentrations of melanotic gingival pigmentations. As such, it is typically not an esthetic concern for patients due to the generalized distribution. Conversely, a localized dark appearance of the gingivae is unsightly and can sometimes be attributed to a discolored root following endodontic therapy. In combination with a thin gingival biotype, the root's dark hue can show through the gingivae. A similar problem occurs with titanium dental implants and abutments surrounded by thin bone and soft tissue. The latter problem is usually preventable by adequate tissue grafting prior to and simultaneously with the implant surgery. Preoperative evaluation of tissue biotype could assist clinicians in avoiding these particular complications.

An esthetic gingival margin has a scalloped appearance and a balanced transition between teeth. Knife-edge marginal gingiva that is tightly adapted to the tooth surface was described as ideal.[2] In general, symmetry is a significant esthetic attribute and also applies to the gingival line. This necessitates the presence of identical tissue levels between contralateral teeth.[3] The gingival margins of the maxillary central incisors and the canines should be symmetric and more apical to the lateral incisors.[4] Additionally, Garber and Salama suggested that in optimal gingival architecture the maxillary gingival line follows the upper lip line.[5]

The gingival zenith is a component of the gingival line and refers to the most apical point of the gingival tissue on the buccal aspect of the clinical crown. It extends an average of 1 mm distal to the axial inclination of the maxillary incisors and 0.5 mm on lateral incisors.[1] The zenith of the maxillary canines usually coincides with the vertical axis of the tooth. In the vertical dimension, the zenith of the lateral incisors is found approximately 1 mm coronal to the adjacent central incisors and canines.[1]

Improper vertical gingival levels can be characterized as either deficient or excessive. Both conditions affect normal teeth proportions and have a direct correlation to esthetics.

The majority of patients exhibit some gingivae in a smile.[6] However, excessive gingival display can lead to patient dissatisfaction. Kokich et al. demonstrated that gingival display of more than 4 mm in a smile is considered unesthetic by lay people.[7] Well-documented procedures for the reduction of excessive gingivae are available and their application depends on the patient's particular diagnosis. Delayed passive and active eruption or attrition and compensatory eruption are ideally treated with surgical crown lengthening.[8] The procedure reduces the gingival display as well as restores normal teeth proportions. The use of orthodontic intrusion was also suggested as well as orthognathic surgery for the correction of vertical maxillary excess and improvement of the excessive gingivae shown in a smile.[9]

Gingival recession may cause teeth to appear abnormally long and therefore unesthetic. Another esthetic compromise is due to exposure of root anatomy and discoloration. A variety of root coverage techniques are available to treat patients presenting with this problem.[10] They include subepithelial connective tissue grafting, coronally repositioned flaps, soft-tissue allografts and guided-tissue regeneration procedures.[11-14]

The interdental papillae are of special esthetic significance since they are usually visible in a smile. This tissue defines the most incisal extent of the gingival line and creates different levels of a scalloped appearance. A normal interdental papilla fills the embrasure space to the contact point and any deviation will cause the appearance of a "black triangle" esthetic deficiency.[15]

FIGURE 4. Orban knife shown following an intrasulcular incision.

FIGURE 5. Pouch creation with Orban knife.

FIGURE 6. Distal extension of the pouch using the Orban knife.

FIGURE 7. Undermining the edentulous ridge using the Orban knife.

The height of the papilla depends on the underlying interproximal bone as well as the periodontal attachment to the two adjacent teeth. Tarnow stated that the papilla is likely to be present if the distance between the interproximal bone crest and the contact point is 5 mm or less. This was an attempt to predict the presence of the papilla as it relates to the above-mentioned distance.[16]

The papillae are especially susceptible to trauma and should always be treated with the utmost care during surgical and restorative procedures. Several case reports describing surgical reconstruction of the interdental papilla are found in the literature.[17,18] However, due to the lack of proper scientific research and in the experience of the authors, surgical reconstruction of damaged interproximal tissue is currently considered nonpredictable. Therefore, gentle minimally traumatic techniques should always be applied and papillae reflection should be avoided where possible.

From this summary it is apparent that gingival esthetics is rather complex and depends on a multitude of elements. Achieving gingival harmony can be defined as achieving a pleasing combination of all the different elements mentioned previously. Although satisfying each separate requirement may be challenging, it is the clinician's responsibility to aim for an optimal soft-tissue result. The following patient presentations demonstrate, in a step-by-step fashion, surgical treatment for root coverage and implant replacement of a maxillary central incisor. They emphasize the need for close attention to details and an attentive approach toward esthetics. Certain challenges as well as critical analysis of the techniques and outcomes are outlined.

Clinical Case Report No. 1 — Root Coverage

A healthy 63-year-old female presented with a chief complaint of an esthetically displeasing fixed partial denture (FPD) and recession on tooth No. 11 (**FIGURE 1**). Teeth Nos. 9 and 10 have been missing for more than 20 years and the edentulous space was restored in her home state with a FPD bonded to the palatal aspect of teeth Nos. 8 and 11. While it was functional for many years, the patient expressed dissatisfaction with its color and shape and wanted to improve the esthetics of her smile. CT scan analysis revealed sites Nos. 9 and 10 were inadequate for implant placement without significant hard- and soft-tissue augmentation. The patient declined the option of implant placement and elected to have a new FPD with improved esthetics. Tooth No. 11 presented with 7 mm gingival recession extending coronally to the mucogingival junction and with less than 1 mm of attached gingivae. A noncarious lesion was noted on the cervical aspect of the tooth. The recession was attributed to the patient's traumatic brushing technique and possibly to occlusal trauma as a co-factor in the recession process. Tissue loss was also observed on the FPD pontics, Nos. 9 and 10, and on the mesial aspect of tooth No. 11.

The latter was a concern in regard to the intended soft-tissue grafting procedure. Blood supply for a soft-tissue graft depends on the presence of interproximal tissue. Therefore, the potential blood supply appeared to be compromised and the predictability of papilla formation on the mesial aspect of No. 11 was determined to be low. The distal interproximal tissue was adequate. In lieu of that, a decision was made to perform soft-tissue grafting without flap elevation to maximize blood supply to the graft.

The initial restorative step was removal of the existing FPD and replacement with a provisional restoration (**FIGURE 2**). The provisional FPD was then removed to allow access to the surgical site (**FIGURE 3**). Following adequate local anesthesia, an incision was carried into the gingival sulcus of the left maxillary canine using a 15C blade. An Orban knife was used to create sharp dissection beyond the mucogingival junction (**FIGURES 4 AND 5**). This dissection separated the periosteum from the overlying connective tissue, thus creating a pouch to accommodate a soft-tissue graft. The pouch was extended sufficiently apically and laterally to create a vascular site (**FIGURES 6 AND 7**). Following this step, the pouch could be seen communicating with the gingival sulcus of tooth No. 12 by

FIGURE 8. Communication with the sulcus of tooth No. 12 by design, demonstrated with a periodontal probe.

FIGURE 9. Soft-tissue graft inserted into the mesial aspect of the pouch and sutured to the gingivae of the edentulous ridge. A second suture is being attached to the distal aspect of the graft.

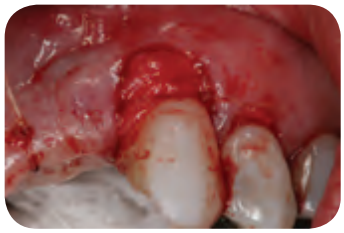

FIGURE 10. Soft-tissue graft inserted into the distal aspect of the pouch and sutured.

FIGURE 11. Flap coronally repositioned and sutured using a sling technique around No. 11.

FIGURE 12. Definitive restoration at six month postoperatively. (Restoration by Dr. Rick Glassman, Beverly Hills, Calif.)

FIGURE 13. Two years postoperatively.

design (**FIGURE 8**). Care was taken not to perforate the overlying flap by keeping the blade parallel with the bone and constantly observing the tissue response from the buccal aspect. Flap perforation compromises the blood supply and can potentially jeopardize the vitality of the graft. Additionally, the perforated site is a port of entry for oral bacteria to cause infection.

A subepithelial connective tissue graft (SECTG) was harvested from the palatal aspect of teeth Nos. 12, 13, and 14. The harvest was initially done by creating two parallel incisions. The first was a superficial incision leaving the epithelial layer intact. The second was a profound incision slightly above the bone layer leaving the periosteum intact. To complete the harvest procedure, mesial, distal, and apical incisions were necessary. The harvested graft measured 20 mm in mesiodistal length and about 8 mm in apicocoronal length. Hemostasis was achieved using adequate pressure and placement of an absorbable gelatin sponge (Gelfoam, Pfizer Manufacturing, Belgium) in the donor site.

Additionally, the donor site was sutured with absorbable gut 5/0 suture material. The connective tissue graft was then trimmed to remove tissue tags and adipose tissue and two separate absorbable gut 5/0 sutures were connected to each end. This step was essential to allow precise placement of the graft into the pouch recipient site. The graft was pulled into the pouch's mesial aspect using the preattached suture (**FIGURE 9**). It was stabilized by suturing the mesial end to the attached gingivae of the edentulous ridge. The distal aspect of the graft was then placed in the distal aspect of the pouch using the same technique (**FIGURE 10**).

The buccal flap was then coronally repositioned to cover the graft using a sling suture with an absorbable monofilament polyglyconate 6/0 suture material (Maxon, Covidien Syneture, Mansfield, Mass.) (**FIGURE 11**). Stability of the graft was verified by a light pull on the lip. The provisional restoration was then recemented using temporary cement. Routine postoperative instructions were given to the patient and included an antibiotic regimen, analgesics and anti-inflammatory medications.

A one-week postoperative examination demonstrated adequate healing and vitality of the graft characterized by redness and slight swelling. Six-month postoperatively, a definitive restoration was completed (**FIGURE 12**). The buccal tissue was of adequate levels with a significant root coverage result and the esthetic outcome was satisfactory to the patient. As anticipated during the diagnosis and treatment planning phase, the tissue between Nos. 10 and 11 and between Nos. 9 and 10 was deficient. The papillae were of inadequate volume due to compromised bone height. It is of note, that a slight residual gingival recession was still apparent on the buccal aspect of No. 11, emphasizing the limitations of treatment in this particular case. **FIGURE 13** shows tissue stability at a two-year postoperative appointment. The probing depths were minimal demonstrating stable periodontal attachment to the previously denuded root surface (**FIGURE 14**).

This report demonstrated a technique for root coverage using a connective tissue graft and a pouch procedure. The principles of obtaining blood supply for the graft and a conservative flap management were applied. It demonstrated the limitations of soft-tissue grafting and the importance of their preoperative recognition.

FIGURE 14. Minimal probing depths demonstrating periodontal attachment at two years postoperatively.

FIGURE 15. Preoperative view with damaged No. 8.

FIGURE 16. Socket following extraction of No. 8 and presence of buccal plate.

FIGURE 17. Particulate bone allograft in the extraction socket.

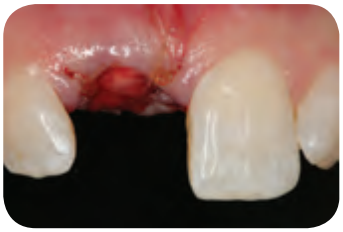

FIGURE 18. A collagen plug for socket seal and suturing.

FIGURE 19. No. 8 site prior to implant placement.

FIGURE 20. Buccal view of site following implant placement with fixture mount. Two vertical papillae sparing incisions.

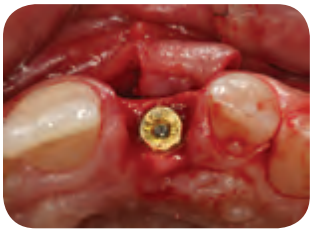

FIGURE 21. Occlusal view after fixture mount is replaced with a cover screw. Crestal palatal incision is noticeable.

Case No. 2 — Implant Replacement of a Maxillary Central Incisor

A healthy 27-year-old female presented with a chief complaint of pain associated with tooth No. 8 (**FIGURE 15**). The cingulum and part of the root fractured below the osseous level rendering the tooth nonrestorable. Extraction with implant placement was recommended to the patient. The timing of implant placement after the extraction was considered (immediate versus delayed placement protocols). An immediate implant placement necessitates that the osteotomy primarily engages the palatal aspect of the socket. Due to the presence of an acute infection associated with the palatal aspect of the tooth, this option was not advisable and a delayed protocol was recommended. The patient was also advised to consider orthodontic treatment due to teeth crowding and less than ideal space status. She declined this option and stated that her objective was to replace the damaged tooth with an implant-supported crown that would resemble the original tooth. A treatment plan was formulated to include extraction of No. 8 with simultaneous bone augmentation, immediate replacement with an interim removable partial denture (RPD), CT scan analysis, possible additional hard- and soft-tissue grafting, a two-stage implant surgery, and a definitive fixed restoration.

Following adequate local anesthesia, tooth No. 8 was luxated using straight elevators, periotomes, and universal forceps. Care was taken not to traumatize the soft tissue and the osseous envelope and the tooth was extracted atraumatically. The extraction socket was debrided and the granulation tissue was removed. The buccal bony wall was verified to be intact (**FIGURE 16**). The socket was then grafted (**FIGURE 17**) with a cancellous bone allograft (Puros Cancellous Allograft, particle size 0.25-2 mm, Zimmer Dental Inc., Carlsbad, Calif.). A collagen plug was placed to seal the socket at its coronal aspect (CollaPlug Collagen Wound Dressing, Zimmer Dental Inc.) and an absorbable gut 4/0 suture was used (**FIGURE 18**). An immediate interim RPD was inserted.

One week postoperatively, the patient appeared to be healing properly with no complications. Due to the severe infection, five months were needed for the site to reach its maximal healing potential from a clinical and radiographic aspect. The patient was then referred for a CT scan to evaluate the site for implant placement. The CT scan showed adequate bone for implant placement. However, bone loss was evident. Implant surgery was recommended and the patient was informed that additional tissue grafting would be necessary.

The patient was scheduled for implant surgery not until three months later due to

FIGURE 22. Buccal view of primary flap closure.

FIGURE 23. Occlusal view of primary flap closure.

FIGURE 24. Buccal tissue concavity is evident from an occlusal view.

FIGURE 25. Crestal palatal incision seen from an occlusal view.

FIGURE 26. Buccal view of two vertical papillae sparing incisions.

FIGURE 27. Orban knife used for sharp dissection under the buccal flap.

FIGURE 28. Orban knife creates a pouch beyond the mucogingival junction.

FIGURE 29. Spoon-shape elevator used to extend the pouch.

FIGURE 30. Pouch is extended apically and laterally.

her work and study schedule (**FIGURE 19**). Following adequate local anesthesia, a crestal palatal incision was made and combined with two vertical releasing incisions (**FIGURES 20 AND 21**). This incision is commonly known as the "papillae-sparing" technique since it leaves adequate proximal tissue attached to the mesial aspects of teeth Nos. 7 and 9. A full thickness flap was then elevated to expose the implant site. A surgical guide was used for optimal implant placement from a prosthetic perspective. A 3.8 mm in diameter by 13 mm in length tapered implant was placed and achieved initial stability with 35 Ncm insertion torque.

Following placement of a cover screw, the tissue was sutured primarily using nonabsorbable monofilament 4/0 suture (Gortex, Gore Medical, Flagstaff, Ariz.) and absorbable gut 5/0 materials (**FIGURES 22 AND 23**). The implant was left to heal for five months and then evaluated for the planned uncovering procedure. A buccal tissue deficiency was noted (**FIGURE 24**), and the goal was to enhance the soft-tissue profile around the implant once it is uncovered.

Following adequate local anesthesia, a crestal palatal incision was made with two vertical releasing incisions repeating the previous incision lines (**FIGURES 25 AND 26**). A full thickness flap was then elevated to expose the implant that seemed to be osseointegrated. The buccal tissue was undermined using an Orban knife to create a similar pouch to that described in case 1 (**FIGURES 27 AND 28**). A small spoon-shaped elevator was used to extend the pouch apically and laterally (**FIGURES 29 AND 30**). Additional horizontal soft-tissue augmentation was obtained by using a soft-tissue allograft (Puros Dermis Allograft, Zimmer Dental Inc.). Two absorbable gut 5/0 sutures were attached to the graft on its mesial and distal aspects (**FIGURE 31**). These sutures were then used to guide the tissue into the pouch in their corresponding sides (**FIGURES 32 AND 33**).

The graft was then secured with the very same guiding sutures and sutured to the adjacent attached gingivae. A healing abutment was connected and the palatal tissue was repositioned buccal to it. Flap suturing around the healing abutment was completed using absorbable monofilament polyglyconate 6/0 (Covidien Syneture, Mansfield, Mass.) and absorbable gut 5/0 suture materials (**FIGURES 34 AND 35**). Postoperative evaluations showed adequate healing with increased horizontal tissue volume (**FIGURES 36 AND 37**). The patient was then referred to her restorative dentist to complete the restorative process.

At a one-year follow up appointment, the patient expressed satisfaction

FIGURE 31. A resorbable suture is connected to one end of the soft tissue allograft.

FIGURE 32. Soft-tissue allograft inserted into the pouch. The distal suture end penetrates the buccal gingivae of tooth No. 7.

FIGURE 33. Soft-tissue allograft pulled with gut suture into distal aspect of pouch. An additional suture is connected to the mesial aspect of the graft.

with the esthetic outcome (**FIGURES 38 AND 39**). The gingival margin was symmetrical between the two central incisors and interdental papillae were present. Radiographically, the implant bone levels appeared stable with proper restorative contours (**FIGURE 40**). Stable results were observed at the two-year follow up appointment (**FIGURES 41 AND 42**).

Subsequently, the following deficiencies were not apparent in the patient smile but are of note for critical analysis of the treatment outcome and are relevant in the context of this article's topic.

As anticipated in the diagnostic phase, the mesiodistal width of No. 8 was slightly greater than the contralateral tooth. It is assumed that the recommended orthodontic treatment would have allowed for better tooth proportions to be created.

It can be observed that the tissue texture around No. 8 is not identical to tooth No. 9 and presented with slight surface irregularities. Additionally, scar tissue on the mesiobuccal gingival area of No. 8 can be observed. This scar tissue is a result of the vertical releasing incisions in the area.

From a treatment planning perspective, it might have been beneficial to graft the buccal bone and soft tissues at the time of implant placement. This would have been a surgical opportunity to create additional horizontal augmentation of the alveolar ridge that underwent significant horizontal resorption throughout the lengthy treatment process.

Of note were the changes in the gingival margin of tooth No. 9 over time. The gingival zenith that was visible prior to tooth No. 8 extraction was not present at the one-year follow-up and the gingival architecture appeared round (**FIGURE 39**). Studies have shown continuous maxillary skeletal growth with continuous eruption of teeth adjacent to implants.[19-21] This may ultimately result in an infraocclusal positioning of a single-implant restoration. The changes in the gingival line of tooth No. 9 could be attributed to the above-mentioned reasons. Surgical trauma was not a likely reason, since the soft tissue on tooth No. 9 was never reflected given that the "papillae-sparing" incision design was utilized (**FIGURES 20 AND 28**). In effect, this was a favorable change since the gingival architecture is now symmetrical to the adjacent implant crown.

The issue of implant placement timing following tooth extraction is of great

FIGURE 34. Buccal view of suturing around healing abutment and graft stabilization in the gingivae of the adjacent teeth.

FIGURE 35. Occlusal view of suturing around healing abutment.

FIGURE 36. Occlusal view following a three-week healing period. Note horizontal augmentation compared to Figure 24.

FIGURE 37. Buccal view following healing.

FIGURE 38. Definitive implant restoration in a smile. (Restoration by Dr. Alan Zweig, Beverly Hills, Calif.)

FIGURE 39. Definitive restoration in retracted view.

FIGURE 40. One-year radiographic follow-up.

FIGURE 41. Two-year follow-up.

FIGURE 42. Two-year radiographic follow-up.

importance. Using immediate placement protocols offers a shortened treatment time and a reduced number of surgical procedures. It appears that immediate implants have a comparable survival rate to delayed implants (>95 percent).[22] However, the data on esthetic outcomes and soft-tissue complications is still lacking. Additionally, immediate implantation is not able to prevent the horizontal resorption of the alveolar ridge.[23,24] Therefore, it may be prudent to allow for soft- and hard-tissue healing prior to implant surgery and to consider compensatory tissue grafting as demonstrated in this case.

Conclusions

Gingival esthetics is an important component of an attractive smile and depends on a multitude of factors. Tissue health, quantity, quality, symmetry, and balance are among the most essential of them. It is important for clinicians to have the knowledge about the ideal esthetic goals as well as the clinical skills to achieve them.

The clinical reports in this article demonstrated different aspects of soft-tissue management in an attempt to achieve pleasing gingival esthetics around restorations. Clinicians are encouraged to give emphasis to the diagnosis and treatment-planning phase and recognize treatment challenges and limitations preoperatively. It can be anticipated that careful soft-tissue management, along with adherence to biologic and esthetic principles, will increase the likelihood of successful outcomes. ■■■■

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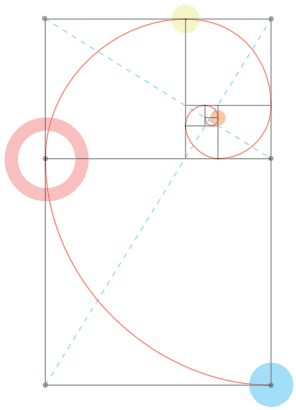

Orthodontic Treatment of a Complex Open-Bite Malocclusion With Temporary Anchorage Devices: A Case Report

ALEXANDER B. WALDMAN, DMD, MMSC

ABSTRACT Orthodontic temporary anchorage devices provide a novel alternative to orthognathic surgery for the treatment of severe anterior open-bite malocclusions. These implantable devices provide skeletal anchorage for maxillary molar intrusion, allowing for mandibular autorotation and subsequent open-bite closure. This case demonstrates step-by-step treatment of a 41-year-old woman with a severe open-bite malocclusion. Detailed orthodontic mechanics are described at every stage of treatment.

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Temporary anchorage devices, TADs, are implantable oral devices that have recently become part of the standard orthodontic armamentarium. They have dramatically expanded the scope of routine orthodontic treatment for both adult and adolescent patients due to their ability to provide skeletal, or "absolute," anchorage.[1] TADs are available in multiple forms including palatal implants and surgical miniplates, but recent attention has been given to the "miniscrew" or "microimplant."[2]

Microimplants are small-diameter temporary implants that are not intended to osseointegrate, but rather rely on cortical retention for stability.[3] Microimplants have become popular amongst orthodontists due to their low cost, ease of placement, effectiveness at treating a variety of malocclusions, and their ability to be used as direct or indirect anchors for orthodontic tooth movement.[2] Furthermore, their small diameter allows for a wide range of surgical sites, including inter-radicular placement.

Prior to the advent of TADs, severe open-bite malocclusions were generally treated with orthognathic surgery.[4,5] With TADs, it is now possible to intrude the maxillary posterior teeth and achieve mandibular autorotation and anterior bite closure without the use of osteotomies.[6] It is also possible to correct an occlusal plane cant.[7]

Several published reports have demonstrated the clinical utility and success of this technique.[8,9] However,

FIGURE 1A.

FIGURE 1B.

FIGURE 1C.

FIGURE 1D.

FIGURE 1E.

FIGURES 1A–E. Pretreatment extraoral photographs. Poor smile esthetics, occlusal cant, long lower face height, bimaxillary retrusive profile.

the specific steps involved in managing the orthodontic mechanics and the timing of various treatment stages are not as well documented. The aim of this paper is to highlight the step-by-step clinical treatment of a complex open-bite malocclusion with microimplants from diagnosis through retention.

Case Report

Diagnosis, Treatment Goals, and Treatment Plan

A healthy 41-year-old woman presented with a chief complaint of, "I want to fix my bite and eat normally." Clinical examination revealed a severe open-bite malocclusion with occlusal contact only on the right third molars. Other significant findings included a tapered maxillary arch form, a mandibular midline deviation, wear facets on the posterior teeth, a cant of the occlusal plane, and mild mandibular anterior crowding. The patient reported a history of orthodontic treatment as an adolescent during which three premolars (Nos. 5, 12, and 29) and the mandibular left third molar (No. 17) were extracted. She also reported nonpainful clicking of the temporomandibular joints 10 years prior to this examination. No recent clicking or temporomandibular joint pain were reported by the patient or noted during the examination.

General orthodontic treatment goals for this patient included improvement in static and functional occlusion, periodontal stability, dental esthetics, and facial harmony. Specific goals were to close the bite, establish anterior guidance, eliminate the cant of the occlusal plane, close the mandibular plane angle, and improve the smile esthetics by leveling the maxillary arch and modifying the maxillary arch form.

Initially the patient was presented with an orthognathic surgery plan that she rejected due to her fear of surgery. TAD-anchored intrusion was then presented as a viable alternative to orthognathic surgery and the patient accepted this treatment plan, although she delayed starting treatment due to her phobias of dental treatment. She was informed that extraction of the third molars would probably be necessary in order to achieve bite closure. She was also informed of microimplant risks, including the possibility of implant failure that could necessitate replacement in the midst of treatment.

Treatment

The following steps were taken in the clinical management of this patient:

1. Orthodontic diagnostic records were taken, including mounted models in centric relation (**FIGURES 1A–S**). In addition to the standard orthodontic records, an MRI of the temporomandibular joints was ordered to assess the etiology of the open bite. Review of the MRI revealed bilateral anterior disc displacement without reduction, a condition associated with the development of anterior open bite.[10,11] However, from review of the medical and dental history and thorough review of the MRI, it appeared that the patient had reached an endpoint in significant joint changes and was stable. Due to the lack of TMD symptoms, no specific therapeutic modalities for the temporomandibular joints were recommended. A significant amount of time between the initial records and the

FIGURE 1F.

FIGURE 1G.

FIGURE 1H.

FIGURES 1F–J. Severe open bite and flattened cusps on the mandibular molars, indicating a history of progressive occlusal changes.

FIGURE 1I.

FIGURE 1J.

FIGURE 1K.

FIGURE 1L.

FIGURE 1M.

FIGURES 1K–M. Pretreatment mounted casts, labial view.

FIGURE 1N. Pretreament-mounted casts, right lingual view.

FIGURE 1O. Pretreatment mounted casts, left lingual view.

FIGURE 1P.

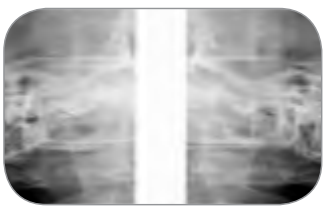

FIGURE 1Q.

FIGURE 1R.

FIGURE 1S.

FIGURES 1P–S. Pretreatment radiographs.

start of treatment, due to the patient's phobia of treatment, allowed for further confirmation of the clinical stability of the joints and the occlusion.

2. Model surgery was performed on a duplicate set of mounted dental casts to assess the results of extracting the remaining third molars. After partial bite closure was observed on the casts, the remaining third molars were extracted. The amount of clinical bite closure noted after the extractions (**FIGURES 2A–C**) closely matched the model surgery and confirmed the accuracy of the centric relation mounting.

3. Orthodontic treatment began with the banding of the maxillary molars using custom-soldered hooks on the palatal aspect of the first molar bands (to allow for easy application of elastic chain for intrusion), and surgical placement of (1.5 mm diameter, 6.5 mm length) microimplants (Spider Screw, OrthoTechnology, Tampa, Fla.) on the mesiobuccal and distobuccal aspect of the maxillary first molars.[12] Another microimplant was placed in the

FIGURE 2A.

FIGURE 2B.

FIGURE 2C.

FIGURE 2A–C. Postextraction of third molars. Note partial bite closure.

FIGURE 3A.

FIGURE 3B.

FIGURE 3C.

FIGURES 3A–C. Start of active orthodontic treatment; placement of buccal microimplants on right and left sides, and one microimplant to the right of the midpalatal suture.

FIGURE 3D. Note the transpalatal arch. It was removed at the next visit to allow for easier unilateral intrusion.

palate to the right of the maxillary midline suture (**FIGURES 3A–D**).The microimplants were self-drilling and were inserted transmucosally under local anesthesia. Multiple buccal implants were utilized in order to maximize anchorage and to allow for precise biomechanical control.

A transpalatal arch was also initially cemented in order to avoid buccal tipping of the molars during the application of intrusion forces. However, this transpalatal arch was removed after one visit to allow for easier unilateral intrusion mechanics on the right side. The palatal microimplant served in place of the transpalatal arch to help counteract any tendency for the molars to tip buccally.

Intrusion was initiated on the right side and the intrusion force was provided by an elastomeric chain that was attached from the right buccal and palatal microimplants to the maxillary right first and second molars. Since the application of force extended directly from the implant to the tooth, this is an example of "direct anchorage."

4. The palatal microimplant became mobile within three weeks of initial placement and was replaced at the next regularly scheduled visit. Additionally, the buccal microimplant between the right first and second molars was intentionally removed as it was originally placed too far occlusally and interfered with the intrusion mechanics due to contact with the buccal attachment on the second molar band. In place of this microimplant, another one was inserted distal to the second molar. The replacement of these microimplants did not impede the patient's progress and demonstrates the flexibility of this technique in adapting to biological and mechanical challenges.

5. After four months of treatment, the right molars were significantly intruded and the only occlusal contact was on the palatal cusp of tooth No. 4 (**FIGURES 4A–D**). In order for the mandible to autorotate and the bite to close, it was imperative to remove this contact. Therefore, a button was bonded on the palatal aspect of No. 4 and an elastomeric chain was attached from the button to the existing palatal implant.

6. Three weeks later, the palatal cusp of No. 4 was intruded and the sole occlusal contact was on the right canines. The patient reported severe discomfort due to the rapid change in her occlusion. The maxillary arch was immediately bonded (**FIGURES 5A–C**), and the maxillary right molars were held in an intruded position to serve as an indirect anchorage unit for intrusion of the right canine and for leveling of the occlusal plane with a round nickel-titanium archwire. The goal was to level and intrude the maxillary right canine without allowing molar extrusion. This goal would not have been achievable with traditional orthodontic mechanics, and therefore this stage of treatment highlights the clinical significance and novelty of the microimplant technique.

7. As No. 6 intruded and the last anterior interference was removed, the mandible autorotated and the bite began to close (**FIGURES 6A–D**). The cant of the maxillary occlusal plane also improved significantly.

8. Three and a half months after the bonding of the maxillary arch, a slight positive overbite was achieved and the left molars were in occlusion. In order to allow for further deepening of the overbite, the maxillary left posterior teeth required intrusion. Therefore, another palatal microimplant was placed to the left of the midpalatal suture and buccal and palatal intrusion forces were introduced on the left side. This addi-

FIGURE 4A.

FIGURE 4B.

FIGURE 4C.

FIGURES 4A–D. After three months of intrusion of the right molars, the sole contact was on the palatal cusp of No. 4. This contact was preventing autorotation of the mandible, so no change in the anterior open bite was yet observed. An elastic chain was attached from the existing palatal implant to a button bonded to No. 4.

FIGURE 4D.

FIGURE 5A.

FIGURE 5B.

FIGURE 5C.

FIGURES 5A–C. Maxillary arch was bonded and the right molars served as an indirect anchorage unit for intrusion of the right canine and leveling of the occlusal plane with the archwire.

FIGURE 6A.

FIGURE 6B.

FIGURE 6C.

FIGURES 6A–D. The maxillary arch is leveling and the bite is closing due to removal of occlusal interferences and autorotation of the mandible.

FIGURE 6D.

tional palatal implant was part of the initial treatment plan but was delayed until clinically necessary in order to prevent potential tongue irritation.

Since the right molars already were slightly out of occlusion, a light elastic force from the right palatal implant was used to keep them from erupting but no further active intrusion on the right side was necessary. This light force to the right second molar also helped improve its palatal crown torque. The mandibular arch was also fully bonded at this time (**FIGURES 7A–D**).

9. After four months of further intrusion (fully active on the left, light on the right), 2.5mm of overbite was achieved (**FIGURES 8A–D**) and the cant of the occlusal plane was corrected. Since the initial treatment goals were met, intrusion mechanics were stopped, but the microimplants were left in place in the event that they would be needed to counteract a relapse tendency. The total intrusion process was completed in 12 months.

10. Over the next seven months, the palatal microimplants were removed and detailing wires were used to perfect the alignment and the occlusion (**FIGURES 9A–D**).

11. The patient was debonded after 19 months of total treatment time and the microimplants were removed without incident and without the use of local anesthesia. Temporary thermoplastic retainers were immediately fabricated and Hawley retainers were delivered three months later.

12. Final records (**FIGURES 10A–L**)

FIGURE 7A.

FIGURE 7B.

FIGURE 7C.

FIGURE 7D.

FIGURES 7A–D. Occlusal contact of the left molars. In order to continue anterior bite closure and increase the overbite, intrusion of the left side was begun. The lower arch was also bonded at this time. Light intrusion of the right side (from the palatal only) continued in order to prevent extrusion of the right molars and to improve the crown torque of the maxillary right second molar.
.

FIGURE 8A.

FIGURE 8B.

FIGURE 8C.

FIGURE 8D.

FIGURES 8A–D. End of active intrusion.

FIGURE 9A.

FIGURE 9B.

FIGURE 9C.

FIGURE 9D.

FIGURES 9A–D. Detailing archwires in place. Palatal microimplants were removed.

were taken two months after debonding. Cephalometric superimpositions (**FIGURES 11A–C**) confirmed absolute intrusion of the maxillary molars and autorotation of the mandible. Facial assessment revealed an improvement in smile arc, profile, and occlusal cant. Mounted models in centric relation confirmed a coincident relationship of centric occlusion and maximum intercuspation.

13. Nine-month post-treatment records showed excellent stability (**FIGURES 12A–H**). Long-term results on the stability of this technique were not yet available in the orthodontic literature at the time of publication.

Discussion

TADS vs. Orthognathic Surgery

An anterior open bite is recognized as a difficult orthodontic problem to correct in adult patients, especially when the etiology of the malocclusion is skeletal in nature. Although there are methods to camouflage the open bite with pure orthodontic tooth movement, orthognathic surgery has been the most stable and reliable method in the past for treating anterior adult open bite. However, there are significant limitations to orthognathic surgery, including cost, postoperative downtime, and surgical risks associated with general anesthesia. Other surgical risks may include vascular and neurological complications, infection, and risk to teeth and other vital structures.[13] Therefore, a technique that would achieve similar results to orthognathic surgery, without its limitations and risks, would be beneficial.

Orthodontic temporary implants now provide such an alternative. Despite the fact that TADs are relatively new in orthodontics, they have quickly proven to be an extremely effective aid in treating a wide range of complex malocclu-

FIGURE 10A.

FIGURE 10B.

FIGURE 10C.

FIGURES 10A–C. Improvement in facial and smile esthetics.

FIGURES 10A–L. Final photos (two months post debond).

FIGURE 10D.

FIGURE 10E.

FIGURE 10F.

FIGURE 10G.

FIGURE 10H.

FIGURES 10D–H. Ideal occlusion and alignment.

FIGURE 10I. Panoramic radiograph showing good root alignment.

FIGURE 10J. Cephalometric radiograph displaying closure of mandibular plane angle and leveling of occlusal plane.

FIGURE 10K.

FIGURE 10L.

FIGURES 10K–L. Improvement in appearance of teeth at rest and upon smiling.

sions.[1] In many open-bite cases, TADs can eliminate the need for orthognathic surgery altogether, as shown here. In a recent study, Kuroda et al. showed that in open-bite cases, TADs are as effective in reducing facial height and increasing positive overbite as orthognathic surgery, without incurring the associated risks.[6]

Despite the success of microimplants and other TADs in correcting anterior open bites, a significant role still remains for orthognathic surgery. TADs are an excellent modality for treating vertical problems; however, they are limited in their ability to correct severe anteroposterior problems. Orthognathic surgery is favored, alone or in conjunction with TADs, in cases with a significant skeletal class II or class III component to the open bite.

Risks Associated With Use of Microimplants

Due to the fact that microimplants are not intended to osseointegrate and rely on cortical anchorage, the main risk associated with their use is implant failure. Failure of a microimplant is determined by clinical mobility and an inability to provide stable skeletal anchorage. This generally necessitates

FIGURE 11A. Full cephalometric superimposition. Note counterclockwise rotation of mandibular plane and forward movement of hard- and soft-tissue chin point (Pogonion). Black= Pre-treatment; Red=Post-treatment.

FIGURE 11B. Maxillary superimposition. Significant intrusion of maxillary molars, and mild retraction of the incisors.

FIGURE 11C. Mandibular superimposition. Mild proclination of the incisors. No significant change in molar position.

FIGURE 12A.

FIGURE 12B.

FIGURE 12C.

FIGURE 12D.

FIGURE 12E.

FIGURE 12F.

FIGURE 12G.

FIGURE 12H.

FIGURES 12A–H. Nine-month post-treatment follow-up displaying excellent esthetics and occlusal stability.

removing the implant and replacing it in an adjacent or alternative area of better bone or soft-tissue quality.

Another potential risk of using microimplants is injury to an adjacent vital structure such as a tooth root or a neurovascular bundle. This risk is mitigated by thorough knowledge of oral anatomy and careful review of appropriate diagnostic imaging. Surgical stents can also be used to help with accurate surgical placement.[14]

Recent studies have measured the success rate of microimplants to be from 84 percent to 93 percent.[15,16] Implant success is dependent on several variables, but initial mechanical stability and the type of force applied to the microimplants are important factors.[17]

Practitioners using these devices should be prepared for some measure of clinical failure and should incorporate these potential events into the treatment plan and informed consent. However, due to the ease and low cost of replacing a microimplant, it is rare for failure of an implant to significantly impact the progress of treatment.

Conclusions

This case report demonstrates the orthodontic treatment of a severe open-bite malocclusion with orthodontic temporary anchorage devices known as microimplants. By using microimplants as skeletal anchors, the maxillary molars were intruded and significant bite closure was achieved. When presenting treatment options to patients, microimplant-anchored intrusion should be considered as a viable alternative to orthognathic surgery for effective treatment of severe open-bite malocclusions. ■■■■

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***SAN BERNARDINO GP –** 4 eq. ops., 1 plmbd not eq. located off the freeway w/a beautiful courtyard in 3 story glass prof. bldg. ID #3201

SAN DIEGO COUNTY

SAN DIEGO COUNTY – Solo Practice, 3 eq. ops., 1 plmd not eq. 2,200 sq. ft. office, free standing bldg. Seller owns bldg. ID #3031
LEMON GROVE GP – Busy shopping center with major anchor tenants. 4 fully eq. ops., 1,178 sq. ft. suite. Absentee owner. ID #3341
SAN DIEGO – Leasehold improvement with some charts & building for sale! 5 fully eq. ops., 1,300 sq. ft. office. ID #3141

VENTURA / SANTA BARBARA / SAN LUIS OBISPO / KERN COUNTIES

BAKERSFIELD GP – 6 eq. ops., 2,000 sq. ft. ste, 1 story strip center. Collected approx. $323K for 2009. NET $124K. ID #3081
SANTA BARBARA COUNTY GP – Long Establised Practice. 3 eq. ops.,1,010 sq.ft, 2 story strip mall. NET OF $300K. ID #2881
VENTURA GP – 2 eq. ops., 2 story med/dent bldg. Great corner location with excellent street visibility. NET OF $200K. ID #2741

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OFFICES FOR RENT OR LEASE

DENTAL SPACE AVAILABLE — Fully equipped space in Vista, CA. Sublease 2-4 days per week. 760-724-1011 or e-mail scnave@yahoo.com.

DENTAL SUITES FOR LEASE — SILICON VALLEY — Renovated ortho, pedo, general office space with views in Los Gatos, an affluent community. Close to schools, downtown and freeways. Contact Trask Leonard at 650-282-4620, e-mail tleonard@baysiderp.com, or call seller 408-781-4599.

EXCLUSIVE DENTAL SUITES FOR LEASE — Short/long term lease, state-of-the-art equipment and accommodations. Conveniently located off the 101 Freeway. Carlos Vazquez 818-758-3557.

OFFICES FOR SALE

MODERN FOUR OPERATORY DENTAL BUILDING IN DUNSMUIR FOR SALE OR LEASE — A beautiful mountain setting in Northern California with hunting, fishing, skiing. Building well maintained. Seller motivated, all terms negotiable. Seller would consider forgiving lease/sale payments for first year to help practitioner establish a practice. Contact seller at mollyruss@sbcglobal.net or Doris Moss Realty, Brett Waite, Broker, 530-926-3807 or brett@mtshastarealty.com.

CONTINUES ON 604

CLASSIFIEDS, CONTINUED FROM 603

OPPORTUNITIES AVAILABLE

ASSOCIATE NEEDED — PALM DESERT CALIFORNIA — Part time associateship, must have five years experience. High quality restorative group practice. Contact Dana at 760-568-5928 or e-mail drmac@dc.rr.com.

DENTAL ASSISTANT PROGRAM DIRECTOR WANTED — Program director wanted to develop curriculum/teach at new center in Tarzana, California. Experience required. Call Laura 818-758-3557.

OPPORTUNITY AVAILABLE — Dentist for Riverside, CA dental practice. Mail to: Attn: Dr. M. Patel, Orangecrest Dental Group, 19510 Van Buren Blvd, F-5 Riverside, CA 92508.

OPPORTUNITY AVAILABLE — NORTH-WESTERN WASHINGTON — Seeking experienced dentist for busy, established, rapidly growing, fee-for-service group dental practice. Excellent immediate income opportunity ($180,000 to $375,000 + per year) depending on productive ability and hours worked. Secure long-term position. You can concentrate on optimum patient treatment without practice management duties. Newly equipped, modern office with excellent staff and lab services provided. If you are bright, energetic with a desire to be productive, very personable, people oriented and have great general and specialty clinical skills, fax resume to Otto J. Hanssen at 425-484-2110.

CONTINUES ON 608

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- **APTOS:** *For Sale* - General Dentistry Practice. Highly desirable location. 2008 Gross Receipts over $1Mil. w/adjusted overhead at 51%. 3-operatories in 1,000 sq ft. Pano & Modi computerized software. 9-hygiene days per week. Practice operated for past 33 years in same location. Open 5 days a week. Owner willing to work back for new owner 2 days/wk. #14305 SOLD
- **ATWATER:** *For Sale* - General Dentistry Practice. Gross receipts $177K with adjusted net income of $67,495. Practice has been in its present location for the past 5 years. 1,080 sq ft. 2-equipped operatories. Owner to retire. #14307 SOLD
- **CENTURY CITY:** *For Sale*-Office Space, equipment and leaseholds only. Opportunity for low cost startup practice and or satellite. Asking $100K.
- **CITRUS HEIGHTS:** *For Sale*-General Dentistry Practice. Well-designed 6 operatories with 1,500 sq. ft. office in professional building. Desirable location. 2-3 days hygiene. Owner is retiring. #14311 SOLD
- **EL DORADO HILLS:** *For Sale*-General Dentistry Practice. 2009 GR $790,758 adjusted net income of $312K. Intra-oral camera, pano, Softdent software, 4-equipped ops. 6-hygiene days. Practice has been in its present location for past 18 years. Owner retiring. #14324
- **EL SOBRANTE:** *For Sale*-General Dentistry Practice: Ideal for recent grad or DDS looking for satellite practice. 3 ops. w/potential of 5. '08 receipts $350K, adj net income $124K. 3 days of hygiene, Pano, Easy Dental software. 1,300 sq. ft. Seller is retiring after 35years in same location. #14302 SOLD
- **FOLSOM:** *For Sale* - General Dentistry Practice 2009 Collections $513K. Adjusted net income $184K. 4 ops (plumbed for 5), Intra oral camera, fiber optics all ops. Patient base software. Owner retiring.
- **GRASS VALLEY:** *For Sale*-This Periodontal Practice is located in a very desirable growing community. Practice has been in its present location for the past 28 years. Office consists of 1,500 sq ft 3 ops, Intral-oral camera. Practice has 5 days of hygiene. #14272 SALE PENDING
- **LAGUNA BEACH:** *For Sale* - General Dentistry Practice. 2008 Gross Receipts $898K. 4 operatory (5th available) 2,000 sq. ft. office. There are 4 days of hygiene. Practice has been in the same location for approx. 25 years. Owner is retiring. SALE PENDING
- **LAGUNA HILLS:** *For Sale* - General Dentistry Practice. Owner aquired practice in 1992. Office remodeled in 2004. 3 days of hygiene, 1,324 active patients, 20 new pts/month, 6 operatories, Eagle Soft software. Receipts were $868 in 2008. Wonderful location.
- **LAKE FORREST:** *For Sale* - General Dentistry Practice. This 4 operatory, 1,200 sq. ft. office had gross receipts of 1.2 million in 2009. There are 5 days of hygiene and approx. 2,000 collective patients. Approx. 10% of receipts are from two HMO plans. Seller has practiced in the same location for approx. 30 years. Owner is retiring. SOLD
- **LIVERMORE:** *For Sale* - General Dentistry Practice. 2009 Collections were $688K with an adjusted net income of $287K. There are 4 ops in this nicely updated 1,082 sq ft office space. Dentrix software, 6-days/wk hygiene. Owner has been in same location for 36 years with long-term employees. Owner is retiring. #14326
- **LOS ANGELES:** *For Sale* - General Dentistry Practice: This practice 80% Dentical and has approximately 2000 active patients. Owner has operated in same location for 31 years. 2009 receipts were $709,000. 6 equipped tx rms, laser, intra-oral camera Pano and Ceph. Call for details. SALE PENDING
- **MODESTO:** *For Sale* - General Dentistry Practice. 5 operatories, 32-years in practice. Gross Receipts $884K w/adjusted net income of $346. Dentrix, Cerec, and Intra-oral camera. Owner to retire. #14308 SOLD
- **MURRIETA/TEMECULA:** *For Sale* - 2009 receipts were $648,000. This 4 op, 1,500 sq. ft. office space with 4.5 days of hygiene. Average age of Dental Equip is 7 years. #14313 SOLD
- **NORTH HOLLYWOOD:** *For Sale* - General Dentistry Practice. 2009 GR $642K with adjusted net income of $251K. Office has 3 operatories 1 Addt plumbed op, 1350 sq ft in a small shopping center, very busy intersection-corner. Intra oral camera, laser, Easy Dental software. Owner relocating. #14328
- **NORTHERN CALIFORNIA:** For Sale- Pediatric practice. Owner has operated in same location for 32 years. Approx. 1,760 active patients, 1,160 sq. ft., panoramic X-ray, Dexis Digital and Dentrix software in this 5-chair office. 2009 Gross Receopits $713K with 48% overhead. Owner retiring. Call for details.
- **NO. CA WINE COUNTRY:** **ENDO PRACTICE** For Sale-GR 958K adj net $673K 4 Ops, 1,500 sq ft. Overhead 29% Owner to retire #14296
- **ORANGEVALE:** *For Sale* - General Dentistry Practice This 5 op, 1,700 sq ft office has 8 days of hygiene. Receipts were $1,154,000 last year with $480K adjusted net income. The practice has shown increases every year the past five years. Pano and Practice Works software. Practice has been in its present location for 18 yrs of its 29 years. Owner is retiring. #14325
- **OROVILLE:** *For Sale* - General Dentistry Practice. Owner dentist recently deceased. 2009 collections $770K. Very nice stand alone dental building with basement. 7 ops digital x-ray 5 days of hygiene. Bldg 3,000 sq ft Basement 540 sq ft. Temporary Dentist in place. #14310 SOLD
- **PALM SPRINGS:** *For Immediate Sale* - General Dentistry Practice. 2008 Gross Receipts $900K with adj. net income of $346K. Highly desire able location with 4 ops. Laser, and Intra-oral camera. 5 days of hygiene. Owner recently deceased. SOLD
- **PLUMAS COUNTY:** *For Sale*-3 equipped ops. Space available for 4th op. 1245 sf office in good location. 2009 gross receipts $475K. Practice in present location over 50 years. Owner is retiring. #14318
- **RED BLUFF:** *For Sale*-General Dental Practice **"REDUCED PRICE"** Facility overlooks the Sacramento River, 3,500 sq ft, has 8 ops, 10 hygiene days. Appraised Value or Best Offer. Historically Gross Receipts have been over $1 Mil per year. 100% financing available. Sale of Building (optional) #14252
- **REDDING:** *For Sale*-Owner looking for Assoc. trans. into Partnership w/Buy-Out. GR $1 Million dollars income $436K. 5.5 days hygiene, 2,200 sq. ft. #14293
- **RENO:** *For Sale* - General Dentistry Practice and Dental Building: 2009 Gross Receipts $517K with adjusted net income of $165K. 4 ½ hygiene days/week. 1, 800 sq ft with 6 equipped ops (7 Avail). Dentrix software, Pano. Practice has been in its present location for 40 years. Owner retiring.
- **ROSEVILLE:** *For Sale* - General Dentistry Practice. Great Location. 2009 GR $900K with adjusted net income of $300K. 1975 sq ft with 4 ops, 8 days hygiene/wk. Digital, Intraoral camera, Dentrix, Trojan, fiber optics, P & C chairs - all less than 5 years old. Owner is retiring.
- **SAN FRANCISCO:** *For Sale-Patient Base for Sale*-Owner passed away last June and the practice has continued on 4 days a week with an associate. Lease can't be renewed. There are approx. 1,000 acive patients in the practice. The patient base can be purchased at no risk to buyer since the purchase price is paid according to the receipts collected on the patients that transfer. #14312
- **SAN DIEGO:** *For Sale*-General Dentistry Practice. This office is plumbed for 4 ops. 3 ops. are equipped with Promo Equipment. Lease is $2,200 per month. 2009 receipts were $185,645. PPO and Fee for service practice. #14315
- **SAN DIEGO/CITY HEIGHTS:** For Sale-General Dentistry practice. Owner has operated in same location for 12 years. Approx. 1,000 active patients, panoramic X-ray, Intra Oral Camera, in this 3-chair office. #14321
- **SAN JOSE:** *For Sale* - 3 op Office space & equipment only in south valley area of San Jose. Fully equipped including hand instruments. If you are going to start up a practice or add a satellite practice you can save hundreds of thousands of dollars. New lease available from landlord with the option to purchase suite.
- **SOUTH LAKE TAHOE:** *For Sale*-General Dentistry Practice. Office is 647 sq ft w/3 ops. Practice has been in its present location for the past 26 years. Owner to retire. #14277 SOLD
- **TORRANCE:** For Sale- General Dentistry Practice: Owner has operated in same location for 20 years. Approx. 1,000 active patients, 1,080 sq. ft., Brican System, and Camsight software in this 2 equipped, 3 available-chair office. 2009 Gross receipts $434K with 38% overhead. Owner relocating. #14320

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KERN COUNTY - *New Listing!*
Well established, 6 op GP with a great location for the dentist desiring a rural lifestyle in a friendly community. This practice collected over $523,000 in 2009 with amazing growth potential.

SOUTH SAN FERNANDO VALLEY
3 op GP located in a busy strip shopping center. The office has computers in each op and utilizes a Digital Schick X-ray system. 2009 collections $357,000+.
SOLD!

ORANGE COUNTY COASTAL COMMUNITY - (Perio)
Busy periodontal practice with a highly desirable location. 5 op, very profitable business with long term goodwill and a great staff. 2009 collections $900,000+. The seller is retiring.

LANCASTER
Long established, 4 op GP with an excellent location in a professional complex. Strong patient base developed over 34 years. 2009 collections exceeded $670,000. The seller is retiring.

SAN DIEGO AREA
Multi office opportunity. Contact us for more details.

SACRAMENTO COUNTY (Ortho)
Spacious 6 op, well established orthodontic practice in a full service easily accessible office building. 2009 collections $440,000+.

LOS ANGELES (Endo)
Price Reduction!
4 op, long established endodontic practice. Located in an easily accessible professional building next to a major intersection

MORENO VALLEY
Spacious, 2,700 sq ft, 7 op (6 equipped), GP with a busy location, 25 years goodwill, strong patient base & plenty of room for growth
Pending

SOLANO COUNTY
Price Reduction!
4 op (3 equipped) GP with strong patient base. Efficient facility and proven systems.

VENTURA COUNTY
Long established 3 op GP with a convenient strip mall location. Well trained staff. Collections are consistently growing with 2009 gross $431,000+.
Pending

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CLASSIFIEDS, CONTINUED FROM 604

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PRACTICES FOR SALE

COASTAL EUREKA PRACTICE FOR SALE — Family practice in beautiful semi-rural area with fantastic outdoor recreation. Production/collection historically near one million per year with high net, a FFS practice with no capitation and doctor only working 14 days per month. Large loyal patient base would support two dentists. Great growth potential by adding endo, perio, oral surgery and increasing work schedule. Priced at $625K. Building available for favorable lease or purchase. Call after 6 p.m. Pacific time 707-499-9799.

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3028 NAPA-SOLANO COUNTY GP

Owner retiring from well-est. practice in 1,400 sq. ft. facility with 5 ops. All fee-for-service pts. with great word-of-mouth reputation. 2009 GR $731K+, June 2010 FY on schedule for $771K + with just 4/doctor-days. Asking $518K.

3030 NORTH BAY AREA PERIO

Owner retiring from well established periodontal practice with excellent referral sources in a 2,411 square foot state-of-the-art office facility with 4 fully equipped operatories and a dedicated staff. Looking for buyer with high ethical standards and great clinical skills. Great location and owner willing to help for a smooth transition. Asking $600K.

3006 MONTEREY COUNTY ORTHO

Est. Ortho practice in 2,668 sq. ft. office with 5 open bay chairs in a professional dental complex. Panorex and Cephlometric X-ray machines. Stable and loyal referral base. Annualized GR as of Oct 2009 are $335K+. Owner retiring and willing to help for a smooth transition. Asking 227K.

3031 WEST SAN JOSE GP

Owner retiring from well-est. practice in great location. 3 fully-equipped [PENDING] 1,000 sq. ft. facility. Avg. GP [illegible] 4 Dr. days & 4 hygiene days/w[illegible] All fee-for-service, great upside potential. Owner willing to help for smooth transition Asking $349K

2986 SAN JOSE FACILITY & EQUIP

A 3 year-old stunning facility with small pt. base that has all the bells and whistles. 2,000 sq. ft. office. Located in desirable comm./ residential neighborhood close to O'Connor Hosp. & Valley Fair Mall. 6 ops and new equip. For the est. GP who is looking to move into a larger facility or for the assoc. GP who is ready to start out on their own. Asking $475K.

3017 SOUTH BAY

Est. Cosmetic and Restorative Practice in desirable area. Seller retiring and able to help for a smooth transi[illegible] sq. ft. office with 4 fully e[illegible] GR $829K+. Asking Pric[illegible] [PENDING]

3016 CONTRA COSTA COUNTY PERIO

Est. 1990 in desirable bedroom community 20 miles from SF. 1,068 sq. ft. beautifully remodeled office w/4 fully-equipped ops., & excellent staff. Assignable 5 year lease w/5 year option. Seller willi[illegible] help in the transition of the practic[illegible] R $441K+, 2009 GR projected to [illegible] as of Oct. Terrific upside potential. Asking $275K. [SOLD]

3022 MODESTO GP

Owner retiring from well est. friendly, family practice w/3 ops. in 1,150 sq. ft. office + spacious storage area. Avg. GR for past 5 years $379K w/44% over[illegible]ad & great upside potential. Qua[illegible] wner willing to help w/smooth tran[illegible] Partnership in building available. Asking $278K for practice. [SOLD]

3023 NORTH BAY

Seller retiring from service oriented practice with loyal patients and seasoned staff. ~2K sq. ft. office w/ 3 fully-equ[illegible]ped ops. & excellent lease terms. ~[illegible]ts. all fee-for-service. Avg. GR $438[illegible]g. overhead 64% w/ 3.5 doctor days/wk. Great upside potential. Asking $273K. [SOLD]

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Campbell General Practice

SF General Group Practice
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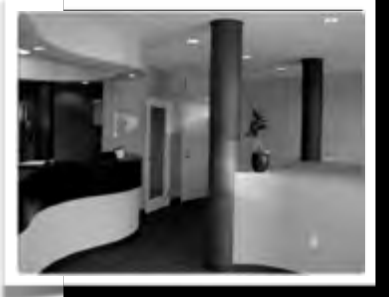

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BAY AREA

A-807 SAN FRANCISCO - Heart of downtown financial district. Quality, state-of-the-art. 800sf w/2 ops. Plumbed for 1 add'l **$250k**

A-817 BELMONT- Surrounded by dental specialties in 2-story Prof. Bldg. 860sf w/2 ops +1 **$210k**

A-829 SAN FRANCISCO Facility – Attractive Office w/traditional décor. 1600sf & 2 ops. **$69k**

A-8911 SAN FRANCISCO— Don't hesitate! One of the areas most prestigious addresses! 2,073 sf, 4 ops + plumbed for 1 add'l op. **$585k**

A-8941 SAN FRANCISCO– Ready to Move In. Fully Equipped. 2 ops. Plumbed for 1 add'l **$85k**

B-846 OAKLAND- Long-established, fee-for-service practice. 2,100sf w/ 3 fully equipped ops **$325k**

B-902 HAYWARD-Easy Freeway access. Near Busy Shopping Mall. 2400sf, 5 ops office. Gross Receipts over $977k in 2009! **$795k**

C-7811 SOLANO CO - 2,997 sf w/6 ops + 2 Hyg ops + 1 add'l op! Buy the whole practice for $1.3m or only 50% for $650k. **Call for Info!**

C-869 NAPA VALLEY AREA - Quality, fee-for-service practice. Dental Prof Bldg w/ ~ 1,000 sq. ft. & 2 ops. Option for 3rd op. **$450k**

C-884 FAIRFIELD –2,856 sf & 4 ops w/ possible expansion w/ plumbing of additional op **$350k**

C-8901 SANTA ROSA– Residential area. 40+ new pats/mo. Highly Visible! 1291sf & 3 + 1 op. **$500k**

D-842 PLEASANTON –General Dentistry. 1,488sf w/ 2 ops **$295k**

D-779 SUNNYVALE - Well established GP in heart of Silicon Valley! 4 ops, 1050sf. **$225k**

D-824 SANTA CLARA- GP - 35+ new pats/mo by word-of-mouth referrals. Just 6 years old w/ 1,500 sf & 3 fully equipped ops. **$485k**

D-845 SAN JOSE - ***Facility*** -Attractive office. Traditional décor. Retail Plaza. 2,240 sf & 5 ops. **$150k**

D-863 SAN JOSE-Excellent location & Stellar Reputation! Professionally Decorated in Popular Retail Shopping Ctr. 1500sf & 3 ops **$495k**

D-870 CUPERTINO– CAT6 fully computerized. 2100sf & 3 ops. '09 collections over $800k! **$650k**

D-877 LOS ALTOS -Pristine Professional plaza. Office is ~ 2,400sf - 6 ops **2009 Collections - $819k!! Asking only $425K**

NORTHERN CALIFORNIA

E-729 AUBURN - Busy retail shp ctr w/excellent signage & good traffic flow. 1750sf, 4ops. Plumbed for 2 add'l ops **REDUCED! NOW ONLY $250k**

E-7121 SACRAMENTO AREA – Largely FFS. 1800sf, 4ops (+2 add'l plumbed). . **$695k**

E-818 SACRAMENTO-Increase the part-time, relaxed workweek & watch the practice grow! Collections $350k+ in '07. 1,200sf & 4 ops. **$315k for Practice & Building**

E-865 FOLSOM–Newly equipped Assoc Driven practice.1650sf, 5 ops **2008 Coll ~ $800k! $525k**

E-872 ROCKLIN– Remarkable opportunity w/ a steady increase in monthly collections! 2450sf w/ 6 ops. **REDUCED $445k**

E-881 SACRAMENTO-State-of-the-art Practice with growing patient base. 2,400 sf & 3 ops. Plumbed for 3 add'l. Seller flexible w/ transition plans**$250k**

E-888 AUBURN - Highly esteemed FFS practice. Well respected. Doesn't get any better than this! Very desirable free standing building. Practice offers unparalleled dental care! 1,480sf w/3 ops. **This IS your dream practice! Call for Details!**

G-751 RED BLUFF/CHICO- Complete remodel ~5 yrs ago. FFS GP. 2350sf /4 ops. Plumbed for 2 add'l. **Current Lender Willing to Carry Qualified Buyer. Practice Offered at $175k / Real Estate $250k**

G-875 YUBA CITY–Estab. 30 + years, GP, FFS, 3575sf /9 ops, great location. **$1.5m**

G-882 YUBA CITY - 3 ops, ~ 850 sf. Thriving Practice! Call for Details! **$190k**

H-634 WEST OF RENO - 1500 sf/ 4 ops, Lease below market value. **$250k**

G-883 CHICO VICINITY – Quality FFS GP. Attractive Professional plaza. 1,990 sf w/ 5 ops **$535k**

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DR. BOB, CONTINUED FROM 614

they merely become proficient." That was my goal as I faced the 800-pound gorilla of dirty laundry looming like Everest in the bedroom. Up until this point, the ritual washer/dryer mystique had not been a feature of my job description. In fact, I had been firmly admonished to never, ever, touch the controls of either machine unless I wished to spend the balance of my life immured in a Tibetan monastery.

"You'll have all our clothes looking that grayish-purple color like a bachelor's or frat boy's laundry," the lady of the house explained. Being a husband is like any other job—it helps if you like the boss, so I demurred. On the fourth day after assuming the Mr. Mom role, it became apparent I couldn't dry myself after a shower with Bounty's 25 percent thicker towels, no matter what the company claimed.

I used to help my mother with the laundry when I was a boy. My job was to shave enough slivers off a bar of Fels-Naptha soap the size of a brick, measure out some Mrs. Stewart's Bluing and standing on a stool, dump these into the washing machine. That state-of-the-art device featured an on/off switch and an agitator designed to reduce Levis to shredded wheat. The spin cycle was an early system consisting of two rubber rollers, a crank, and a receptacle to collect the excess water. Feed the wet/wash items now weighing about 20 pounds each between the rollers, turn the crank and viola! You have induced great rents in the material as it caught in the roller's gears. Back up, try it again or give up when you can no longer recognize the original purpose of the garment.

Things have changed.

Our present washing machine was designed by a coalition of MIT engineers and Silicon Valley electronic geeks. There are five (5) knobs, assorted push-pads and enough permutations and combinations of water amounts, temperatures, second rinses and spin cycles to confound the innards of the Mars Rover. Apparently, women love this kind of stuff.

Teamed with the 120 hp Evinrude engine featured on their Force Nine Leaf Blower, I shall Be Prepared to make cleaning house a whole new ballgame.

What I recalled as a simple task of washing clothes had evolved into a nightmare of overthought, overdesigned and overhyped hoo-ha to appeal to housewives who also enjoy having 15 kinds of skin moisturizers and anti-aging creams and lotions to choose from as a daily part of their lives.

Taking advantage of my emergency laundry-master position and obeying the basis canon of husbands expressed as act fast, repent at leisure, I loaded the washing machine with all the accumulated dirty clothes using a small forklift I had rented for the purpose. I set the machine to "heavy load, max hot, second rinse and 50,000 rpm spin cycle." Finishing adroitly with cup of detergent, a dash of Arm & Hammer all-purpose washing soda, a pinch of salt, and a dash of cilantro or oregano from an unlabeled bottle, I closed the lid, wishing I had a maraschino cherry to top it off. Wait … something she said about bleach—so I found a bottle of some medicinal smelling liquid, poured that in and departed, satisfied I had accomplished in a few minutes what it normally takes my wife half a day to do.

In less time than it took to create the Colossus of Rhodes, I managed to transfer the soggy clothing into the dryer after recapturing the machine that, during the spin cycle, tried to walk itself out of the room.

Again, things have changed from trying to hang a full-size sheet on a sagging clothesline with a mouthful of clothespins. The modern dryer is a piece of work! Women who believe that keeping house is like threading beads on a string without a knotted end, never had it so good. No more dirty clotheslines, the hazards of high winds, rampaging dogs, kids and inclement weather. No, what they have now is another overoptioned device with choices of gas or electric, high heat, low heat, cycles for knit/casual, delicates, perm-press and tumble dry.

For good measure, since I was well ahead of schedule, I tossed in three sheets of Downey fabric softener, an adjunct with a fragrance advertised to enhance socks as nicely as bras. The sheets were delicately scented as "clean breeze" as if there were another option of "dirty breeze." I set a couple of the dials for cotton (high heat), 90 minutes, ignored the rest of them, and pushed to start.

In retrospect, I consider the washer/dryer task as meriting a "well done" commendation. The clothes were clean and they were dry, some of them almost crisp. True, my boxers had a sort of unmasculine tinge of pink and the lint trap was resplendent in a shade difficult to describe. The remarkable thing was the result of being liberated from this duty had on my wife. Equipped with the new time-saving methods I had shown her, she was miraculously back on her feet, seemingly anxious to resume this phase of her pay grade, which she pointed out was the only job where the work is steady but the pay isn't.

Happy to have been of service, I have now turned my attention to vacuuming and dusting. Our vacuum is seriously inefficient and the dusting is just primitive at best. Home Depot has a shop-vac said to be powerful enough to suck the house right off its foundations. Teamed with the 120 hp Evinrude engine featured on their Force Nine Leaf Blower, I shall Be Prepared to make cleaning house a whole new ballgame.

My wife believes that housework is what she does that nobody notices until she doesn't do it. Not only do I believe I can reduce the dusting/vacuuming job time by half, but I think everybody will notice! ■■■■

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Diary of a Domestic Engineer

The Boy Scout manual did not include a treatise on how to take over all household tasks when a temporary disability felled my wife.

→ Robert E. Horseman, DDS

ILLUSTRATION BY DAN HUBIG

On Feb. 8, 1910, Chicago publisher William Boyce founded the Boy Scouts of America. The organization incorporated many of the features of the original British Boy Scout movement that included proactive defenses against snakes and insisting on helping elderly ladies to cross the street whether they wished to go or not.

Created by Gen. Robert Baden-Powell, one of the few heroes to come out of Britain's Boer War, the Boy Scouts' motto and leitmotif of "Be Prepared" awoke a tocsin in my blood enabling me in later years to run like the wind from bigger boys who wanted my lunch money.

A few years after I weaned successfully, I was proudly accoutered in the BSA uniform with the entry-level rank of Tenderfoot. Fortified with enough accessories, including a knife with 162 functions, I was ready to tackle any region on the globe marked "unknown territory." Thus prepared and adhering religiously to the Boy Scouts' credo of honoring God, country and the barf-inducing glories of hot dog eating contests, I have survived the Sturm und Drang of aging, marriage, wars, and reality TV shows.

Recently, my comfortable world suddenly collapsed when I suddenly discovered that I was not prepared. The Boy Scout manual did not include a treatise on how to take over all household tasks when a temporary disability felled my wife, rendering her incapable of anything but plaintive bleats for amenities just out of reach.

I believe that married men make the best husbands, but as H.L. Mencken observed, "husbands never become good;

CONTINUES ON 613

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