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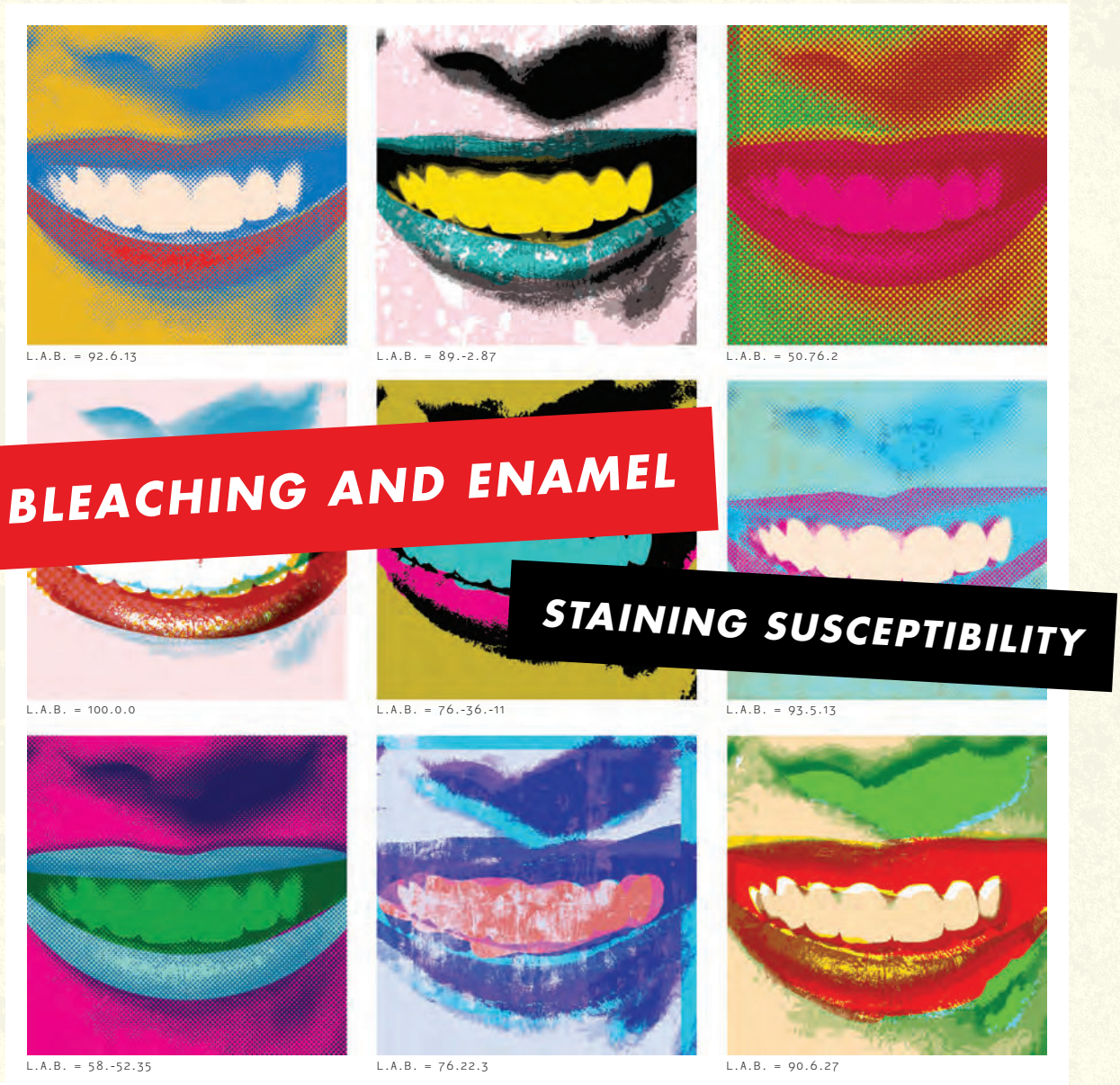

BLEACHING AND ENAMEL

STAINING SUSCEPTIBILITY

OF THE CALIFORNIA DENTAL ASSOCIATION
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DEPARTMENTS

FEATURES

Steven A. Gold, DDS

What's Old Is New Again

Some issues in dentistry never go out of fashion, at least for very long. The interest they generate may wax and wane but the issue itself remains, sometimes persisting through generations. Fifteen years ago, discussions on access to care were scarce. Yet, if one searched organized dentistry's journals and newsletters for commentaries and stories on insurance and amalgam, one could easily stack a desk with reading material. (Recall that it was all in print then.)

In more recent years, the topics of dental amalgam and insurance were more or less just under the radar of most dentists. There was activity. For instance, the American Dental Association successfully filed lawsuits against two major insurance companies for practices which were ultimately deemed unacceptable by the courts. And organized dentistry at all three levels of the tripartite have been dealing with fallout over ongoing concern with the presence of mercury in dental amalgam. Yet, to this observer, these issues have not grabbed the headlines nor infiltrated the practitioner's daily life like they once did, perhaps until now. Why have these "old" issues become new again?

Let's examine the issue of dental insurance first. As the 20th century drew to a close, it seemed that dentists began to settle into a philosophy of how they would deal with insurance. They fell largely into one of three camps. At one end of the spectrum, there were the dentists who decided the best way to deal with insurance was to distance their practices from it. They chose to no longer participate in insurance plans and stopped accepting assignment of benefits on behalf of their patients. Theirs became true fee-for-service practices. Many were successful as the loss of some of their "insurance" patients was balanced out by higher fees and less hassle. At the other end of the spectrum, there were those dentists who recognized the tremendous number of patients who relied on and highly valued their dental insurance, whether it was indemnity, PPO, or HMO. Theirs became insurance practices as they were modified to remain profitable. These dentists typically saw more patients and substantially cut their overhead to make up for the reduction in reimbursement for services rendered. In essence, they learned to play the insurance game.

In between these two ends, there were the rest of us. We found being heavily involved in dental insurance objectionable. We valued a certain standard of care for our patients that we felt insurance companies compromised. We were not willing to reduce our time spent with patients, use cheaper and poorer quality materials and laboratories, and hire cheaper and lower quality staff. We did not violate legal and ethical principles as some insurance-heavy practices did to remain profitable. Yet, at the same time, much of our patient bases were made up of every day people who had dental insurance, and we did not want to turn our backs on them. Through the hard work of educating these patients on the benefits and limitations of their insurance, and educating our staff on proper financial arrangements and verbal skills, we walked the line down the middle.

So what has changed with dental insur-

So what has changed with amalgam? Nothing. The debate over the safety of amalgam continues.

ance? Nothing. Most patients' yearly benefit maximum is $1,000 to $1,500, just as it was 30 years ago. During that same time, premiums paid by individuals and employers rose like all other costs making insurance companies some of the most profitable in all of the corporate world. Our questions still remain. Like why do insurance companies impose so many restrictions on reimbursement to patients that fall within a predetermined yearly maximum? Some of us will continue to shun insurance, some of us will warmly embrace it, and most of us will continue to walk the line between.

And what about the issue of dental amalgam? There has been a recent flurry of activity and media coverage since the Food and Drug Administration has been taking a closer look. Regardless of what we in the profession of dentistry know to be the science behind amalgam, as long as the material contains the magic word "mercury," there will be those who raise a skeptical eye. I do not believe that even amalgam's staunchest opponents are necessarily malicious-minded. Rather, they seem to be merely misinformed and misled. One need only look at the recent media coverage of the FDA panel's activities to see how journalistic spin can sway one's opinion.

I am a dentist first and foremost, but also a journalist, albeit an amateur one. At some point in their careers, journalists like dentists, must come to terms with what constitutes professional integrity. Particularly for the news media, this means reporting on issues in a fair and unbiased manner. Reporting that amalgam is safe, however, is not exciting, and such headlines will not captivate the attentions of readers or viewers. As soon as we hear or read that something is harmful to us, we take note. Those are the headlines that sell newspapers and commercial spots and make profits for the parent media companies and careers out of reporters.

As this issue goes to press, a panel of outside advisers to the FDA voted, without unanimity, to essentially call for more research into the safety of amalgam. They noted gaps in the current research including the effects of maternal amalgams on the fetus. Some media sources, such as the *Chicago Tribune* chose to spin that rather simple concept into an indictment of both amalgam and the ADA. While some who covered this story did so responsibly, others, like the *Tribune*, seemed more concerned about reaping the rewards that a sensational story would generate than in practicing journalistic integrity. In so doing, they defile every other journalist, even the amateurs, who try to uphold professional integrity and present information in a fair and accurate manner.

So what has changed with amalgam? Nothing. The debate over the safety of amalgam continues. A legislative ban on amalgam does not seem imminent. And millions of us will quietly walk around with amalgam restorations, which are not only a part of, but contribute to, a healthy mouth and body.

Ours is a profession marked by both tradition and change. New challenges will always be around the corner. Others will remain with us like old, comfortable adversaries. Successfully meeting them, whether as individuals or a united profession, requires one foot grounded in fact and science, the other in character and integrity: strength drawn from history and tradition, and nimbleness to adapt to changing times. In so doing, the future of dentistry in good measure rests. ■■■■

Dentists Treating Sleep Apnea

By Dell Richards

Despite it being outside their scope of practice, many dentists are making snoreguards. Other dentists are helping their patients with sleep apnea. Aware they have to work under the supervision of a medical doctor who does the diagnosis, dentists are using at-home sleep tests to measure apnea episodes and making oral appliances to treat them.

"In my opinion, this is probably one of the most impactful areas in dentistry for public health," said Mark J. Friedman, DDS, professor of Clinical Dentistry at the School of Dentistry, University of Southern California. "As a dentist, you can have a huge impact on public health if you screen your patients by asking a few questions."

Some 12 to 20 million people have snoring and/or sleep apnea. Another

"As a dentist, you can have a huge impact on public health if you screen your patients by asking a few questions."

MARK J. FRIEDMAN, DDS

70 million have sleep disorders such as insomnia, restless legs, and other issues.

Yet only 10 percent are diagnosed. That means the other 90 percent are at increased risk of cardiovascular problems, diabetes and obesity — not to mention exhaustion and accidents — without even knowing it.

"The numbers are staggering," said Friedman, who screens every patient for sleep disturbances during the regular exam for gum disease, oral cancer, and blood pressure at his private practice, Center for Dental Aesthetics and Dental Sleep Medicine, in Encino.

Friedman asks such questions as:

- Do you dream a lot?
- Are you tired when you wake up?
- Do you want to take a nap in the afternoon?
- Do you have a tendency to snore?

"When you ask these questions, the response will clue you into whether the person needs an evaluation," Friedman said.

For example, if the patient doesn't dream much, it could mean they are likely to have a sleep disturbance and never get to the rapid eye movement stage of sleep, where people dream the most.

Recent steps by the American Academy of Sleep Medicine made it easier for dentists to move into this field. In January, the AASM issued new guidelines saying that oral appliances are a recommended first-line treatment for people with mild to moderate sleep apnea. While they also note that continuous positive airway pressure, CPAP, therapy should be the first choice, their position is realistic. After a year, more than 60 percent of patients no longer wear the CPAP.

Recent articles, published in the physician's trade journal *Internal Medicine News*, reiterated that oral appliances were a more effective therapy than surgery or over-the-counter products.

To date, at least 40 dentists in California are using a new ambulatory study tool, Watch-PAT 100, to measure sleep.

Worn on the wrist and using a probe over two fingers, the device allows a patient to have their breathing tested at home. From reading their peripheral artery tone, PAT, which tells whether blood vessels are dilated or constricted, the Watch-PAT measures respiratory disturbances, oxygen saturation and actigraphy. A pulse rate also can be derived from the PAT signal as can REM sleep.

Not only is the cost less than that of a clinic, but the patient is not asked to sleep in a strange bed at a laboratory with electrodes on their body and people monitoring them.

"If a person has garden-variety snoring or sleep apnea, you don't need a huge, expensive test," said Gary Sagiv, director of marketing and sales, Itamar Medical Inc., the company that sells the Watch-PAT 100, which is FDA-approved and has been available in the United States for the past four years. "You'll get as good or better results because the person can sleep. Our study is accurate as a clinical study and actually measures what you need to know."

Gary Demerjian, DDS, has been using the Watch-PAT almost since it came on the market.

"The patient puts it on their hand and goes to sleep," said Demerjian, who has offices in Glendora and Valley Village. "It monitors how many apnea episodes the person has had. It tells the oxygen level, and if it drops below a certain level. It also tells how many times the person woke up at night. With it, you can really tell what's going on."

Because Demerjian works with temporomandibular disorder patients on a daily basis, he also ends up seeing patients with sleep disorders.

"Many patients with TMD issues also have airway issues," Demerjian said.

"Once we're done with the TMD treatments, we try to control their clinching and grinding at night as well as their breathing because it is all related."

To play it safe, Demerjian has patients go to their doctor for a diagnosis (and for medical insurance coverage) before he makes an appliance. "Unless you have a clinical diagnosis, you don't know what you're treating," said Demerjian, who does not make a snoreguard without a doctor's referral or a polysomnogram of the patient.

To deal with this issue, Itamar Medical recently initiated a program of sending the patient's sleep study to a board-certified sleep doctor, who diagnoses it for the dentist and sends it back with a score. This allows the dentist to make an oral appliance and still be within the scope of medicine they are allowed to practice.

Michael Moore, DDS, also has a Watch-PAT 100, but has had a harder time convincing patients they need it. Because medical insurance is the payer, most dentists insist the patient pay the costs up front. Between the testing, the appliance and re-testing usually needed, the cost can run $4,000 to $5,000, depending on the dentist. "Because a physician has to diagnose it, you never see the person again," Moore said.

Moore also is concerned with liability. He has patients sign informed consent releases so that he cannot be held liable if the patient stops wearing the appliance and has an accident or dies as a result.

Nonetheless, it is difficult to watch people making such shortsighted decisions about their health. "People with apnea can get really sick," Moore said. "They are in fight-or-flight a lot of the time during the night because the brain is fighting to stay alive."

Moore does use the Watch-PAT 100 as a prescreening device to see what the respiratory disturbance index numbers are. By screening, Moore can tell if he can make a sleep appliance that would help. "You can also have them do a polysomnogram to check," said Moore, of the gold standard.

Although biased, Sagiv believes that ambulatory, in-home tests are the wave of the future. He says looking at the numbers tells the story. "Today, over 90 million Americans who have sleep problems are undiagnosed with sleep centers screening less than 2 million a year," Sagiv said.

In doing the math, it becomes obvious that a more efficient, less costly — but still effective system — needs to be put in place. Especially since snoring and sleep apnea worsens with age. Those ubiquitous baby boomers, who comprise a huge segment of the population and are just hitting their stride in terms of snoring and sleep apnea, are going to increase the numbers of people needing tests and oral appliances even more.

"Dentists can play a huge role in this," Friedman said.

And in their patient's health. Friedman, who has been doing esthetic restorative dentistry for 25 years, says he would give that up in a second to help snorers and people with sleep apnea because it has been so much more rewarding.

"For some people, it changes their life instantly. They wake up feeling good and can spend the day not having to sleep," Friedman said. "Their spouse will sleep with them again. Their blood pressure goes down and it probably increases their longevity. Dentists have this whole new realm of people to treat who are vulnerable."

For Friedman, Demerjian, and dentists like them, that is reason enough to brave this new frontier.

A practicing journalist, Dell Richards runs Dell Richards Publicity, a public relations firm specializing in dentistry, health care and technological innovation.

"Many patients with TMD issues also have airway issues."

GARY DEMERJIAN, DDS

Educating Parents on Children's Well-being

If everyone wants healthy children, it is ironic that some parents let their kids indulge in unhealthy behavior.

In *Membership Matters*, the publication of the Oregon Dental Association, some of the things dentists assume are common knowledge are not obvious to the community at large.

The link between enamel erosion and diet is not a well-known fact among parents or educators.

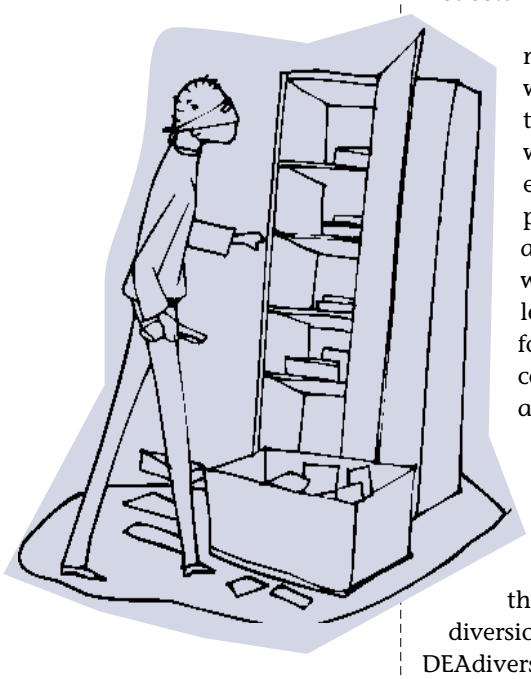
The link between enamel erosion and diet is not a well-known fact among parents or educators, said Carol Klingensmith, DDS.

In a sidebar to the Klingensmith's article, Janet Peterson, DMD, provided some tips for dentists who wish to work with local schools in fostering a wellness program for students:

- Too much consumption of fruit juice is as bad for children as soda. Juices often are as cariogenic and caloric as sugary sodas. Too much can have a negative effect on children's oral and overall health.
- Drinks that are reclosable, such as those with a screw cap can increase the number of times teeth are exposed to sugary soda pop. Children are more likely to sip soda from reclosable bottles longer than they do from cans.

Report Controlled Substance Loss Online

Thanks to updated Drug Enforcement Administration technology, dentists and other registrants can now go online and report the theft or loss of controlled substances.



All registrants are required to notify the area DEA field office, in writing, of any significant loss or theft of any controlled substance within one business day of discovery. However, if the facts to complete the form are not yet available, the DEA recommends initial written notification on business letterhead submitted by facsimile for later reporting online or by conventional mail "in a timely and accurate manner."

In a letter to the American Dental Association, the DEA explained online and alternative reporting procedures. Dentist registrants may access the theft/loss form on DEA's diversion control Web page at www.DEAdiversion.usdoj.gov. The DEA Form 106 is accessible in various ways:

- Choose the "DEA Form 106 Online" box, which is third from the top on the right side of the diversion control homepage to go directly into the secure connection and online form.
- Select "Applications and Online Forms" (first tab) under the "Diversion Programs" heading on the left side of the page then select the seventh and last bullet, "Theft or Loss of Controlled Substances."
- The diversion control Web site also describes alternative reporting procedures and offers a toll-free telephone number, (800) 882-9539, for registration support. For questions about electronic submission of Form 106, call the DEA registration and program support section at (202) 307-4925.

Accountable loss from spillage, breakage, or other damage, such as Hurricane Katrina last year, should be reported separately on DEA Form 41, Destruction of Controlled Substances. Registrants follow different procedures for reporting losses recoverable or not recoverable, according to the DEA's letter.

Model Aims to Increase Diversity in Dentistry

A dental education panel has offered a model "for realistically improving the proportion of underrepresented minorities in dentistry" that would engage minority-serving universities in preparing students to become dentists.

"We fully expect institutional interest will vary," said the committee in a feasibility study released in May. The report, "Bridging the Gap: Partnerships between Dental Schools and Colleges to Produce a Workforce to Fully Serve America's Diverse Communities," is available at www.communityvoices.org. Supported by the W.K. Kellogg Foundation, Community Voices: Healthcare for the Underserved is located at the National Center for Primary Care at Morehouse School of Medicine.

The ADA's Immediate Past President Bob Brandjord, DDS, was among several dental leaders who commented at the briefing. He encouraged a full reading of "this very good report that gives us good food for thought." He also cited ADA's efforts to increase access to care and diversity within the profession and offered association research on the economic impact of dental practice in rural areas.

The report recommended pilot studies to implement the model, which adapts a medical education model as a framework to educate greater numbers of students of color in dentistry. The report called for foundation and government financial support so that low-income students will have the opportunity to enroll and "strongly recommends" that states without dental schools or those with workforce problems support a portion of the costs of education.

Now, About Those Phone Manners ...

With so much automation in many of today's dental offices, it may be very easy to forget the fundamentals of one of the most basic tools used: the telephone.

In an issue of the *Illinois Dental News*, Tess Fyalka wrote of the importance of remembering the potential a telephone has on making a practice a great success. For example, too many dental offices use voicemail as a frontline tool to screen calls. This is an unwise policy, Fyalka said, because most people prefer to talk to someone when calling their dentist's office. Want to lose a potential patient? Then, by all means, present them with a recording during business hours. Voice mail should be used only as a method to greet callers when the office is closed and not staffed.

One of the most important tasks an office manager can undertake is not training staff to handle phones correctly. It is not enough for assistants covering the phones merely to be polite, they also have to be properly trained to gather all the information necessary. Designating one person to handle incoming calls also makes sense. According to the article, Char Sweeney, a practice management consultant said, "When the call is mishandled, you're more likely to have patients arrive at the practice not prepared to pay because they weren't aware that this would be expected, or they may not have taken the appropriate medication, etc. When multiple people are answering the phone, there is a lack of accountability."

Practice management consultants highly suggest that dentists have their friends phone the office once in a while pretending to be new patients. The results often are eye-opening, and may lead dentists to conclude that more phone training for staff is needed.

"This is an innovative answer from the ADA to the problems of underserved populations and underserved parts of our country."

BOB BRANDJORD, DDS

Adding New Dental Team Member Proposed

The American Dental Association's House of Delegates is expected to receive a report this month calling for a new member of the dental team.

In April, a proposal was presented to the Board of Trustees as "an innovative answer" from the ADA to the problem of access to care.

Developed in response to a resolution adopted by last year's house, the proposal details the duties, "core competencies," and training of a community dental health coordinator who would assist dentists and other dental team members in bringing care to the needy in remote and underserved areas.

"The Community Dental Health Coordinator would work under a dentist's supervision as an adjunct to the existing dental team," said the ADA's Immediate Past President Bob Brandjord, DDS, who appointed the six-member committee that developed the CDHC proposal.

"The CDHC will connect with federally qualified health centers and community groups like senior citizen centers and school boards to promote dental health, particularly in remote areas or urban environments," he said. "This is an innovative answer from the ADA to the problems of underserved populations and underserved parts of our country."

Chaired by Perry K. Tuneberg, DDS, ADA 8th District trustee, the 96H committee worked in tandem with a larger Workforce Task Force charged with exploring other staffing and dental care delivery issues.

Upcoming Meetings

2006

Nov. 2-4	Hispanic Dental Association 14th Annual Meeting, Universal City, www.hdassoc.org or (217) 793-0035.
Nov. 5-11	United States Dental Tennis Association, Palm Desert, www.dentaltennis.org.
Nov. 12-18	57th American Academy of Oral and Maxillofacial Radiology 57th Annual Session, Kansas City, MO., www.aaomr.org.
Dec. 3-6	International Workshop of the International Cleft Lip and Palate Foundation, Chennai, India, (91) 44-24331696.

2007

April 15-21	United States Dental Tennis Association, Sarasota, FL, www.dentaltennis.org.
May 3-6	CDA Spring Session, Anaheim, (866) CDA-MEMBER (232-6362).
June 27-July 1	Academy of General Dentistry Annual Session, San Diego Convention Center, (888) 243-3368.
Nov. 27-Dec. 1	American Academy of Oral and Maxillofacial Radiology 58th Annual Session, Chicago, www.aaomr.org.

To have an event included on this list of nonprofit association 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.

The Effect of 16 Percent Carbamide Peroxide on Enamel Staining Susceptibility

Marjaneh Ghavamnasiri, DDS; Maryam Bidar, DDS; Arezou Habibi Rad; and M. Sadegh Namazikhah, DMD, MSEd

Statement of Problem: Recently, vital bleaching by carbamide peroxide has become more popular; therefore, it is necessary to study the effect of this agent on enamel and dentin.

Purpose: The purpose of this study was to evaluate the effect of a 16 percent carbamide peroxide bleaching gel, Vivastyle, on enamel staining susceptibility.

Materials and Methods: Thirty bovine specimens were selected and randomly divided into two groups of 15. The experimental group was subjected to Vivastyle gel and then was immersed in coffee for half an hour daily for three weeks. The control group was only immersed in coffee. The teeth were evaluated using a colorimeter to measure L*, a*, b* of each tooth. Value (black to white) is denoted as L*, wheres chroma (a* b*) is denoted as red (+a*), green (_a*), yellow (+b*), and blue (_b*). Total color differences between two colors (ΔE) were calculated using the following formula:

$\Delta E=[(\Delta L^*)_2 + (\Delta a^*)2+(\Delta b^*)_2]$: ΔE1. Bleached, ΔE2: bleached and immersed in coffee, ΔE_3: immersed in coffee.

Results: Mean differences were: ΔE_1= 9.478, ΔE2= 13.808 and ΔE_3= 7.230. Paired comparison by use of Duncan test showed there was a significant difference between ΔE_1 and ΔE2 (P0.000); and t test showed there was no significant difference between ΔE_3 and ΔE_1. (P0.08>0.05), but ΔE_3 showed a significant difference with ΔE_2(P0.000).

Conclusion: After vital bleaching, the enamel staining susceptibility significantly increased.

Vital bleaching with carbamide peroxide is becoming more popular. Showing good clinical long-term results, some scanning electron micrographic evaluations of natural teeth have indicated that no major changes in surface texture occur when teeth are bleached with 10 percent carbamide peroxide, although many studies have evaluated the potential adverse effects of carbamide peroxide agents.[1-4] When using SEM evaluations, some changes in enamel and dentin surface morphology have been reported.[5-8] There are scientific reports that demonstrate alterations of composition of bleached enamel.[9] Vital bleaching agent may result in reduction of the calcium and phosphate content, and also reduction of the fluoride amount in enamel.[10,11] In contrast to these findings, Crews and others described an increase in the amount of calcium and phosphate in enamel after vital bleaching.[12]

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M. Sadegh Namazikhah, DMD, MSEd, is a professor and former chair of Department of Endodontics and director of the Advanced Endodontic Program, University of Southern California School of Dentistry.

Disclosure / This study was supported by a grant from the Research Council of Mashad, University of Medical Sciences, Mashahd, Iran.

Table 1

Mean Color Differences and Standard Deviation

	Mean	N	Std deviation
ΔE1	9.4784	15	2.6181
ΔE2	13.8086	15	2.6718
ΔE3	7.2300	15	4.1239

In a previous study, it has been shown that the loss of micro hardness in bleached enamel could be compensated by a remineralization period following bleaching.[13] Remineralization was accomplished by immersing the bleached enamel in artificial saliva. It may be speculated that in this case, micro structural defects may be repaired by the adsorption and precipitation of components of the saliva, such as calcium and phosphate.

It is well-known that some dietary factors, such as coffee and tea, lead to extrinsic tooth discoloration.[14] This discoloration is dependent on various parameters such as the acidity of the staining solution. The low PH-value of coffee and tea is reported to increase staining as compared with chlorhexidine, which is less acidic.[15]

The aim of this study was to evaluate the influence of coffee after bleaching with a 16 percent carbamide peroxide gel on enamel stain susceptibility.

Materials and Methods

Thirty noncarious bovine incisors were selected. They were divided into two groups: experimental group (n=15) and control group (n=15), and were kept at room temperature for 10 days. Extrinsic stains of the teeth were removed with a dental prophylactic agent using Nupro prophylaxis fluoride paste (Dentsply, Preventive Care, York, PA.). Prophylaxis was performed at least two weeks prior to initiating the active study phase. Specimens were then stored at 100 percent humidity and 37 C. Both groups were evaluated using a colorimeter (Chroma Meter Model SR-321 Minolta, Ramsey, NJ) to measure L*, a* and b* of each tooth. Each tooth was measured three times in nonconsecutive order. After colorimetry evaluation, the control group was only immersed in coffee and color evaluation was done once again after immersion. In the experimental group, teeth roots were embedded in acrylic resin blocks.

The cementum adjacent to the exposed enamel was sealed with nail varnish. A thin plastic night guard (.020 Coping Material #31720, Buffalo Mfg. Co.) was fabricated using a vacuum-forming machine (STA-Vac, Buffalo Mfg. Co.) for each acrylic resin block.

Two drops of a 16 percent carbamide peroxide gel, Vivastyle (Ivoclar Vivadent AG, Bendererstrass 2 FL- 9494, Schaan, Lichtenstein) were placed in each tooth form nightguard, and the nightguard was seated on the acrylic resin block. The teeth were kept at 100 percent humidity and 37 C. The experimental group was subjected to Vivastyle gel for a period equivalent to two weeks of nighttime wear, followed by storing in artificial saliva consisting of 1 percent sodium chloride, 1 percent albumin, and 0.1 percent sodium azide. After the bleaching treatment was completed, the nightguard was removed from the tooth. All samples were rinsed with distilled water. Colorimetry was done once again after bleaching on the experimental group for L*, a* and b*.

The specimens were finally immersed in coffee for half an hour daily, followed by storing in artificial saliva for three weeks, rinsed, and evaluated using a colorimeter one last time as above.

The mean value was considered as the real color value. The L*, a* and b* color space system has been defined by the Commission International de I E Clairage in 1979 and is referred to as CIE LAB (International Commission on Illuminations, 1978).

The control group was only immersed in coffee as above. Total color differences between two colors (ΔE) were calculated using the following formula:
(ΔE= [(Δl*) 2+ (Δa*)2+ (Δb*)2]
ΔE1= bleached, ΔE2: bleached and immersed in coffee, ΔE3: immersed in coffee.

Data were analyzed statistically using Duncan and t tests (❑=0.05).

Results

Mean color differences are shown in **Table 1**.

The tooth color was compared for differences in mean, ΔE1, ΔE2 using a paired comparison analysis; (Duncan

test, α= 0.05). Table 1 demonstrates the mean ΔE values randomly for each pair. The results showed that there was a significant color difference between ΔE_1 and ΔE_2 (P0.000).

t tests showed that there was a significant difference between ΔE3 with ΔE2 (P0.000), but there was no significant difference between ΔE_3 with ΔE_1 (P0.08) (**Figure 1**).

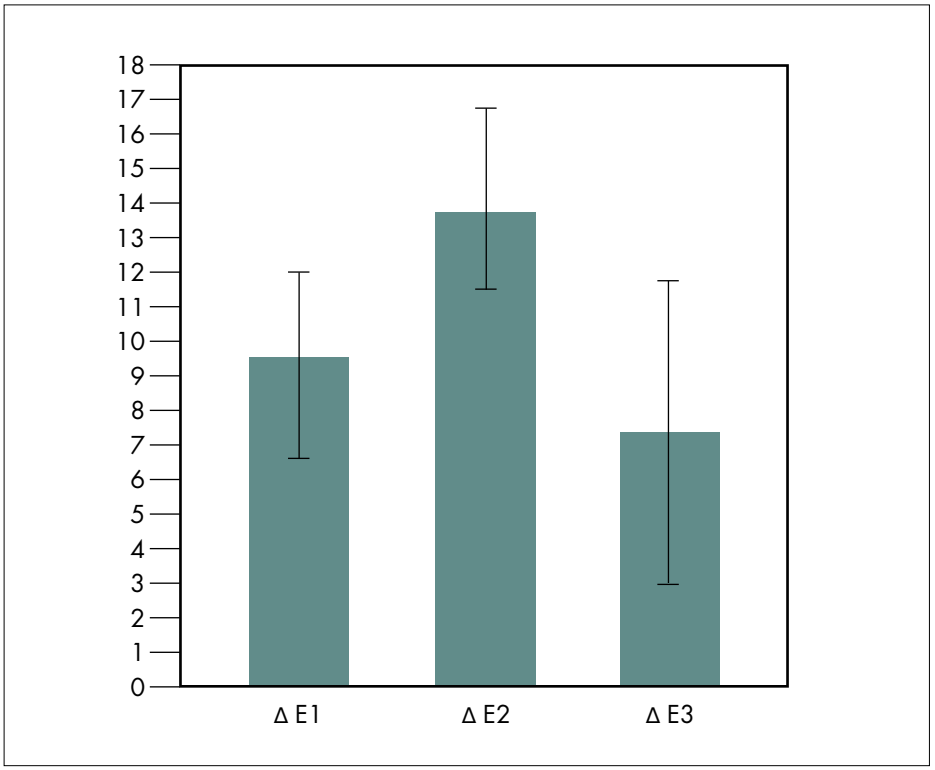

Figure 1. Mean color differences in three groups.

Discussion

In this study the authors examined, described, and compared the staining susceptibility of bleached enamel after immersion in coffee, which had not been done before. In this study, bovine specimens were used because the chemical composition and structure of bovine teeth are similar to that of human samples.[16]

The surfaces of the samples were not ground before the experiment, as the authors intended to investigate the teeth under natural conditions. However, this might have led to a greater variation among the specimens with respect to the adsorbsion of stain because of some irregularities on the enamel surface texture.

The samples ran their respective treatment on 14 successive days with intermitting storages in artificial saliva. Storage in saliva was chosen because the authors wanted to simulate the remineralization of the bleached specimens.[17] Therefore, artificial saliva was used instead of human saliva in order to standardize the conditions in the study.

The 8-h period of bleaching was chosen to simulate wearing of a nightguard filled with the bleaching agent. Storage of the samples in coffee after the bleaching procedure mimics an everyday situation with consumption of coffee for 30 minutes, and represents a longer period as compared with the presumably shorter contact of the teeth with coffee during drinking. This time period was considered regarding that of Scherer and others.[18] However, one study has indicated that tea had a higher propensity to stain teeth than coffee or chlorhexidine.[19]

The CIE LAB ΔE*, after two weeks of bleaching with 16 percent Vivastyle, recognized lightening of the specimens when compared with unbleached samples ΔE1= 9.4784. This is consistent with some previous studies.[18,20-22] After immersion in coffee, the samples showed higher ΔE values compared with that of bleached enamel (ΔE2= 13.8086). One recent study showed that the immersion of bleached enamel in tea at different intervals could not have an effect on increasing the ΔE.[23] An ΔE value of greater than one or two units represents a color change, which may be observed by individuals with the naked eye.[24] The less ΔE value represents the lighter color of subject.[20]

Paired comparison tests showed that there was a significant difference between ΔE1 and ΔE_2. t test showed that there was a significant difference

between ΔE_3 (7.230) and ΔE_2 (13.806).

The lowest change in the ΔE-values was recorded for the control group, and the highest was observed in the "bleached enamel and then immersed in coffee" group. This means that the application of Vivastyle, followed by the immersion in coffee, resulted in stronger staining of the specimens when compared with the control group.

T-test showed that ΔE_3 (7.230) had no significant difference with ΔE_1 (9.478). This means that neither the bleaching agent nor the coffee had an effect on the original color of the teeth. Therefore, the high value of ΔE_3 was probably due to roughness of the enamel surface.

A previous SEM evaluation demonstrated alteration in surface enamel after vital bleaching, indicating exposure of the enamel's prismatic layer, frequently to the depth of the enamel rods, and possibly the dentin.[6] This change in enamel and dentin may lead to more penetration of bacteria and colored liquids; therefore, rebleaching will be required.[6] Attin and others claimed that contact of bleached enamel with tea lead to some extrinsic stains which are not macroscopically detectable and should be totally removed by cleaning the samples.[23]

In the future, one study is necessary to evaluate the best way to decrease the staining susceptibility of bleached enamel.

Conclusions

1. There was a significant difference in tooth color between the bleached teeth and teeth that had undergone bleaching and then were immersed in coffee.

2. There was a significant difference in tooth color between teeth immersed in coffee and teeth that had undergone bleaching and then were immersed in coffee.

3. No significant difference was observed in tooth color between bleached teeth and teeth immersed in coffee. ■■■■

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PUBLICATION BIAS

Evidence-based Research in Alternative Protocols to Dental Implantology: A Closer Look at Publication Bias

David R. Moradi; Peter K. Moy, DMD; and Francesco Chiappelli, PhD

Abstract

Several techniques exist for the surgical placement of dental implants. The aim of this study was to assess systematically, the efficacy of these protocols by the evidence-based perspective. Five best-case studies involving 607 early/immediately loaded implants and 300 conventionally loaded implants were identified by examining the available literature and rigorous inclusion/exclusion criteria. Overall analyses demonstrated a 98.4 percent success rate for the early/immediate procedure and a 95.3 percent for the conventional protocol. Success rates in the articles reviewed were based on implant survival over a follow-up period of between one to two years. A meta-analysis was generated to evaluate the presented evidence and to aid in decision-making.

Despite its common implementation, this technique presents many caveats, among which publication bias is one of the most common. To investigate the possible presence of publication bias, a funnel plot analysis complemented several statistical tests. By means of the systematic investigation of dental implants, the authors' results confirm the presence of publication bias in implant dentistry literature, which strongly suggests that clinicians ought not base their decisions solely on the results presented by a few published studies. Rather, it is recommended that clinicians cautiously draw conclusions and seek studies that present accountable and clinically relevant results. Furthermore, it is suggested that clinicians attend seminars to learn of the effective advances in evidence-based dentistry, so as to develop the ability to easily detect inadequate literature due to attempted correlation with the most current research. It is also recommended that additional research is necessary to analyze which fields of research are more prone to bias, thus forewarning clinicians before formulating clinical conclusions.

As an alternative to fixed and removable bridges, partials, and dentures, dental implants have become very popular throughout the field of dentistry.

Providing a foundation for the replacement of missing dentition, once covered with artificial teeth, implants look, feel, and function just like natural teeth.[1] Due to implant popularity, much research has recently been conducted aiming to improve the surgical procedures implemented. The conventional placement of an implant requires two procedures.

- First (stage 1), a titanium implant is placed within the jawbone and covered by the gingival tissue.
- Second (stage 2), a small post known as an abutment is attached to the implant, protruding through gingival tissue and thus providing an anchorage for the artificial tooth.[1] The second surgical procedure begins only after the titanium implant has integrated with the jawbone.



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1a. Implants after healing period.

1b. Stage II conventional procedure.

1c. Implants ready for prosthesis.

Figures 1a-c. Conventional implant preparation.

The time period required for osseointegration, formerly known as the "healing period," takes about three to six months of time. During this time interval, the patient wears a temporary denture and should stay on soft diets.

Recent advances in implant dentistry demonstrate that the healing period can greatly be reduced or even eradicated, despite the necessity for osseointegration.[2] In a process known as "early loading," the prosthesis is placed in six weeks or less after the first stage procedure. In the "immediate load" technique, the implant, abutment, and prosthesis are all placed in one visit or within two to three days.[1] Not only do these techniques simplify the surgical process, but they also eliminate the problematic and irritable usage of postoperative partial dentures. In addition to comfort, patient satisfaction greatly increases because patients enjoy sooner the functional and esthetically pleasing look of the implant.[3] Through these surgical advancements, dentists are able to provide patients with the most convenient and advanced dental treatments.

However, despite the great expediency of the early/immediate load procedures, practitioners must inquire about the overall success of the implant, defined as an implant that sustains a loading force for a minimum of one year. Can the implant withstand the masticatory forces and succeed by loading the prosthesis in such a minimal time period? To minimize the risk of implant failure, it is best that implants are kept load-free during the healing period until osseointegration occurs.[4] Despite this, current literature explains that the early/immediate load treatments are both predictable and reliable. Furthermore, the research community affirms that these forms of treatment, compared to the conventional procedure, neither increase the number of implant failures nor bone loss.[3]

Presented with these conflicting ideas, dentists are left unaware of the most efficient technique, which promises implant success. To clear up ambiguities, the most effective method to investigate implant success can be achieved through the evidence-based perspective. As the most receptive form of research, evidence-based research provides systematic research on research and seeks to discover the best available evidence regarding a specific treatment.[5] Thus, in a patient population in need of dental implants, is the immediate load technique more effective than the conventional implant procedure in increasing implant success?

Methods

Part I: Conventional Protocol

Due to the rising demand of dental implants, several modes of surgical procedures exist. In general, the standard protocol for implant placement includes the conventional procedure, which emphasizes the load-free healing period as one of the most important requirements for implant/bone integration[6] (**Figures 1a-c**).

1. Search Strategy

A best-case study was designed to evaluate the current published literature on the conventional implant protocol. The PICO question was formulated as follows: In a patient population in need of dental implants, is the conventional implant procedure more effective than the early/immediate load technique in increasing implant success?

The search was restricted to articles relevant to the PICO question within the PubMed database. Only articles written in English were considered, excluding contact with any relevant authors regarding original data. Review articles, abstracts, unpublished reports, and publications in press were not considered. The search used two search titles including "conventional

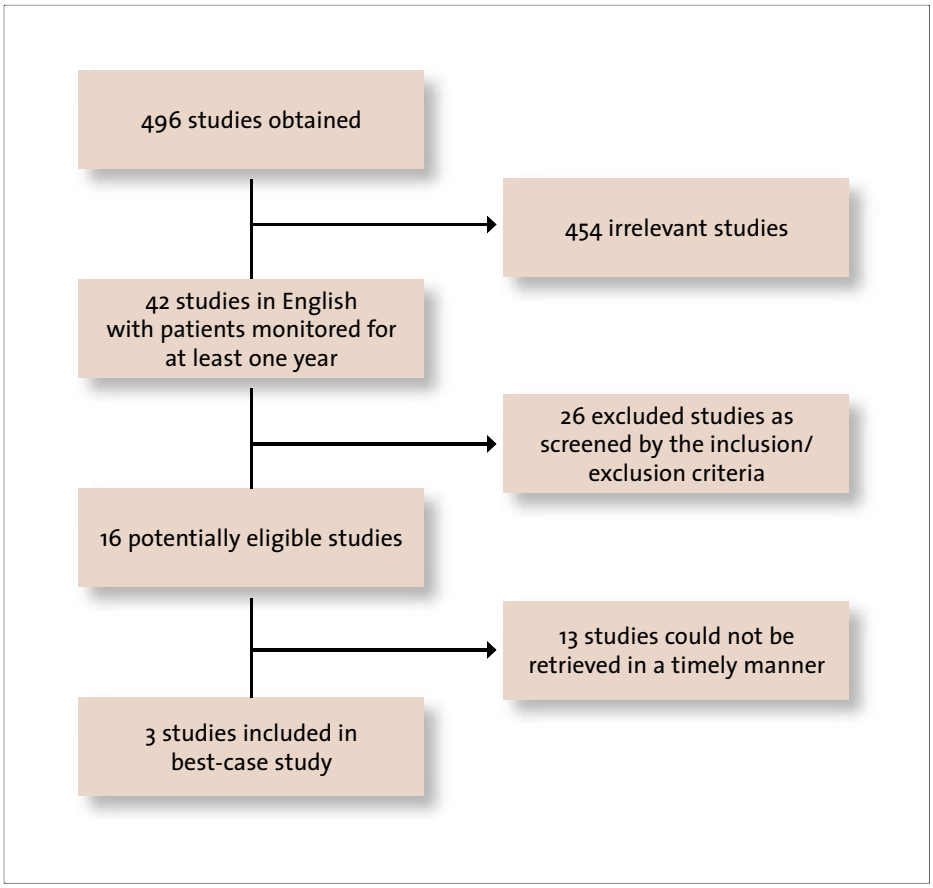

Figure 2. Conventional protocol: Search results.

load dental implants" and "conventional dental implants." The search was limited to studies that prospectively monitored a patient's implant(s) for several years following surgery. Only studies that considered both protocols — conventional and early/immediate — were included in our search. The titles and abstracts of all published articles obtained from this search were examined to determine the applicability of the articles to the study's purpose/PICO question.

2. Inclusion/Exclusion Criteria

A screening was carried out based on the following inclusion criteria:

1. Execution of at least a one-year minimal prospective follow-up,
2. Implant success was assessed based on survival after at least one year,
3. Patients had adequate bone (no need for bone grafting),
4. Usage of any type of dental implant (i.e., ITI, Nobel Biocare, Astra, 3i, etc.),
5. Usage of any type of prosthesis (i.e., single dentition, partials, dentures …),
6. Patients had adequate oral hygiene (absence of any oral disease),
7. Subjects were humans, and
8. English articles.

Studies with men and women of all ages, as well as patients of any race and/or ethnicity, were included in the study. Furthermore, it was essential that the papers provided statistics on implant survival/failure needed for the production of a meta-analysis.

Using the PubMed database, the search conducted generated an initial lot of 478 papers using the phrase "conventional dental implants," and a total of 18 papers using the phrase "conventional load dental implants" as keyword search item entries. Of these papers, 42 articles included patients who were monitored for at least one year and were written in the English language. Another screening was executed to filter out papers that only included one protocol. A final screening was executed to filter out trials failing to meet the inclusion and exclusion criteria of the search strategy. These irrelevant studies were thus omitted from the best-case study (**Figure 2**).

3. Quality Assessment

Three trials provided data on 220 conventionally loaded dental implants and 321 early/immediately loaded dental implants in patients with adequate bone quality and oral hygiene. Reports were evaluated for quality of methodology, design, and data analysis based on the Wong Scale-Revised.[7] This scale is based on reviewer responses of nine questions concerning the research quality of each individual paper. Each of the nine questions was scored from 1 to 3 (with 3 equaling the best). An overall comprehensive score ranging from 9 to 27 was generated from the summation of the individual scores of each individual question.[7]

The literature regarding the conventional implant protocol was reliable in that all of the papers in the best-case study obtained a total Wong

WHAT

- What is the research question/purpose/outcome sought? Is the stated purpose tested and measured correctly?
- What are the findings; how are they presented? Do the findings respond to the stated purpose/outcome sought?
- What is the clinical significance of the findings, and what is their statistical significance? Do the findings mean anything anyway ... research-wise or clinic-wise?

WHO

- What was the sample tested, is the sample representative of the population under study, of your patients?
- Are numbers presented in the paper that you can trust, and would that permit you to compute the Number Needed to Treat (NNT)? List experimental group event rate (EER) and control group event rate (CER), and compute NNT. Is there any information about Intention to Treat (ITT)
- Can the information provided in the paper be of any use directly to any patient or the group of patients in your practice now?

HOW

- How was the question addressed from the perspective of design, and were the appropriate caveats discussed?
- How was the outcome measured; were issues of reliability and validity presented?
- How were the data presented and analyzed (SESTA)?

Figure 3. Wong Scale—Revised.

Scale score of 18 or greater. The scores imply that the quality of the methodology, design, and data analysis of these papers met the minimum cut-off requirement of acceptability. Analysis of the scores led to the establishment of criterion of acceptability for each of the individual domains of research assessed by the Wong Scale-Revised (**Figure 3**).

Part II: Early/Immediate Protocol

1. Search Strategy

By the same approach, the authors formulated a PICO question with respect to the early/immediate loading of implants, which greatly expedites the implant process. In brief, it stated that: In a patient population in need of dental implants, is the immediate load technique more effective than the conventional implant procedure in increasing implant success? As described, the outcome of interest (implant success) was based on implant survival for at least one year.

As above, the search was restricted to articles relevant to the PICO question within the PubMed database. Only articles in English were considered, excluding contact with any relevant authors regarding original data. Review articles,

4a. Extraction of tooth.

4b. Immediate implant placement.

4c. Final abutment ready for prosthesis

Figures 4a-c. Early/immediate implant preparation.

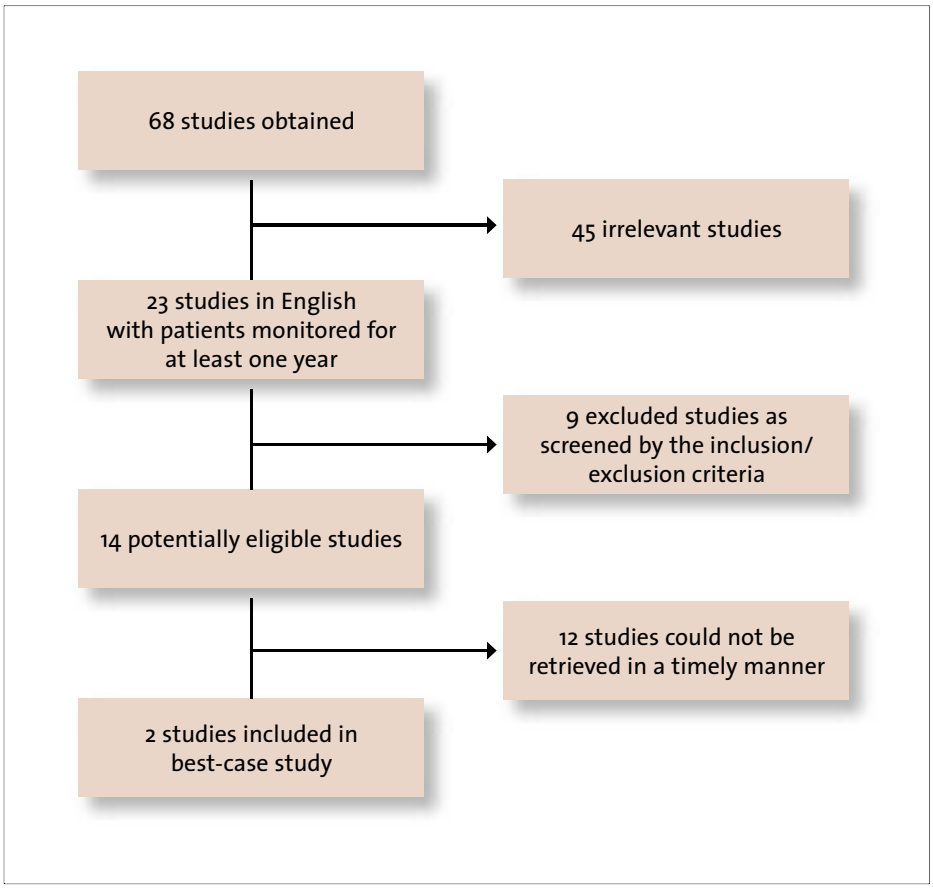

Figure 5. Early/immediate search results.

abstracts, unpublished reports, and publications in press were not considered. The search used two search titles including "early load dental implants" and "immediate load dental implants." The search was limited to studies that monitored a patient's implant(s) for a minimum of one year following surgery and studies that considered both protocols. The titles and abstracts of all published articles obtained from this search were examined to determine the applicability of the articles to the study's purpose/ PICO question (**Figures 4a-c**).

2. Inclusion/Exclusion Criteria

A screening was carried out based on the same inclusion criteria utilized for the conventional protocol. Using the PubMed database, the search conducted generated an initial lot of 28 papers using the phrase "early load dental implants," and a total of 40 papers using the phrase "immediate load dental implants" as keyword search item entries. Of these papers, 23 articles included patients who were monitored for at least one year and were written in the English language.

Another screening was executed to filter out papers that only included one protocol. A final screening was executed to filter out trials failing to meet the inclusion and exclusion criteria of the search strategy. These irrelevant studies were thus omitted from the best-case study (**Figure 5**).

3. Quality Assessment

Two trials provided data on 286 early/immediately load dental implants and 80 conventional load dental implants in patients with adequate bone quality and oral hygiene. As mentioned previously, the quality of methodology, design, and data analysis of each individual paper met the minimum cut-off requirement of acceptability according to the Wong Scale-Revised. Analysis of the scores led to the establishment of criterion of acceptability for each of the individual domains of research assessed by the Wong Scale-Revised.

Results

Following the acceptable sampling analysis, a meta-analysis was generated using the data collected from the two searches. Data from the five studies resulted in a total of 607 early/ immediately loaded implants and 300 conventionally loaded implants. The meta-analysis compared the success rates (survivability of dental implants after at least one year) of implants placed via these two procedures. The overwhelming finding of this analysis indicated that the early/immediate procedure, compared to the conventional protocol, yielded a *greater* success rate in terms of implant survival for at least one year.

The data show that the best available evidence derived from this best-case study suggested that the procedure of choice for individuals in need of

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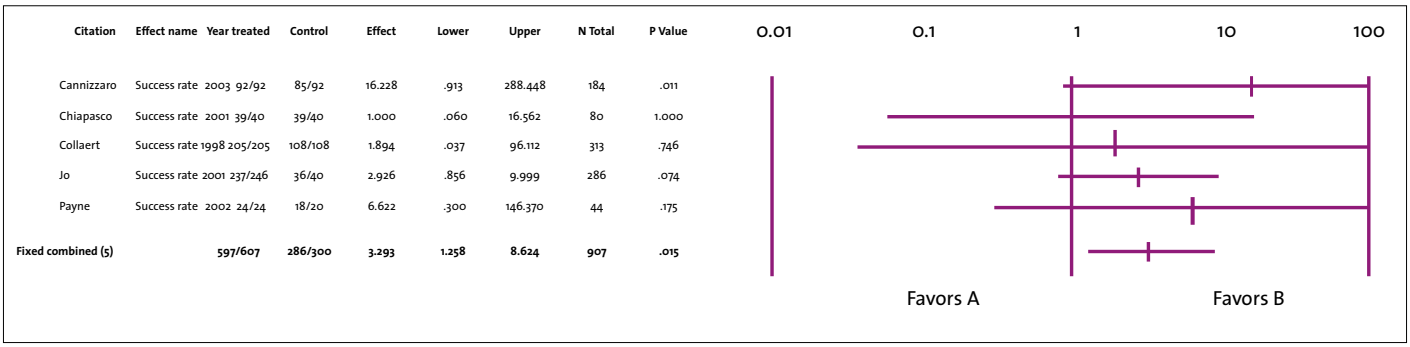

Figure 6. Meta-analysis (A=Conventional protocol; B=Early/immediate protocol).

Table 1

Success/Failure Rates of Early/Immediate vs. Conventional Protocols

Authors of best case studies	Success and (failure) of early/immediate protocol	Success and (failure) of conventional protocol
Cannizzaro et al., 2003	100% (0%)	92.4% (7.6%)
Chiapasco et al., 2001	97.5% (2.5%)	97.5% (2.5%)
Collaert et al., 1998	100% (0%)	100% (0%)
Jo et al., 2001	96.3% (3.7%)	90% (10%)
Payne et al., 2002	100% (0%)	98% (10%)

dental implants is the early/immediate procedure, in terms of success rate, as defined by the PICO question. As each individual study confirmed, the early/immediate protocol either yielded a greater or equivalent success rate when compared to the conventional procedure. Overall, the combined results of the five best-case papers show a success rate of 98.4 percent for the early/immediate procedure and a 95.3 percent for the conventional protocol. Thus, clinicians should be confident in choosing the early/immediate protocol as the best procedure, promising patients lasting and effective implants (**Figure 6 and Table 1**).

Discussion

Dental implants are significantly altering the standard of care and quality of life. Providing one of the most beneficial solutions to the replacement of missing dentition, dental implants improve a patient's way of life by promising a lasting and confident smile. Furthermore, implants open the door to a lifetime of renewed comfort in that patients no longer deal with the frustration, inconvenience, and frequent embarrassment that traditional removable restorations offer.[1] Implants are unquestionably enhancing the way of life of mankind in the 21st century.

Evidence-based research is the finest form of research in the health sciences because it provides a systematic method of performing research on research to reach an ultimate conclusion. This form of research yields the best source of evidence regarding the effectiveness of a treatment for each patient. Especially significant in the case of dental implants, evidence-based research examines clinical data and amalgamates the outcomes of several procedures, thus generating a final and assertive conclusion. The generation of a meta-analysis graphically represents this conclusion by summarizing the results of several applicable papers. In turn, the presented evidence can aid clinicians in making clinical decisions. Due to the high demand of dental implants, the most effective procedure must be implemented to provide patients with the finest and most superb dental care.

1. Publication Bias in Evidence-based Research Through Implant Dentistry

Before clinicians base their decisions on results generated by the evidence-based method, they must first question the validity of the published dental implant literature. Despite the substantial literature of clinically relevant information regarding implants, clinical decisions cannot be made solely based

on reported results because implant literature is significantly biased.[8] Not only does this apply to implant literature, but publication bias is also a major problem in social and other biomedical sciences as well.[9] Because it is easier to publish studies with significant results, studies that show results with no difference between the controls and treated groups and/or studies with poor results are seldom published.[10] This problem jeopardizes the validity of a meta-analysis because accumulated data is solely extracted from published literature.[11] With this awareness, it is quite evident that publication bias is a major flaw in evidence-base research due to its dependency on meta-analyses.

Publication bias can be noticed through the results generated in this study. As observed through the meta-

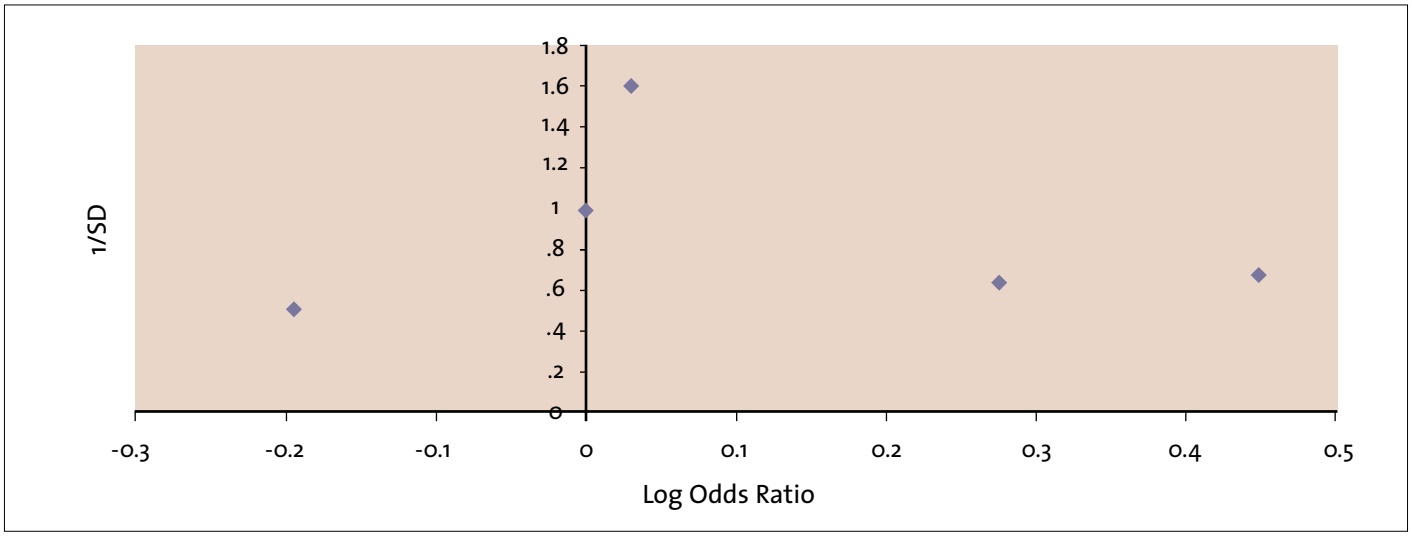

Figure 7. Funnel plot analysis of the publication bias.

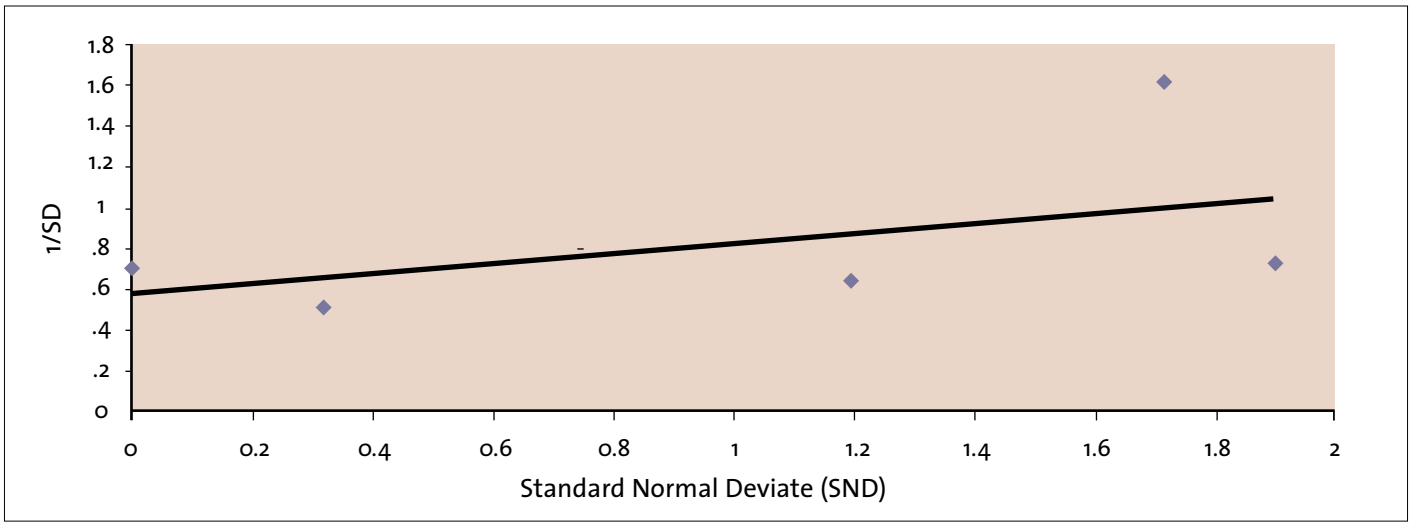

Figure 8. Egger's regression analysis of the publication bias.

PUBLICATION BIAS

9a. Site ready for implants.

9b. Early load prosthesis.

9c. Temporary prosthesis.

Figures 9a-c. Implant process.

analysis produced from the five best-case papers, all five papers confidently confirmed the success of the early/immediate protocol. Not only do they exhibit success, but three papers enthusiastically explained that the early/immediate protocol yielded even more successful results than the conventional procedure.[2,12,13] The other two papers validated both procedures as equally successful by presenting success rates of 100 percent and 97.5 percent for both procedures.[14,15] It is interesting to note that all five papers failed to explicate, if any, failure rates, especially for the early/immediate protocol (**Table 1**). If exposed, the authors did not justify why the implants failed but rather presented certain "complications" that occurred during the surgical procedure.[2] For example, one paper presented mobility as the cause of early/immediate implant failure. However, instead of justifying failure as a lack of osseointegration, the authors provided secondary explanations such as bacterial infestation.[2]

Analysis of the generated results demonstrated that studies with extremely successful results — although possibly dubious — are most commonly published, while studies with adverse, yet meaningful results are generally disregarded.

Detection of publication bias can best be shown through the generation of a funnel plot.[11] A funnel plot is a type of scatterplot that estimates the effects of each study used in a meta-analysis against a measure of its precision.[16] In the absence of bias, the plot is symmetrical, and is thus in the shape of an "inverted funnel." This shape is expected because in studies with smaller sizes, a large variation exists in the effective size of these studies. Thus, random variations become increasingly influential.[17] However, in the presence of publication bias, the plot becomes asymmetrical due to the omission of nonsignificant, left-handed studies that are less likely to become published.[9] It can be observed that data points in the authors' funnel plot are greatly skewed to the right, thus confirming the presence of publication bias (**Figure 7**).

In addition to graphically assessing publication bias, various statistical methods also exist. One of the most common tests detecting publication bias is the Egger's regression test.[18] This test assesses asymmetry (bias) using precision to predict the standardized effect.[18] The slope of the generated regression line indicates the effect size and direction, while the y-intercept indicates the presence of bias.

If there is no bias present, the intercept will be zero. However, in the presence of bias, the intercept is significantly different from zero.[9] Implementation of Egger's test confirms the possibility of publication bias as exhibited through the funnel plot. As observed in Figure 8, the y-intercept greatly deviates from the origin, reinforcing the presence of publication bias (**Figures 7 and 8**).

2. Prevention of Publication Bias

Due to the presence of publication bias, a clinician cannot confidently reach conclusions regarding specific protocols based on published literature. If a clinician were to adhere to the authors' systematic review regarding the efficacy of early/immediate load dental implants, he or she would select this protocol over the conventional procedure. This is because the authors' systematic review displays this convenient procedure with remarkable success and effectiveness, as demonstrated through the convincing meta-analysis (**Figure 6**). Furthermore, clinicians can sooner satisfy patients with yearning esthetic results (**Figures 9a-b**) as opposed to inconvenient temporary prosthetics (**Figure 9c**). Thus, due to publication bias, the authors' results — although skewed — portray the early/immedi-

ate protocol as the most convenient and successful procedure, although this most definitely may not be the case.

At this point, it is best to ask what clinicians must do regarding the erroneous results presented in systematic reviews. As explained, regardless of a paper's relevancy, clinicians cannot base their decisions on systematic reviews and/or meta-analyses unless they thoroughly assess the methods used in executing the study.[10] There are many steps clinicians can take to determine the validity of a study, or better yet, exclude adverse studies. Firstly, clinicians can conduct an unbiased search for studies. This can be achieved through the execution of both electronic and manual searches. While conducting this search, it is best to include "grey literature."[9] In the health and social sciences, there are systematic differences between the results presented in both studies. Furthermore, by meticulously documenting what has been searched and how the search was implemented, the prevalence of publication bias greatly decreases.

In addition to this systematic approach of investigating the literature, clinicians can perform several analyses to analyze the sensitivity of a paper's results based on the characteristics of the study.[10] Because systematic reviews and meta-analyses are most commonly used to assess evidence regarding certain procedures, one step to directly investigate the possible presence of publication bias — as was conducted in this study — would be to produce a funnel plot.[16] Although the construction of an asymmetrical plot does not decisively confirm publication bias, clinicians become conscious of a paper's atypical results.[11] To further investigate irregularities, clinicians can conduct various statistical tests such as the Egger's regression test.[10] Other tests include a modified version of Macaskill's test and/or the permutation test.[16] Another alternative lies in the "trim and fill" model.[9] This model develops a method that determines where missing data fall, adds them to the analysis, and subsequently re-computes the combined effect. By conducting these analyses, clinicians become aware of the possible presence of publication bias and can therefore eliminate misleading systematic papers, which would otherwise lead to inaccurate conclusions.

By conducting these analyses, clinicians become aware of the possible presence of publication bias and can therefore eliminate misleading systematic papers.

In addition to graphically and statistically testing published literature, another approach can be taken to prevent making decisions based on biased results: searching for unpublished data.[10] This option would result in accurate conclusions because it completely eliminates any form of bias in that the clinician collects all the necessary data. If access is limited, however, clinicians can contact authors of published literature and request additional data. If available, the accumulation of raw data can be used to reach final conclusions regarding specific protocols (**Figure 9**).

3. Probability of Literature Assessment

Clinicians can systematically detect the presence of publication bias. In this study, the authors addressed whether clinicians would actually undertake these steps before reaching their final conclusions. It is quite evident that determining the validity of a study requires much time investment and patience. Based on this fact, would a clinician actually spend quality time on assessing the validity of a paper by conducting tedious statistical tests, seeking grey literature, and/or contacting authors? Considering a clinician's limited time, it is highly unlikely a typical clinician would alter his or her priorities to accomplish these tasks.[17]

It is understandable that a clinician will not conduct time-consuming statistical tests that require complicated calculations. Furthermore, it is improbable that clinicians would search for grey literature and contact authors to seek unpublished data. However, contrary to the inconveniences these two options present, the generation of a funnel plot is theoretically simple and quite easy, and relatively quick to implement.[17] Thus, this option seems to be the most appropriate and convenient method to evaluate systematic reviews and meta-analyses.

4. Alternative Method of Assessment

In order to provide the best form of treatment, clinicians must stay current with new advances and clinical breakthroughs.[8] Therefore, in addition to solely investigating the literature, clinicians should attend lectures to analyze the literature and discuss clinical advances as a group. In this way, new advances would be carefully investigated as a group of clinicians seeking the finest and most effective procedure, rather than by authors wanting to glorify their

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impressive, yet trivial results. By attending seminars, clinicians can promptly detect inadequate literature due to their acquaintance with the most current research. Not only does this method beneficially impact patients, but it also aids clinicians in implementing the best procedures with the confidence of attaining successful results. This trend reaffirms the need for lifelong learning in that clinicians must continuously be aware of the newest and most successful advances in the dental field.[8]

Further research investigating the success rates of both protocols several years following implant surgery is needed. This will allow clinicians to choose a protocol resulting in lasting implants with more confidence.

In summary, the analysis of the effects of publication bias through evidence-based research in alternative protocols to dental implantology indicates that the results of several studies cannot be confidently used to reach a final, assertive conclusion. Despite its efficacy, evidence-based research is flawed in terms of data collection. Despite the many methods of dealing with publication bias, clinicians do not have the power or authority to restrain authors from publishing their significant results. With the awareness that publication bias can never be completely eradicated, it is recommended that clinicians seek studies that present reasonable results. By executing various analyses, clinicians can attempt to eliminate publication bias, thus basing their decisions on the remaining high quality evidence. Furthermore, clinicians should attend seminars to learn of the effective advances in dentistry. Due to the dental innovations, including implants, constant research is required to keep dentistry up-to-date and paramount. However, despite its significance, research must be carefully executed to eliminate publication bias. Through clinicians who are conscious of the valid research, patients will benefit from clinical advances, consequently demonstrating the excellence of dental clinicians. ■■■■

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The Economics of Dental Practice — Present and Future

H. Barry Waldman, DDS, MPH, PhD, and Steven P. Perlman, DDS, MScD

Abstract

The combination of increased practitioner income, increases in the proportion of the population reporting visits for dental services, decreases in the number of dental school graduates, decreases in the dentist-to-population ratio, and increases in the number of female students and practitioners (many of whom report significantly fewer work hours than their male counterparts), portends favorable economics for dental practices. However, the cost of dental care is "felt" to a greater extent than for other health services. Current and future funding arrangements for dental services could be vulnerable to economic downturns, efforts to control business overhead costs and continued minimal government support. There may need to be concern regarding the infrastructure of economics of dental practice.

A series of favorable developments, including increasing dental practitioner income, an increasing use of dental services, decreasing numbers of graduates and decreasing practitioner-to-population ratios would seem to favor continued encouraging prospects for the future of dental practices. However, compared to other health services, the reliance on 1) out-of-pocket funding for a major share of dental expenditures, and 2) limited government support for dental services raise questions regarding the infrastructure of dental economics. These subjects are reviewed in the following presentation.

The average net income for an independent private dental practitioner who owned all or part of his/her practice in 2002 was more than $174,000 for a general practitioner, and more than $291,000 for a specialist.[1] Through 2003, there was a progressive increase in the proportion of the population (ages 2-17, 18-64 and 65 and over) reporting a dental visit in the previous year.[2] More than $81 billion were expended for dental services in 2004, with projections for increases to more than $116 billion in 2010 and $147 billion in 2014.[3-5] Undeniably, the economics of dental practice have continued to improve since earlier presentations in the *Journal of the California Dental Association* that documented favorable economics during the 1980s and 1990s.[6-8]

"The demand for oral health care correlates closely to the health of the national economy. At higher income levels, individuals with increased discretionary dollars are better able to pay for their own dental services, even in the absence of dental insurance."[9]

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However, the dynamics of the spending for health services is undergoing dramatic changes as increasing numbers of large and small industries seek the means to reduce overhead costs as they compete in a global economy. Employer negotiations and contractual arrangements are demanding greater employee contributions for health costs. The combination of increased "competition" for out-of-pocket spending for the various health service needs, in particular, dental care, and the continuing minimal level of government spending for dental services, could portend serious potential consequences in the long term for the economics of dentistry. But first the good news about the economics of dental practice.

Dental Practitioners

Numbers of Dental School Graduates

Between 1980 and the early years of the present decade, there was an increase of more than 60 million residents of this country.[10] During the same period, there were dramatic decreases in the number of graduates from schools of dentistry. In some years, a decrease of more than a thousand new dentists as compared to the early 1980s. As a consequence, the number of dental graduates per population decreased from highs in the 1980s of 20 to almost 25 graduates per million U.S. residents, to 14 and 15 graduates per million population in the mid-1990s and early 2000s (**Table 1**).

Table 1

Dental School Graduates and Graduates Per Million Population: Selected Years 1980-2003[9-11]

Year	Number of graduates	Graduates per million population
1980	5,256	23.1
1983	5,756*	24.5
1985	5,353	21.6
1990	4,233	17.0
1995	3,908	14.3
2000	4,171	14.8
2003	4,443	15.2

*Greatest annual number of graduates.

Table 2

Population Per Private-practicing Dentists: Selected Years 1993-2003[5,10]

Year	Population (in millions)	Dentists	Population per private practitioner
1993	260.3	142,603	1,825
1995	266.6	146,089	1,824
2000	282.4	152,798	1,848
2003	291.0	160,177	1,816

Dentist-to-Population Ratios

The ratio of professionally active dentists to 100,000 population peaked in 1994 at 60.2 having risen from a low of about 49 in 1960. This ratio of professional active dentists includes active private practitioners, dental school faculty and staff, armed forces dentists, government-employed dentists, interns, residents and other health or dental organization staff members.

The American Dental Association and federal agencies project a continuing decline through 2020, to about 54 professionally active dentists per 100,000 population.[9] Limited changes in the population per private practitioner ratio occurred between 1993 and 2003, ranging between 1,816 and 1,848 residents per practitioner (**Table 2**). Since 1993, the ADA Survey Center has modified its methodology to determine the number of active private practitioners, thereby precluding comparisons with earlier periods. (Personal communication, Survey Center, Jan. 13, 2006.)

Female Dentists

There has been a substantial change, however, in the gender mix of dental students and dentists. The proportion of women dental students increased from 24 percent in 1985 to 40 percent in 2002. Women accounted for fewer than 3 percent of practicing dentists in 1982 and 13 percent in 1997, with projections of 22 percent in 2010 and 28 percent in 2020; with "… suggest(ions) there may be even greater proportions of female dentists in future years."[12,13] Repeated studies of the work patterns of male and female dentists indicate, that while there are differences in the various stages in one's career,

Table 3

Trend in Dental Expenditures Per Private-practicing Dentist: Selected Years 1993-2003[3-5,10]

Year	Expenditures (in billions)	Dentists	Expenditures Per Dentist		
			Current dollars	CPI*	Constant dollars
1993	$39.2	142,603	$274,900	144.5	$190,200
1995	45.8	146,089	313,500	313.5	205,700
2000	60.7	152,798	397,300	172.2	230,700
2003	74.3	160,177	463,900	184.0	252,000

* Dental Services Consumer Price Index, 1982-84=100

Table 4

Current and Constant Dollar Dental Expenditures: Selected Years 1970-2014[3,10]

	Total (in billions)			Per capita	
	Current dollars	CPI*	Constant dollars	Current dollars	Constant dollars
1970	$4.7	39.2	$11.9	$22	$56
1980	13.3	78.9	16.8	57	72
1990	31.6	155.8	20.2	121	77
2000	60.7	258.5	23.5	211	82
2003	74.3	293.1	25.3	251	86
2004	81.5	307.2	26.5	277	90
Projected					
2010	116.4			370	
2014	146.9			452	

* Dental Services Consumer Price Index, 1982-84=100.

"… women (dentists) worked significantly fewer hours than men (dentists)."[12] As such, "… work capacity could impact on dentist supply projections."[12]

National Dental Expenditures Per Private Practicing Dentist

Between 1993 and 2003, based upon national expenditure data, there was almost a 70 percent increase in the current dollar and almost a one-third increase in constant dollar, removing the effects of inflation, spending for dental services per private practicing dentist (**Table 3**). National expenditure figures include spending for dental services in nonprivate practice arrangements, e.g., hospitals, government institutions. Therefore, these expenditure figures would be greater than actual spending per private practitioner and should be used only as trend indicators.

Economic realities of spending for dental services

Current and Constant Dollar Expenditures

For more than 30 years, current and constant dollar national expenditures and spending per capita for dental services has continued to increase. Projections through 2014 continue to anticipate continued current dollar growth in national and per capita expenditures for dental services, $277 per capita spending in current dollars in 2004 (**Table 4**). Specific estimated constant dollar deflation multipliers, which would permit projections for future years for dental services are not available. (Personal communication, Centers for Medicare and Medicaid Services, Jan. 16, 2006.)

Distribution of Expenditures

Between 1970 and 1990 there were dramatic changes in the source of funds for dental services; primarily an increase in private health insurance and a decrease in out-of-pocket spending. During this period, government dollar support essentially remained almost insignificant, and proportionately actually decreased. By 2004,

Table 5

Dental Expenditures by Source of Funds: Selected Calendar Year 1970-2014[3,4,14]

	Total	Total private	Out-of pocket (in billions)	Private Health Ins.	Total Public	Medicaid
1970	$4.7	$4.5	$4.2	$0.2	$0.2	$0.2
1990	31.6	30.6	15.4	15.1	0.9	0.8
2000	60.7	57.6	27.0	30.5	3.1	2.6
2004	81.5	76.1	36.1	40.5	4.9	4.2
Projections						
2010	116.4	105.2	51.0	54.1	11.2	10.2
2014	146.9	129.7	63.1	66.6	17.1	16.0
			(Percent distribution)			
1970	100%	95.4%	90.8%	4.5%	4.6%	3.5%
1990	100	96.8	48.7	47.8	2.8	2.5
2000	100	94.6	44.4	50.2	5.1	4.3
2004	100	93.4	44.3	49.7	6.0	5.1
Projections						
2010	100	90.3	43.8	46.5	9.6	8.8
2014	100	88.4	43.0	45.4	11.6	10.9
			(Per-capita expenditures)			
1970	$22	$21	$20	$1	$1	
2000	211	200	94	106	11	
2003	251	234	111	123	17	
Projections						
2010	370	334	162	172	36	
2014	452	399	194	205	53	

Note: Numbers and percentages have been rounded.
* Subset of public funds.

less than $5 billion, 6 percent of the total national expenditure of $81.5 billion, was spent by various government agencies for dental services. Since 2000, approximately half of dental costs have been covered by private health insurance arrangements; with out-of-pocket spending accounting for about 44 percent of the total cost for dental care.

Limited changes in the proportion of dental care costs covered by out-of-pocket spending are projected through 2014. Private insurance coverage is anticipated to decrease to about 45 percent during this period. Government coverage is projected to increase to almost 11 percent; primarily as a result of increased spending under the Medicaid program (**Table 5**).

Spending Comparisons

Dental care costs are "felt" to a far greater extent than all other major health services. Although approximately half of dental costs are covered by private insurance arrangements, compared to other heath services, a far greater proportion of dental costs — 44 percent — are required from out-of-pocket sources. By comparison out-of-pocket

spending for other major health services range from 3 percent for hospital services to 30 percent for prescription drugs (**Table 6**).

■ Much of the difference in out-of-pocket spending for dental care is a reflection of the significant differences in government support for heath services. Government agencies provide about 6 percent of the costs for dental care. By contrast, support by these agencies range from 24 percent for prescription drugs to 60 percent for nursing home care (**Table 6**).

Table 6

Proportion of Out-of-Pocket and Government Spending for Health Services: Selected Years 2000-2014[3]

	2000	2003	2010*	2014*
Percent out-of-pocket				
All personal health care	17.0%	16.0%	14.4%	14.0%
Dental care	**44.4**	**44.2**	**43.8**	**43.0**
Hospital services	3.1	3.2	3.3	3.4
Physician care	11.1	10.2	9.7	9.4
Prescription drugs	31.5	29.7	20.2	19.8
Nursing Home services	28.0	27.9	27.5	27.0
Percent government spending				
All personal health care	43.1%	43.1%	46.8%	47.7%
Dental care	**5.1**	**6.6**	**9.6**	**11.6**
Hospital services	58.6	58.3	59.0	59.1
Physician care	27.4	27.4	32.7	32.8
Prescription drugs	21.9	24.1	43.0	46.0
Nursing Home services	58.9	60.7	62.2	63.7

*Projected

Concern Regarding the Infrastructure of Dental Economics

The continued positive direction of dental economics in the future will be dependent upon the ability and willingness of individuals and their employers to finance 90 percent or more of dental cost, a combination of out-of-pocket spending and dental insurance. Almost all government disbursements for dental services are within the boundaries of the Medicaid program ($4.2 billion of the total $4.9 billion of government support in 2004 for personal dental health services), thereby limiting assistance primarily to individuals and families below the poverty level (**Table 5**).

Dental costs will increasingly be "felt" as employers seek to reduce overhead health insurance expenses (for current and past employees). Employers progressively will need to deal with the impact of global economics and the related issues of out-sourcing to lower salaried work forces in other countries. Management-union negotiators could readily overlook dental services as they seek to insure the greater expenses of hospital and physician services. Similarly, federal government attempts to place limits on fringe benefits, could place dental costs beyond the caps set for these tax-free benefits.[15,16]

It is all well and good to counter these concerns with the fact that practitioner income continues to improve, even exceeding that of some physicians, e.g., "The net hourly income of dentists now exceeds that of family physicians, general internists and pediatricians."[9] Or that "For 2000, national expenditures attributable to the provision of dental services were calculated at $203.6 billion."[17] Indeed, the economics of practice are increasingly so satisfying that shortages exist in the recruitment of clinical faculty for schools of dentistry. "The greatest factor influencing faculty separations and recruitment is retirement, followed by faculty leaving to enter private practice."[9] But there is also the dilemma that, "In the next 20 years, (written in 2000) the number of (dentist) retirees will grow faster than the number of graduates, exerting a downward pressure on the value of dental practices."[18]

At some point, the increasing expenditures for general medical services resulting from 1) the need of employers to control health insurance benefits in order to maintain a competitive stance with national and global competitors; 2) government efforts to place a cap on non-taxable fringe benefits; and 3) health care demands of the aging baby boomer generation, which, in the not too distant future, will represent 20 percent of the population.[19] Based upon the presented information, the profession should be concerned about the underpinnings of the economics of dental practice. ■■■■

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The Use of Autogenous Bone Grafting With Platelet-Rich Plasma for Alveolar Ridge Reconstruction: A Clinical Report

Ziv Simon, DMD, MSc, and Joseph Friedlich, DDS

Abstract

Implant dentistry has become an effective and predictable treatment modality in modern dentistry. Patients with missing teeth can benefit from partial or complete tooth replacement. Implants can also be used to improve denture retention, stability and support, and enable improved function and esthetics for patients. Several implant systems are commercially available, and their use is predictable with excellent success rates.

Many indications for implant therapy are encountered in daily practice, ranging from a single tooth replacement to complete rehabilitation of edentulous alveolar ridges. Implants can also be used as orthodontic anchorage or temporarily to support a temporary restoration until the final implants heal.[1,2] Clinicians are able to offer patients a wide variety of different treatment options to achieve the desired outcome in a particular clinical scenario while providing a predictable treatment with long-term performance of the dental implant. In many situations, the optimal implant sites from a prosthodontic perspective are compromised due to inadequate

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quantity and quality of bone. This deficiency may be due to bone resorption in response to periodontal disease, trauma, acute infection, neoplastic processes, and disuse atrophy following premature tooth loss. Various bone augmentation procedures have been developed to address the problem of compromised bone quantity.[3,4]

The objective of these augmentation procedures is to reconstruct the deficient ridge three dimensionally and obtain an optimal implant site with proper esthetics for the prosthesis. When required, the bone graft of choice for most augmentation procedures is autogenous, as it provides a great degree of predictable success. Several donor sites are available and include intraoral sites (chin, mandibular ramus, and maxillary tuberosity and bone harvested from implant site drillings) and extraoral sites (e.g., iliac crest, and tibia). Extraoral sites are used when significant amounts of bone are required to reconstruct large deficiencies. Intraoral sites have the distinct advantage of decreased patient morbidity and, at times, remain accessible through the implant field.

The chin, as a donor site, has the advantage of being easily accessible to the surgeon and can provide significant bone volume for a localized moderate ridge augmentation. The mandibular symphysis can provide cortical as well as cancellous bone to be used as a block graft or as a particulate graft. Grafts that are primarily cortical bone can be molded to fit the recipient site and usually show less volume loss after implantation. The chin is considered relatively safe site for harvesting bone, yet complications can occur due to proximity to adjacent anatomical structures. The surgeon must maintain an adequate distance from the apices of the lower anterior dentition, the mental foramen and lower border of the mandible.[5] Bicortical grafts should be avoided to prevent injury to structures within the floor of mouth. Recognized postoperative sequelae may include swelling, bruising, and pain. Infrequent and more serious complications include devitalization of teeth, altered facial contour, sensory disturbances, prolapsed mentalis muscle (known as a "chin drop"), and fracture of the mandible.

Figure 1. Preoperative buccal view.

Figure 2. Preoperative occlusal view.

Several grafting materials are commercially available for the use in ridge augmentation procedures, e.g., bovine bone mineral, demineralized human bone matrix. As effective as these materials may be, they lack a predictable osteoinductive potential, i.e., the ability to induce differentiation of bone forming cells. Most graft materials are able to serve as a scaffold for bone forming cells, thus making them osteoconductive. An ideal bone graft for use in ridge reconstruction should have osteogenic, osteoconductive, as well osteoinductive properties.[6]

Autogenous bone provides these essential properties through its mineralized structures, as well as pluripotential undifferentiated mesenchymal cells with osteogenic potential. The release of growth factors that stimulate bone formation and revascularization of the graft are a direct benefit of autogenous grafting procedures.

Abundant ongoing research is aimed at exploring the use of biologically active substances for bone regeneration. It is believed that through the addition of factors that induce differentiation of cells, such as endothelial and osteoblastic cells, enhanced osteogenesis will occur. Some of the suggested factors include bone morphogenetic proteins, which have been shown to act on undifferentiated mesenchymal cells, inducing them to differentiate into chondroblasts and osteoblasts.[7] Platelet-rich plasma, PRP, has also been suggested as an effective way to enhance osteogenesis.[8,9] PRP has been advocated in conjunction with bone grafting with the expectation that faster and better graft consolidation will occur together with improved bone quality.[10]

These qualities are attributed to the vast variety of growth factors that are released from the platelets as they degranulate. Among the factors that can be found in PRP are platelet-derived growth factor, PDGF; transforming growth factor ß, TGF-ß; vascular endothelial growth factors, VEGF; epidermal growth factors, EGF; and insulin growth factor, IGF. These factors introduce a combined effect that includes the formation of new blood vessels, known as angiogenesis, stimulation of bone growth and maturation and enhance-

Figure 3. Horizontal deficiency of the alveolar ridge.

Figure 4. Chin donor site.

Figure 5. Block graft harvested.

ment of the wound-healing cascade. Although some evidence may exist to support the use of PRP, it has not been studied in randomized control trials and should be further investigated.

PRP is derived from the patient's own blood and is processed in a centrifuge to isolate a high concentration of platelets. Blood is collected from the patient (approximately 50 cc, but variable) and is stored in commercially available test tubes with an anticoagulant. The latter prevents coagulation and premature degranulation of the platelets. The blood is then separated into cells and plasma. The cellular component contains the PRP, which is manipulated to create an autogenous tissue adhesive. In the following case report, PRP was utilized together with an autogenous corticocancellous chin graft to facilitate ideal rehabilitation of a partially edentulous patient.

Clinical Report

The patient was a 43-year-old healthy man with a noncontributory medical history. His objective was to have tooth No. 7 restored with a fixed restoration (**Figure 1**). Tooth No. 7 had been lost 10 years earlier. Examination of the edentulous site revealed a large horizontal labial osseous defect (**Figure 2**). Tomographic evaluation confirmed the existence of a labial concavity. The absence of sufficient soft and hard tissues posed a challenge for ideal placement of a dental implant. Had an implant been placed in the site, it would have resulted in an esthetic compromise as well as nonaxial loading of the future restoration. After presenting all treatment options to the patient, including restoration with a fixed partial denture, consent was obtained to perform a ridge augmentation procedure utilizing a block graft harvested from the chin in conjunction with platelet-rich plasma.

Employing a proper aseptic technique, the procedure was accomplished under intravenous sedation using midazolam hydrochloride (Versed). The phlebotomy was accomplished at the time of initiating intravenous access. A total of 50 cc of blood was collected. The patient also received 8 mg of dexamethasone. The patient's blood was processed in the method described previously, and PRP was obtained and set aside to be used later. The patient was anesthetized at the donor and recipient sites by means of local infiltration and bilateral mandibular blocks. The recipient site was exposed using two vertical releasing incisions beyond the mucogingival junction with full thickness labial and palatal flaps.

The site proved to be significantly deficient in the horizontal dimension (**Figure 3**). The vertical component of the site was optimal (1.5-2 mm apical to the CEJ of the planned crown). The dimensions of the required graft size were determined. A vestibular incision between the mandibular canines, apical to the mucogingival junction was then utilized to facilitate elevation of a full thickness mucoperiosteal flap and exposure of the donor site. The outline of graft was drawn with a sterile pencil based on the measurements taken at the recipient site. The most superior aspect of the graft was determined to be more than 5 mm from the apices of the lower incisors. Using a high speed with irrigation diamond disk, cuts were made according to the outline, into the cancellous portion of the mandible (**Figure 4**). The graft harvest was then completed by the use of osteotomes (**Figure 5**).

Additional cancellous bone was harvested and placed into chilled saline together with the block graft. The intrabony defect in the donor site was obliterated with an absorbable gelatin (Gelfoam, Kalamazoo, MI) to aid in hemostasis, and then closed in a layered fashion ensuring proper reapproximation of the mentalis muscle.

Figure 6. Block graft fixated to recipient site.

Figure 7. Implant placement with surgical guide.

Figure 8. Implant integrated with healing abutment.

The graft was trimmed to fit the recipient site. The recipient site was intentionally perforated several times, and the graft was fixated in place using two fixation screws. The cancellous bone was then hand mixed with the PRP and activated using thrombin. The mixture created a moldable mass and was used as filler around the block graft. Additional PRP was then placed over the reconstruction (**Figure 6**). The flaps were repositioned to achieve primary closure in a tension-free manner, and closed with Gortex 4/0 sutures (Gore, Flagstaff, AZ). Perioperatively, the patient was placed on an antibiotic regimen (amoxicillin 500 mg TID for one week), a nonsteroidal anti-inflammatory (ibuprofen 600 mg TID for two days) as well as chlorhexidine rinse (BID commencing three days prior to the surgical procedure for one week).

The immediate postoperative period was uncomplicated. The patient did identify "numbness" of his lower anterior teeth, which subsided after three weeks. The patient reported an intermittent "wooden" sensation in one of his lower anterior teeth. This sensation subsided several months later. The donor and recipient sites healed uneventfully.

Following a healing period of seven months the patient returned for implant placement. Under local anesthesia, the No. 7 site was exposed preserving the adjacent papillae. At the time of exposure, the graft was noticed to be completely incorporated within the surrounding bone and minimal resorption on the labial aspect had occurred. This anticipated resorption is the reason overgrafting is advised in ridge augmentation procedures. The site presented with an increase in the ridge width that was now optimal for implant placement. The fixation screws were removed and a 10 mm length by 3.75 mm diameter 3I Osseotite implant was placed using a surgical template (**Figure 7**). The site was sutured using Gortex 4/0 sutures. The postoperative healing period was uneventful and the site was left to heal for four months.

After the second healing period, the implant was exposed using the same flap elevation technique as employed at the time of the osteotomy. The implant was clinically integrated and a healing abutment was placed. Radiographically, the implant presented with proper bone level on its mesial and distal aspects (**Figure 9**). Following an uneventful healing period of three weeks the implant was restored with a screw-retained crown (**Figure 10**).

Discussion

Implant surgeons are often faced with clinical scenarios that require site preparation procedures prior to implant placement. The ability to predictably augment the alveolar ridge with deficient bone volume has greatly benefited patients with such challenging situations. Block grafts offer the advantage of slow resorption and easy fixation in the site of compromised bone quantity. The use of autogenous bone has been advocated as the preferred bone graft, with its osteogenic, osteoinductive and osteoconductive properties. Clinicians with an advanced level of surgical training (oral surgeons and periodontists) can harvest bone from donor sites and use it for ridge augmentation procedures. Intraoral donor sites are ideal, since they can be easily done in an office setting with minimally invasive techniques. In an attempt to enhance the bone grafting procedures, clinicians have used different kinds of growth factors as part of the innovative tissue-engineering concept. Platelet-rich plasma has been proposed as potential stimulant of bone and soft tissue healing. Reports have shown enhanced osteogenesis and faster healing periods. These observations are most probably attributed to the abundance of growth factors that can be found in

Figure 9. Radiograph of integrated No. 7 implant

Figure 10. No. 7 implant-supported crown.

PRP. Although, no randomized control studies have been done examining the benefit of PRP, the preliminary results obtained to date suggest that these techniques hold promise.

The described implant treatment modality is lengthier compared to other treatment options, e.g. removable or a fixed partial denture. This is due to several healing periods required for graft incorporation with the surrounding bone and the appropriate implant healing period. Potential morbidity can also be encountered while using this technique. Therefore, the sequence of procedures, healing periods and possible risk and complications should be clearly explained to patients prior to treatment.

In conclusion, this clinical report demonstrated that block grafts with PRP may be successfully used in healthy patients with deficient alveolar ridges, restoring the original bony architecture to accommodate a dental implant.

Summary

In the case reported here, a patient who required a dental implant had a deficient alveolar ridge that was unsuitable for a dental implant placement. The patient underwent a ridge augmentation procedure using a block graft taken from his chin in conjunction with platelet-rich plasma that was used in the recipient site in an attempt to enhance the hard and soft tissue healing. The graft has healed uneventfully and enabled implant placement in an ideal position from a restorative perspective. The implant was restored and is now in function for more than four years. The use of autogenous block grafting is a predictable treatment modality in ridge augmentation procedures. It was well documented in the literature using different donor sites (i.e. mandibular sumphysis, ramus, iliac crest), and provides sufficient bone quality and quantity for implant stabilization by itself without using PRP. Adding platelet-rich plasma may enhance the soft tissue healing and the maturation of the graft. At present, the previous statement has not been proven and whether growth factors can significantly improve the treatment outcome of these procedure remains to be investigated. ■■■■

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Robert E. Horseman, DDS

The Thrill of the Grill

"Because I want to see if your tongue is infected and secretly hope it hurts like hell and you can never find the hole again."

OK, let's have a look." New patient, female, age 19, no complaints, health history normal.

YIKES! Do you remember the first time you saw a pierced tongue? A combination of wonder, revulsion, curiosity, more revulsion, a dollop of anger and an instant evaluation of maxed-out stupidity — these flashed through my mind as I tried to keep the emotional kaleidoscope from registering on my face. I'm a professional — cool, detached.

She knows. It's not the first time. Now comes the lecture, she's thinking, another sanctimonious adult out of the loop.

No lecture — not yet, anyway. "You want to take that thing out of your tongue?" I asked in my cool, detached professional manner.

"Why?"

"Because I want to see if your tongue is infected and secretly hope it hurts like hell and you can never find the hole again." I didn't actually say this, but she complied eventually, deftly unscrewing the components with white, squared-off nails like little snow shovels.

Normal. Dang! No question, I'm out of the loop, a loop that has an impenetrable border through which no undocumented alien such as myself can ever cross. Dentists — unless they are in their 20s and devotees of the hip-hop phenomenon — will always be out of the loop. We never see these things coming. Tattooed lip and eye liners, trout lips with or without loops of their

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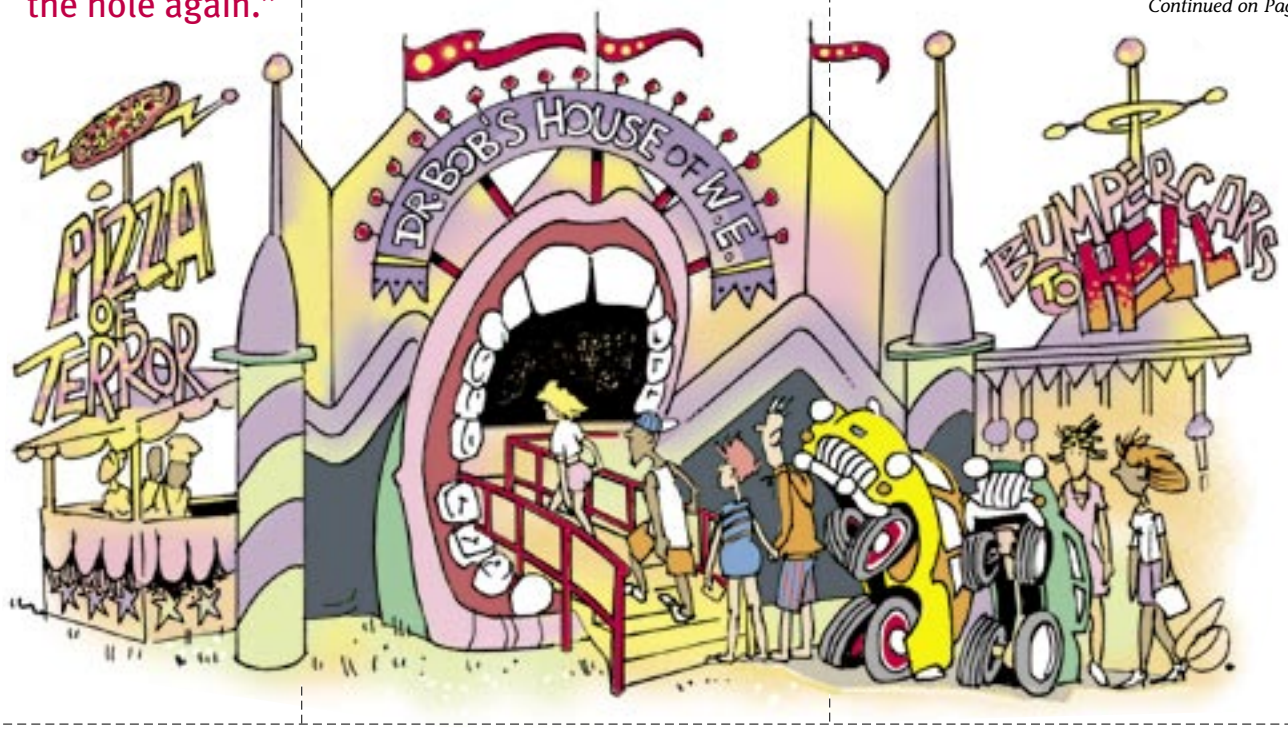

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own. A different world and we don't have a passport.

That's why an article by Jillian Cohan reporting for Knight Ridder newspapers out of Wichita, Kansas, hardly ruffled my cool detachment at all, especially after the Zoloft kicked in. Jillian reported on the activities of one Earl "Cadillac" Hunter, owner and chief designer at Cadillac House. This is not a GMC facility, although Earl fancies a Cadillac as his own personal transport. It is Mr. Hunter's entrepreneurial baby catering to a gaggle of in-loop people who have a yen for "teeth jewelry" called "grills" and the pelf to indulge it. Not yet on the *Fortune 500* list, Cadillac House is the Mecca for grill-seekers from all over the nation hoping to get in on the latest craze before it becomes passe.

You know of a hip-hop icon known as Nelly? Of course not, you're too old, been immured in your dental cubicle for too long and the real world is passing you by. But Google knows and thanks to Nelly (nee Cornell Iral Haynes, Jr., age 35) the dental aspect of Nelly's career peaked recently with the hit rap number "Grillz." The catchy lyrics urged kids across the country to "Smile for me daddy, let me see your grills."

A technical note for dentists, CDTs, and other out-of-loop parties who couldn't care less: Grills are apparently removable castings of precious or nonprecious metal that snap on over one's teeth much like an orthodontic retainer, only more expensive. They are an expression of one's own unique hipness, but unless you can have them studded with diamonds, rubies, or other gemstones, forget it, another Paul Wall or Lil' Flip you'll never be, not that there is anything wrong with that.

Unless you can have them studded with diamonds, rubies, or other gemstones, forget it.

I am only revealing this phenomenon to you so that when you greet a patient sporting grills, rampant decalcification, TMJ problems and an attitude, your cool, detached demeanor won't vaporize just when it's most needed.

For those grillers eager to move on, visit Dr. Bob's House of Wretched Excess — No Request Too Stupid. I plan to have a demo full denture with "Down With Global Warming" etched in gold across the centrals, flanked by a couple of impressive cubic zirconiums on the laterals. A choice of religious symbols imbedded in the extra-length cuspids will be offered at no extra cost with a complimentary tube of Fixodent. I'll show 'em who's out of the loop! ■■■■