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Journal

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RESTORATIVE SUCCESS

PART 1 OF 2

"Treatment Planning"

RICHARD T. KAO, DDS, PHD

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DEPARTMENTS

FEATURES

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The Power of Choice

STEVEN A. GOLD, DDS

An elementary school cafeteria in rural Iowa seems an unlikely place to start a movement that will determine the future of our nation and the world. Yet on Jan. 3, it wasn't unlikely at all.

While the rest of the country was still shaking off their New Year's hangovers, Iowans set about the business of electing the next president. I know a few Iowans and they don't seem ones to grandstand. But surely they must relish their moment on the world stage as the choices they make are watched, scrutinized, and possibly copied by the rest of the country. That a small group of Iowans has such an important role in shaping the future of the United States is testament to the fact that choice is one of the most powerful gifts in the world.

This is particularly true to us, as dentists; in our professional and in our personal lives. Dentistry's legacy, our professional success, and our personal happiness rise and fall based on the choices we all make, day in and day out. We should regularly examine how our choices affect both of these areas of our lives so we can make the right ones.

Every generation of dentists is forced to confront issues by which the public holds the profession up to the light of scrutiny. For roughly the past decade or two, our profession has been besieged by those practitioners who place their own personal financial gain, motives, and egos above the health and well-being of their patients. They seek to use the veil of providing cosmetic services to justify a practice that in many cases leaves patients in worse dental health, not better. Every day, healthy teeth are irreversibly prepared (or "mutilated" as some would say) to place crowns or veneers on them. As a result, patients' pulpal, periodontal, and temporomandibular joint health are too often sacrificed. Practices such as these are what caused public respect of the dental profession to decline also during the last decade or two. Is this coincidental?

Dentistry's legacy, our professional success, and our personal happiness rise and fall based on the choices we all make, day in and day out.

Sadly, this is the result of choices made by individual dentists everywhere. When faced with the choice to provide patients with services that will enhance their health or to sell them a bill of cosmetic goods that pad the dentists' pockets, which will we choose? We can make the choice to practice by our code of ethics and by the principle of "do no harm," or we can choose to ignore these tenets to serve our own selfish ends. We have the power of choice and those choices will either enhance the status of the profession or cause it to continue its downward slide in the poll of public opinion.

The number of dissatisfied dentists appears to be growing. These individuals may be unhappy in their personal or professional lives, or both. Some experts have identified a window in a practitioner's career when burnout is common, 10 to 15 years out of dental school is the time frame I've been told. What choices have our colleagues made during those first 10 to 15 years that brings them to the point of such personal dissatisfaction? Beyond the dental office, we too often see the physical and emotional toll that stress takes. Physical illnesses and injuries are often linked to lifestyle choices we make. What we eat, how much, and what type of exercise we do, our level of drug and alcohol use, and how much and in what environment we work all play critical roles in our health and happiness.

Perhaps as important is the toll that psychological pathology has on us, especially as we age. For example, depression is largely undertreated in our society. This is unfortunate because it is often readily treatable with either talk therapy, medication, or a combination of the two. And, not surprisingly, much of our personal happiness is by choice, as well. University of California, Los Angeles' Joel Adelman, an expert in individual and family psychotherapy says that at some point in a person's life, he or she makes a choice; and that choice is between wisdom or despair. Isn't it refreshing and inspiring when we meet individuals in their 80s and 90s who are outwardly happy, optimistic, and excited about life? It makes us want to learn their secret. Perhaps it is simply a choice that they made.

At its simplest, life is a series of choices we as individuals make. As dentists we are afforded great opportunity to achieve happiness and fulfillment and to make a difference in the lives of others through our profession. Our hope as a profession is that individuals understand the power of choice and make those that best help themselves and the public we serve. ■■■■

Address comments, letters, and questions to the editor at alan.felsenfeld@cda.org.

Matt Mullin

The State of America's Health: The CDC Reports

Almost one in five American adults, an estimated 40 million, said they don't have adequate access to the health care they need because they can't afford it.

According to the Centers for Disease Control and Prevention's Health, United States, 2007 Report, nearly 20 percent of adults said they needed but could not afford one or more oral health, prescription medicine, medical, mental health, or vision services.

"Access problems varied among the 25 most populous states," the report said. The 567-page annual health status report is a compilation of previously released data supplemented with health interview analysis and new access features.

"The majority of Americans do not report having problems accessing health care," noted a special section on access to health care. Data spans several years for

CONTINUES ON 163

The Dental Record, a division of WDA Professional Services, Inc., announced new Tamper-proof Prescription Forms

New Tamper-proof Prescriptions Pads and Tamper-resistant Paper are now available for purchase from The Dental Record. These prescription pads and paper offer unprecedented security, and adhere to federal mandates required for prescriptions covered by Medicaid slated for early 2008. Features include hidden security measures that appear if prescriptions are photocopied and thermochromatic ink that shows a "secure" mark when heated. In addition, the forms can be customized with your contact information. For additional information, visit www.dentalrecord.com, or call (800) 243-4675.

Obesity Linked to Weak Antibacterial Immunity in Mice

A team from Boston University Goldman School of Dental Medicine has linked obesity to weakened antibacterial immunity.

Through experimental research, Salomon Amar, DDS, MS, PhD, associate dean for research, and his team looked at how obese and control mice fought *P. gingivalis* infection. They infected the mice using silk thread that had been coated with bacterial broth and tied around their molars for the study. It was determined that obesity acutely compromised the immune responses to gum infection, as well as infection of the entire body based on the bone loss and bacterial counts of the mice.

"These findings are significant because they are the first to demonstrate an immune paralysis related to obesity," said Amar. "Based on this knowledge, substantial attention to antibacterial immunity will now be required in the treatment of obese individuals."

More information about Amar's research team appeared in the Dec. 10, 2007, *Proceedings of the National Academy of Science.*

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CDA JOURNAL, VOL 36, Nº3

Patients: The Teeth and Eyes Have It; Dentists: Not So Much

Beauty is in the eye of the beholder. And a difference of opinion may depend on what side of the dental chair you're sitting.

In a new study out of Norway, people tended to rate their smiles higher than their dental counterpart. What's more, eyes and teeth topped the list of important features of an attractive face, with those under the age of 50 finding satisfaction with their grins.

The study, published in a recent issue of the *Journal of the American Dental Association*, asked 78 patients in Norway to rate their own smiles on a 100-point satisfaction scale. The patients' regular dentist and an independent periodontist subsequently rated each patient's smile from photographs, using an identical scale.

The results were that patients were more satisfied with their own smiles than their dentists, rating them an average 59.1 on the 100-point scale. However, the dentists' ratings of the patients' smiles averaged 38.6 (independent periodontist) and 40.7 (patients' own dentist).

It may be difficult to understand what a smile satisfaction level of 59 really means, researchers said, adding it might be more accurate to say patients are "accepting of, or contented with, their smiles."

The study participants, 50 women and 28 men, were not actively seeking cosmetic dental treatments, and averaged 51 years of age (range, 22-84 years).

"The fact that the patients had much higher opinions of their smiles than we dentists did is interesting," said the researchers, explaining that while dentists made their assessments from photographs, patients expressed their opinions from memory. The researchers speculated that had the patients used the clinicians' detailed approach to include assessing tooth shade, spacing, crowding, or lip lines, their opinions *might* have been different.

"Dentists should be aware that patients who seek esthetic services may have different perceptions of their smiles than patients who do not express such desires," researchers said.

Had the patients used the clinicians' detailed approach to include assessing tooth shade, spacing, crowding, or lip lines, their opinions *might* have been different.

Registration for ADA/Kellogg Executive Management Program Now Open

The American Dental Association and Northwestern University's Kellogg School of Management have announced that the registration deadline for the 2008 session of the ADA/Kellogg Executive Management Program for dentists is May 31.

Since 2004, the executive program is designed for dentists wanting to learn more about business management from one of the nation's top-rated management schools.

"It takes business training for dentists to another level, exposing them to the many dynamics involved in effectively managing an organization in the 21st century," said James B. Bramson, DDS, ADA executive director.

The program's content is based on the core curriculum of matriculating Kellogg MBA students, including business strategy, organizational leadership, marketing, finance, accounting, economics, quantitative methods, and information systems.

The 2008 program consists of three sessions separated by seven-week intervals and is conducted at Northwestern University's Chicago campus. The session dates are July 1-16, Sept. 12-17, and Nov. 6-10.

UPCOMING MEETINGS

2008	
May 1-4	CDA Spring Scientific Session, Anaheim, 800-CDA-SMILE (232-7645), cda.org.
May 2-3	Evidence-based Dentistry Champion Conference, ADA headquarters, Chicago, ada.org/goto/ebdconf.
May 4	International Conference on Evidence-based Dentistry, ADA headquarters, Chicago, ada.org/goto/ebdconf.
May 6–9	Conference for Oral Health in the Americas, Lima, Peru, http://www.fdiworldental.org/public_health/3_1conferences.html.
Sept. 12-14	CDA Fall Scientific Session, San Francisco, 800-CDA-SMILE (232-7645), cda.org.
Oct. 16-19	American Dental Association 149th Annual Session, San Antonio, Texas, ada.org.
Oct. 25-29	American Public Health Association Oral Health Section's annual meeting and exposition, San Diego, www.apha.org/meetings.
2009	
May 14-17	CDA Spring Scientific Session, Anaheim, 800-CDA-SMILE (232-7645), cda.org.
Sept. 11-13	CDA Fall Scientific Session, San Francisco, 800-CDA-SMILE (232-7645), cda.org.
Oct. 1-4	American Dental Association 150th Annual Session, Honolulu, Hawaii, ada.org.

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

CDC, CONTINUED FROM 161

comparative purposes and for reporting trends, but the access section focuses on 2005. Additionally, the data is increasingly more up to date and timely. These annual reports are prepared for the president, Congress, and health policy makers.

In the 31st annual report, dental data cited include that:

- One-third of all children living below the poverty level did not have recent dental visit in 2005 compared with less than one-fifth of children from higher income families.
- Those living below 200 percent of the poverty level (the average poverty threshold for a family of four was $19,971 in 2005) were substantially more likely to have had no dental visit in the past year than individuals in families with higher income.
- Sixty-one percent of adults had dental coverage in 2001 compared to 86 percent of adults with medical insurance.
- In 2003, on average, Americans paid out-of-pocket for about half of the costs of their dental care.
- About one-quarter of those age 65 and older in 2005 were edentulous.
- Between 1988-1994 and 2001-2004, roughly 25 percent of adults age 20-64 had untreated dental caries, which is down from nearly 50 percent in 1971-1974.

A CDC commentary on the data addressed the complexity of "dental care utilization" with footnotes on the data references.

"Lack of regular dental care can result in pain, infection, and delayed diagnosis of oral diseases, including periodontal or gingival diseases, and oral cancers. Barriers to accessing dental care include paying for care; navigating government-assistance programs; finding a dentist who will accept Medicaid; locating a dentist close to home — especially true for inner-city and rural residents — getting to a dental office; and cultural or language barriers," according to the report.

"For some people, lack of knowledge concerning the need for periodic oral health care is also a barrier to seeking care. Certain subpopulation groups — the poor, black persons and persons of Mexican origin — were more likely to have untreated dental caries. Untreated dental caries indicates that needed dental care was not received," the report said.

The report also noted that "accessing dental care may be more difficult than accessing medical care because a smaller percentage of Americans have dental insurance than medical coverage."

The report is available at www.cdc.gov/nchs/hus.htm. For more information, call (800) 232-4636; menu prompts are "1" for English and "4" to order publications.

CDA JOURNAL, VOL 36, Nº3

Portions of Dental Practice Act Posted on CDA Web Site

Requirements of the Dental Practice Act, with some exceptions, have been summarized and organized by subject, and have been posted to cda.org at http://www.cda.org/library/pdfs/guide_to_dpa_compliance.pdf. You can access this guide from two pages on the CDA Web site — the Regulatory Compliance page, http://www.cda.org/advocacy_&_the_law/regulations/regulatory_compliance, and the Dental Board of California page, http://www.cda.org/advocacy_&_the_law/regulations/dental_board_of_california. The guide is only accessible to CDA staff and members.

Simply click on a section title in the guide's Table of Contents to forward to the page where the section begins. The links to the pertinent regulation or statute are embedded in the guide.

Survey of Dental Services Rendered Report Completed

Greatly expanded since its 1999 report, the Survey Center now has ADA information on the number of dental procedures completed by U.S. dentists. The 2005-2006 Survey of Dental Services Rendered report includes estimates of the number of dental procedures completed by U.S. dentists during one year: from the second quarter of 2005 to the first quarter of 2006.

Additionally, the report includes tables showing the numbers of patients receiving each procedure by age.

The cost of the report (catalog number SDSR-2006) is $100 for ADA members; $150 for nonmembers; and $300 for commercial firms, plus shipping and handling. As with all new Survey Center reports, a PDF file of the report can be downloaded for the same price at www.adacatalog.org. A hard copy of the report can also be ordered by calling (800) 947-4746.

Dental Fee Survey Published and Now Available

In addition to the just-released 2005-2006 Survey of Dental Services Rendered report, results of the ADA Survey Center's 2007 Survey of Dental Fees has just been published. The 240-plus-page report lists mean, median, and percentile fees for almost 200 different dental procedures as reported by private practicing dentists in the United States. Along with the fee information, each procedure includes a brief description as well as its corresponding CDT-2007/2008 code. Results are provided for nine regions of the country for general practitioners and nationally for each of six specialties.

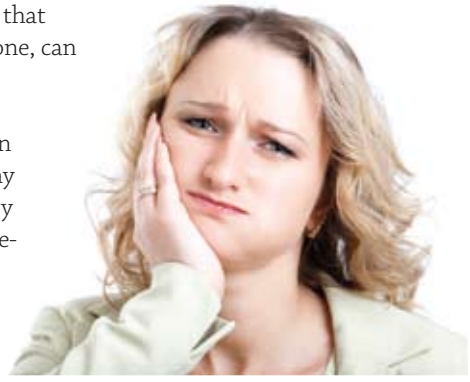
A copy of the report can be purchased by calling ADA Catalog Service at (800) 947-4746 or visiting online at http://www.adacatalog.org. The cost of the report (catalog number SDF-2007) is $125 for ADA members, plus shipping and handling.

Some Patients Do Need High Doses of Pain Meds

The diversion of pain medication is a serious problem, and physicians, dentists, and other health professionals who prescribe opioids without taking into consideration this possibility could be described as irresponsible, so wrote C. Kerry Stratford, MD, and Lynn Webster, MD, in an issue of *UDA Action*, published by the Utah Dental Association.

Despite the real problem of addiction and the occasional wrongful use of prescription drugs, it simply is incorrect to say, as a Salt Lake County Sheriff's official recently did, that "90 to 100 hydrocodone pills at a time is irresponsible."

As Stratford and Webster noted in their article, some patients dealing with intractable pain need the help that opiate painkillers can provide. "They are not addicts. They are not criminals. They are people in pain who need the kind of help that only a physician can give." The authors said that Norco10, containing 10 milligrams of hydrocodone, can be taken at a dosage of up to 12 tablets per day.



Stratford and Webster also commented that law enforcement officials should not take it upon themselves to imply that a certain amount of any prescription medicine is too much. "Let's be wary of any blanket medical judgments made by someone without a medical degree to back it up."

Stratford is president of the Utah Medical Association and Webster is president of the Utah Academy of Pain Medicine.

Diabetics Should Pay Special Attention to Oral Health

To emphasize the association between diabetes and gum disease, the FDI World Dental Federation has teamed up with the International Diabetes Federation.

Both organizations, during the FDI Annual World Dental Congress convened a symposium on the subject that resulted in a call to action for dentists, physicians, and their respective organizations.

At the symposium, which was held in Dubai late last year, participants learned about the relationship between diabetes and gum disease. Attendees did not have to go far to learn what region is one of the highest in the world: The United Arab Emirates has the dubious honor of being second, according to IDF's Diabetes Atlas, third edition, with the tiny island country of Nauru, in the Micronesian South Pacific, topping the list.

"There is a strong relationship between oral health and diabetes," commented Massimo Massi-Benedetti of the IDF. "On one hand, people with diabetes are much more susceptible to developing periodontitis or severe gum disease. On the other hand, emerging research suggests those with periodontitis may have difficulties in controlling their diabetes because severe gum disease may impact the metabolic control and nutritional status of people with diabetes."

Burton Conrod, DDS, president of FDI, said that by educating both physicians and dentists about the relationship between oral health and diabetes, "we can work to increase the quality of care for those who suffer from diabetes."

"For people living with diabetes, it is important that they are aware of the increased risk factors for each of the different disease areas and take the preventative measures necessary to control these risks."

Scientific papers based the symposium will be printed in journals of both health organizations.

"Emerging research suggests those with periodontitis may have difficulties in controlling their diabetes because severe gum disease may impact the metabolic control and nutritional status of people with diabetes."

MASSIMO MASSI-BENEDETTI

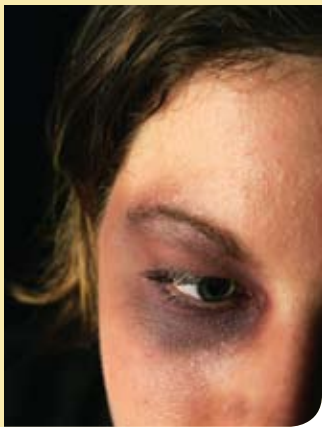
Carefully Handling Suspected Domestic Abuse

That domestic abuse victims keep dental appointments strongly demonstrates trust in the profession. As such, it is important for dentists and their staff to know what to do when abuse is suspected, said authors in an issue of *UDA Action*, published by the Utah Dental Association.

In their article, Steven Steed, DDS; Joanne McGarry, MSPH; and Peggy Bowman, RDH, also suggested some steps that can be taken in instances of domestic abuse intervention:

- Ask. In a nonjudgmental way, screen patients for possible abusive situations at home, expressing concern.
- Validate. In cases where abuse is confirmed, tell the patient that her victimization is not her fault. Let the victim know abuse is a crime and is never acceptable.
- Document. Make notes in the patient's chart recording suspected abuse; also note your comments to the patient. Make sure to document statements verbatim ("My husband hit me.").
- Refer. Always provide victims with phone numbers to local resources, such as shelters or victim advocates.
- Report. Domestic violence is a crime. Dentists and other health professionals, in all states, are required by law to report injuries that have resulted from abuse.

The authors also provided a link to the California Dental Association's Foundation that provides a free online training kit: www.cdafoundation.org/learn/dental_professionals_against_violence.



CDA JOURNAL, VOL 36, Nº3

RESTORATIVE SUCCESS: TREATMENT PLANNING

RICHARD T. KAO, DDS, PHD

GUEST EDITOR

Richard T. Kao, DDS, PHD, is in private practice in Cupertino, Calif. He also is associate clinical professor at the University of California, San Francisco, School of Dentistry, and the University of the Pacific Arthur A. Dugoni School of Dentistry.

Treatment planning remains the greatest challenge in clinical dentistry. With increased interest in advanced restorative, cosmetic, and implant dentistry cases, this and the next issue of the *Journal of the California Dental Association* will focus on topics to improve the likelihood of treatment success. While next month's issue will focus entirely on dental implants, this issue focuses on diagnostic considerations in treatment planning.

Treatment planning is often based on our perception of the clinical situation and its likelihood to respond to therapy. As a result, to accurately assign a prognosis is critical for success. Yet, this topic is often superficially covered during our dental training. Dr. Steven Schonfeld has defined the art and science behind periodontal prognosis. Factors that influence the prognosis of individual tooth and the overall dentitions and its clinical implications are reviewed.

In the second paper, Dr. David Richards and I discuss how clinical innovations such as the clinical success of dental implants can change how we treatment plan. Notably, in teeth with questionable prognosis, what is the best treatment/management approach? In this era of evidence-based dentistry, predictable treatment needs to be based on outcome studies. A review of outcomes of traditional periodontal, endodontic, and prosthodontic treatment approaches are compared to the option of strategic extraction and dental implant placement.

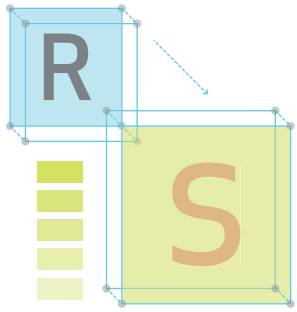
The gummy smile is a restorative challenge but often can be successfully managed. Unfortunately, there have been several advocates of the simple use of

gingivectomy or laser-assisted gingival contouring procedure to eliminate the gummy appearance or in preparation for veneers. Is this the correct surgical approach? In this paper, the anatomical basis and surgical management for the various types of gummy smile are reviewed. Cases are used to emphasize the appropriate use of surgical approaches and to provide the readership with examples of the esthetic improvements.

The last paper discusses how thick vs. thin gingival biotype of the tooth to be extracted may help predict the type of implant site preparation procedures needed. By understanding the anatomical basis for thick vs. thin gingival biotype, it is possible to predict the type of resorptive process that will occur after tooth extraction. If a dental implant is planned for the site, then certain procedures may be necessary and, at times essential, in order to ensure there will be adequate bone volume for implant placement. This concept is important in preparing the patient in appreciating ancillary procedures needed in order to achieve implant success.

Most of the topics covered in this issue are important determinants for clinical success. It is hoped this issue will provide readers with a greater appreciation for the complexity associated with treatment planning. ■■■■

CDA JOURNAL, VOL 36, Nº3



The Art and Science of Periodontal Prognosis

STEVEN E. SCHONFELD, DDS, PHD

ABSTRACT In this paper, periodontal literature related to making a periodontal prognosis is reviewed. Factors that can influence both an overall and tooth-specific prognosis are enumerated. Factors influencing the overall periodontal prognosis include age, genetics, oral hygiene, systemic conditions, and tobacco use. Tooth-specific influences include the amount of attachment loss, crown:root ratio, position in the arch, and presence or absence of furcation invasions. These factors are then synthesized into a scheme for determining a periodontal prognosis.

AUTHOR

Steven E. Schonfeld, DDS, PHD, is a periodontist in private practice in Eureka, Calif.

Periodontal prognosis refers to the expected longevity of teeth with or without periodontal therapy. One can consider an overall prognosis for the dentition and also a prognosis for individual teeth. The concept of periodontal prognosis is an expression of the expected longevity of a tooth or an entire dentition and is useful for making decisions on whether to treat, retain, or remove periodontally involved teeth.

In this paper, the author was charged with discussing the "art and science" of periodontal prognosis. This article will discuss the science relating to both overall prognosis and the prognosis for individual teeth. While many considerations from the classical periodontal literature still apply, new information and techniques should be considered when making the decision on whether to retain teeth or not, which is where the "art" of periodontal prognosis comes into play.

The Science

I. OVERALL PROGNOSIS

There are a number of factors which need to be considered when deciding on an overall periodontal prognosis:

Age: Studies consistently show more periodontal disease and generally greater severity of disease in older as opposed to younger people.[1,2] However, this is primarily a function of the chronicity of the disease process (i.e., older individuals have had the disease for a longer period of time than younger ones). Provided that things are not already too far gone at the initial examination, it is possible to treat older adults successfully. Therefore, age is really not a major factor that needs to be considered in a patient's prognosis for garden-variety chronic adult periodontitis; if anything, an older patient probably has a better prognosis for a given level of attachment loss than a younger patient does. There are also aggressive forms of periodontitis that are

seen generally in much younger patients.

Oral Hygiene: While periodontal diseases are associated with a number of specific bacterial pathogens, rather than the total microbial plaque burden, the patient's ability to perform adequate plaque control is clearly important in determining whether or not the disease can be arrested.[3]

Smoking: Dentists have long suspected that tobacco use was a risk factor for periodontal disease. Because it was also noted that smokers generally had a higher level of plaque and calculus than nonsmokers, the role of smoking per se remained unclear. In the past 15 years, there have been a number of studies reporting the role of smoking as a major risk factor for periodontitis, and that there is a linear dose-response relationship between amount of tobacco use (in pack years) and periodontal attachment and bone loss.[4-6] Hence, other things being equal, a patient who continues to smoke will have a worse prognosis than one who either does not smoke or quits.

Systemic Diseases or Conditions: A number of systemic diseases and conditions can affect an overall periodontal prognosis. Among the more common ones are:

- Diabetes: The vast preponderance of studies find a strong association between both Type 1 and Type 2 diabetes and periodontal disease.[7] This is not surprising, as diabetes is known to reduce resistance to infection and to compromise healing. Thus, patients with diabetes, especially poorly controlled diabetics, will generally have a worse overall prognosis than patients who are not diabetic or who are well controlled.
- Genetics: There are reports suggesting that genetic polymorphisms in certain genes involved in the immune response (e.g., interleukins IL-1 and IL-10 as well as Fc gamma receptors) may be associated with susceptibility to severe periodontitis in some populations. While it is easy to imagine how these genes could affect the host response to infectious disease, a recent review suggests that more research needs to be done in this area before definitive statements can be made.[8]
- Immunodeficiency states: The human immunodeficiency virus is well known for increasing susceptibility to infections. Periodontal infections are included in the spectrum of oral manifestations of HIV infection.[9] Because of their severely compromised immune system, AIDS patients generally have a poor periodontal prognosis, although HIV+ patients who are being successfully managed with anti-retroviral drugs and proteinase inhibitors can have a good long-term prognosis.

PROBING DEPTH, crown:root ratio and percent bone loss are all measures of periodontal attachment loss.

- Neutrophil disorders: Severe periodontitis can be associated with rare systemic conditions such as Chediak-Higashi or Papillon-Lefevre syndromes; leukocyte adhesion deficiency and others, including acquired neutrophil defects. Any systemic disease that lowers neutrophil count or impairs neutrophil function can be associated with an increased risk of periodontal destruction.[7]
- Osteoporosis: There is increasing evidence of the association between osteoporosis and periodontitis, particularly in women.[10]
- Stress: Many periodontists are of the opinion that stress aversely affects periodontal prognosis. A recent meta-analysis of the literature suggests that psychological stress can lead to increased periodontal disease and, hence, a worse overall prognosis.[11]

II. PROGNOSIS FOR INDIVIDUAL TEETH

There have been some interesting studies concerning which periodontal diagnostic criteria were the most important in determining tooth loss and periodontal prognosis.[12,13] They found that probing depth, furcation involvement, crown-to-root ratio, fixed abutment status, and percent bone loss were the most important factors in determining tooth loss.

Probing depth, crown:root ratio and percent bone loss are all measures of periodontal attachment loss. Clearly, the greater the attachment loss tooth has, the worse the prognosis for that tooth. Remember that attachment loss can be caused by root resorption in addition to periodontal pocketing.

Fixed abutment status is a measure of occlusal load and also of the patient's ability to perform plaque control (floss needs to be threaded under soldered contacts).

The classic literature can still tell us a lot about the prognosis for individual teeth. Hirschfeld and Wasserman did an extensive analysis of tooth loss in their patients.[14] They divided their patients into three groups: well-maintained, downhill, and extreme downhill. It is likely that some of the factors discussed previously in the section on overall prognosis influenced which patients fell into each group.

A key finding was that "there is a predictable order of likelihood of tooth loss according to position in the arch" with posterior teeth being more likely to be lost earlier than anterior teeth.

For example, when all three groups of patients were considered, tooth loss over 22 years for incisors ranged from 3.4 percent (mandibular laterals) to 6.3 percent (mandibular centrals); 0.8 percent of mandibular and 3.6 percent of maxillary cuspids were lost. Mandibular premolars experienced about a 3 percent loss, while maxillary premolars experienced about a 6 percent loss. Mandibular first and second molars averaged about a 10.5 percent loss; while about 17.5 percent of maxillary first and second molars were lost.

The principal reason for the increased tooth loss in posterior teeth is the greater complexity of root morphology (convexities, furcations) found in these teeth.[15] When furcations are invaded, the prognosis for the teeth becomes worse. This is probably due to the difficulty of adequately debriding and maintaining the root surfaces within the furcation (both by the hygienist during supportive periodontal therapy and by the patient attempting to control plaque).

Interestingly, Hirschfeld and Wasserman found that the overall prognosis for a given patient had a great deal of influence on posterior tooth loss. Less than 20 percent of furcation-involved teeth were lost over 22 years in the well-maintained group, as contrasted to almost 70 percent in the downhill group, and more than 84 percent in the extreme downhill group.

The Art

I. OVERALL PROGNOSIS

Given the above information, how does a dentist go about systematically assessing the periodontal prognosis for a particular patient and for particular teeth in that patient's dentition?

The first step is to evaluate the patient's social and medical history. Does the patient have any of the known risk factors (e.g., diabetes, tobacco use, stress, immunodeficiency diseases)? If the patient does have risk factors, what is the potential for mitigating them (e.g., tightly controlling their diabetes, reducing or eliminating tobacco use or behavior modification for stress control)? This should give the dentist a feeling as to their overall health and for their potential to control their periodontitis.

The second step is to perform a complete periodontal examination with radiographs. This should consist of six-point probings for each tooth as well as measurement of gingival recession, mobility, furcation invasions and recording bleeding on probing or the presence of exudate.

THE PRINCIPAL REASON for the increased tooth loss in posterior teeth is the greater complexity of root morphology (convexities, furcations) found in these teeth.

The third step is to form an opinion of the overall periodontal health of the patient based on the results of the examination. Is the disease localized or generalized? If the disease is localized, are there obvious local factors (such as a palatal groove or trauma) which could account for the involvement of those particular teeth? Is the overall case type one of gingival health, gingivitis only (inflammation of the gingiva without attachment loss), or is there attachment loss?

If there is attachment loss; is the disease early, moderate, or advanced? Reasonable rules of thumb for determining case type are:

- Early disease: Attachment loss of 3 mm or less (generally corresponds to probing depths of 3-6 mm with normal gingival margins).
- Moderate disease: Attachment loss of 3-6 mm (generally corresponds to probing depths of 6-9 mm with normal gingival margins).
- Advanced disease: Attachment loss of greater than 6 mm (generally corresponds to probing depths greater than 9 mm with normal gingival margins).

Of course it is possible to have generalized early or moderate disease with areas of advanced disease. Again, one should look for localized factors that might be responsible for the advanced disease on certain teeth.

One also should consider the amount of attachment loss in relation to the patient's age. Advanced loss of attachment in younger patients (under age 30-35) is suggestive of aggressive disease with a correspondingly worse prognosis than similar levels of attachment loss in older patients and, the younger the patient, the worse the overall periodontal prognosis.

In the middle-aged patient without systemic risk factors, the overall prognosis for early-moderate periodontal disease case types is generally good. The overall prognosis for patients with generalized advanced disease is generally bleak although it is sometimes possible to maintain teeth in these patients for many years.

Finally, one should consider the patient's ability and consistency in performing plaque control when determining the overall prognosis. Clearly, the better his or her plaque control, the better the long-term prognosis. This determination is an important part of the re-evaluation examination following initial root planing and oral hygiene instructions.

CDA JOURNAL, VOL 36, Nº3

II. PROGNOSIS FOR INDIVIDUAL TEETH

One should evaluate the prognosis for individual teeth. The most important consideration is the amount of attachment loss. Teeth with less than 4 mm of attachment loss (probing depths of 7 mm or less with normal gingival margins) generally have a good prognosis if they are not going to be used as abutments. Teeth with more than 7 mm of attachment loss (probing depths of 10 mm or more with normal gingival margins) generally have a poor prognosis.

Remember the crown-root ratio is also a measure of attachment loss, especially when dealing with root resorption (where attachment loss occurs from the apical end).

As seen from the work of Hirschfeld and Wasserman, the next most important consideration is the presence of furcation invasions. Teeth with minimal (Class I) or no furcation invasions generally have a good prognosis (other things being equal). The greater the amount of attachment loss in the furcation, the worse the long-term prognosis for that tooth. Teeth with complete loss of bone in the coronal aspect of the furcation (Class III) generally have a poor prognosis.

Teeth such as the maxillary premolars, which have pronounced root concavities, are also more difficult to instrument and maintain, and likewise have a worse prognosis than teeth with relatively straight roots.[14]

Severe mobility of a tooth is also generally an indicator of a poor long-term prognosis.

Know When to Hold 'Em and When to Fold 'Em:

Clearly, teeth with a good periodontal prognosis should be maintained, provided the patient is capable of doing their part (adequate oral hygiene and keeping to a schedule of appointments for supportive periodontal therapy).

In most cases, one should consider removing a tooth with a poor prognosis, especially in patients with systemic conditions that compromise the overall prognosis. On the other hand, if maintaining a marginal tooth could compromise the patient's overall health (for example, a patient who is about to undergo organ transplantation, chemotherapy, or radiation treatment to tooth-bearing bone), it should similarly be removed.

However, the overall and tooth-specific periodontal prognoses are not the only elements that go into the decision of whether to treat or to remove a given tooth or teeth. Equally important is the overall treatment plan.

ADVANCES IN TECHNOLOGY may make it possible to have a more positive outlook on the prognosis for teeth with severe periodontal involvement.

Is there arch integrity? If the patient has intact arches and no teeth will need to be replaced, a tooth with a relatively weaker prognosis can be maintained for longer than if there are many missing teeth (with correspondingly increased occlusal loads on the remaining teeth). If teeth are going to be replaced, is the tooth in question going to be a prosthetic abutment? If so, the prognosis needs to be better than for a tooth in an intact arch.

Does the tooth require endodontic treatment and/or extensive restorations? One must balance the costs of such treatment with the projected longevity of the tooth. Does it make sense to put thousands of dollars of endodontic and restorative treatment into a tooth with a guarded-poor prognosis (i.e., a tooth that is expected to be lost in only a few years, even with treatment)? Of course patient wishes and expectations play a role in the decision-making process here as well.

Advances in technology may make it possible to have a more positive outlook on the prognosis for teeth with severe periodontal involvement. In the past 20 years, techniques such as guided-tissue regeneration and the use of biological modifiers such as enamel matrix proteins and tissue growth factors have given dentists the ability to regenerate periodontal tissues to a greater extent than ever before. For example, when the author was a dental student in 1972, a lower second molar with a deep distal intra-bony lesion might have been given a poor prognosis. Today, skilled clinicians utilizing regenerative techniques can restore such a tooth to a state of periodontal health with a fairly high degree of predictability.

On the other hand, advances in technology may also make it less desirable to retain teeth with severe periodontal involvement. Particularly in the past 25 years, with the advent of highly predictable dental implants, it is no longer necessary or even desirable to try to maintain a tooth with extensive periodontal destruction and a correspondingly poor prognosis. Although the author does not think we should be too quick to "pull the trigger" on a periodontally involved tooth, removal of a tooth and replacement with an implant is probably preferable to heroic treatment such as root amputation with corresponding endodontic and restorative costs.

Another important consideration in deciding when to remove a tooth is that, in general, the longer a tooth

with a poor periodontal prognosis is retained, the greater the amount of bone loss that can be expected. This may make eventual replacement with an implant more difficult or impossible.

Putting It All Together

From this review, it is clear there are some objective criteria that go into deciding on a periodontal prognosis. However, there are also many judgments that need to be made regarding the prosthetic treatment needed, patient desires and expectations, and the patient's willingness and ability to follow through with treatment recommendations. A clinician's knowledge of, and experience with, various treatment modalities also enters into what he or she thinks is realistically possible in terms of treatment, which clearly influences that individual's idea of the prognosis. Finally, and perhaps most importantly, a judgment needs to be made about the patient's willingness and ability to maintain themselves following the active treatment phase.

An experienced clinician will integrate all of the previously mentioned factors into a prognosis for the case and for individual teeth. While it has often been said there can only be one correct diagnosis, different dentists and periodontists may well give a single case a different prognosis and consequently different treatment plans based on their perceptions and judgments regarding all of the factors mentioned. ■■■■

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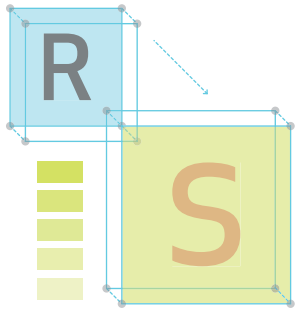
CDA JOURNAL, VOL 36, Nº3



Strategic Extraction: Comparison of Traditional and Implant Therapies

DAVID W. RICHARDS, DDS, PHD, AND RICHARD T. KAO, DDS, PHD

ABSTRACT According to the evidence-based dentistry principles, the superior treatment options should be pursued. As endosseous dental implants gain greater acceptance, the critical question is whether a tooth with a questionable prognosis should be managed conservatively in a traditional fashion or extracted in preparation for a dental implant. The evidence regarding this issue will be examined in this paper as the outcomes for various treatments are compared.

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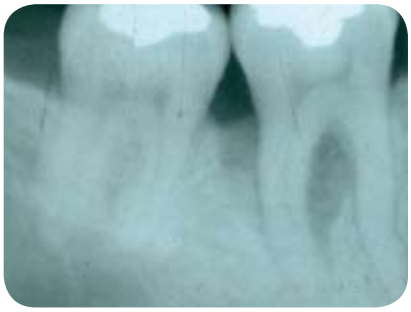
The concept of evidence-based dentistry essentially states that treatment plans should be devised based on the best available evidence from the literature using the experience and wisdom of the practitioner and the needs and desires of the patient. The evidence regarding various treatment strategies needs be compared to fulfill this concept.

Strategic extraction originally described the removal of a tooth or root to create a more hygienic environment.[1,2] The objective was to enhance the status and prognosis of an adjacent tooth or the overall prosthetic treatment plan; that is, eliminate the high-risk element to improve the overall periodontal prosthetic prognosis. Prosthodontists began using the strategy to extract teeth that did not contribute to the removable partial denture design or that compromised the final prosthesis. Orthodontists expanded the tactic to include extracting healthy teeth in crowded dentitions to achieve ideal occlusion. With the acceptance of dental implants, the concept of strategic extraction in preparation for dental implant merits re-examination.

The decision to apply strategic extraction is based on each clinician's prognosis for each individual tooth as well as the overall dentition. Although there is general agreement on the assignment of prognosis, there are subtle differences between practitioners based on decisions as to what tooth or teeth can be successfully treated. These differences are the result of our personal clinical experiences, interpretation of the literature, and techniques at our disposal. With strategic extraction, the prognostic decision process is essentially the weighing of one option against another to determine which offers the best chance of success. As implants become a more accepted treatment, it is important to access their value compared to other treatment modalities.

Selecting implant treatment is essentially a decision to use strategic

extraction, but there have been few articles on this subject.[3-5] This review will examine the concept by comparing the evidence of therapeutic outcomes of placing dental implants as compared to saving teeth with periodontal, prosthetic, and endodontic treatment options.



1A.

1B.

FIGURES 1A-B. Radiographic and surgical presentation of a Class II furcation with a circumferential defect around the distal roots. Treatment of this case would require one to consider the likelihood of therapeutic success for both an intraosseous defect and that of a furcation. Can this be predictably treated?

Comparison of Treatment Options

This review will address the traditional treatment options to be considered when making an individual tooth prognosis. Comparing treatment options is a complex dilemma between relying on evidence-based dentistry and personal clinical experience-supported literature.

PERIODONTAL CONSIDERATIONS

Determining an accurate prognosis for each individual tooth and for the overall dentition is difficult. Forecasting individual tooth prognoses is usually based on clinical and radiographic parameters (e.g., radiographic bone loss, probing depths, clinical attachment levels, bleeding on probing, furcation involvement, and mobility). Classic studies by Hirshfeld and Wasserman and others have shown that even with highly compliant patients, it is almost impossible to predict the survival of a periodontally compromised tooth.[6-8] During the period these patients were maintained, tooth loss ranged from 6.2 percent to 9.8 percent with an annual average of 0.08 percent to 0.11 percent. Tooth loss for the treated but not maintained population was higher with an annual tooth loss rate of 0.22 percent.[9] These studies also generally indicated that it is more difficult to accurately forecast the prognosis of teeth with furcations and/or multirooted versus the single-rooted tooth (**FIGURES 1A-B**).

In a series of papers, McGuire and Nunn determined that clinical parameters were "ineffective in predicting any outcome other (than those teeth with) good" prognosis.[10-12] Forecasting accuracy for teeth assigned a good prognosis was accurate 81 percent of the time after eight years, but this dropped to 35 percent when applied to teeth with an initial prognosis of less than good. In a recent literature survey, long-term retention of teeth with questionable prognosis ranged from 38 percent to 97 percent.[5] A direct comparison of these studies is not possible due to differences in patient population, clinical evaluation parameters, maintenance methods, and the number/type of tooth monitored. Most importantly, there were no standard criteria to define a questionable prognosis.

Extensive research efforts have focused on clinical parameters as predictors of disease progression. Bleeding on probing is a poor predictor of periodontal disease progression and its absence on sequential visits has been shown to be a good predictor of no future attachment loss.[13] Several retrospective studies suggested furcation involvement was one of the main reasons for tooth loss.[6-8] In a review of therapeutic outcomes, retention rates of furcated teeth ranged from 43 percent to 98 percent suggesting that the actual retention rate is better than long-term prognostication.[5] Tooth mobility has also been proposed as a risk factor for attachment and tooth loss, but other reports suggest hypermobility is not always associated with advanced disease progression or worsening prognosis.[11,14-16] Some studies have suggested that deep probing depths predict future attachment loss.[17-19]

However, another study suggests that this relationship is not absolute.[19] Deep probing depth appears associated with a higher risk for further attachment loss, compared to shallow probing depth but further disease progression is not inevitable and treatment can reduce this possibility. It is the absence of deep probing depth, similar to bleeding on probing, which is a good forecaster of periodontal stability. These clinical parameters have not been reliable forecasters of disease activity.

In addition to the lack of reliable prognostic determinants for periodontal stability, the clinician is further hampered by patient management issues which may complicate the periodontal forecast. This first issue is patient compliance with home-care instructions and maintenance therapy appointments. Studies indicate that 20 percent to 30 percent of treated patients do not comply with the recommended maintenance therapy, and of those who do comply, approximately half are erratic in their care.[20-22] As expected, erratic compliers required more retreatment compared to patients who follow the home-care guidelines and regularly present for maintenance.[22] The second issue is systemic disease risk factors such as smoking, diabetes, and immunosuppression; these are not within the scope of this discussion, but it should be noted they contribute to

the difficulty of periodontal evaluation.

A clinical situation that is often under appreciated is the situation of a fractured tooth (**FIGURE 2**). In a desire to minimize financial expense and to save the tooth, cases of badly broken tooth are often treated endodontically and then referred for crown lengthening. In order to have this tooth restored, there has to be adequate root length so there is a patent seal for the root canal therapy. Then there needs to be an adequate length for post retention. Lastly, there has to be enough tooth length that will permit the 2 mm needed for the restorative ferrule effect and the 2 mm or more for biological width. In this example, evidence-based decision-making would have you consider the outcome success of the following parameters: success of crown lengthening procedures, root canal therapy, post size and space, adequate crown retention on natural tooth structure, and the availability of root structure and periodontium to withstand occlusal forces and then compare this to alternative plans, most obviously replacement with a dental implant.

When analyzed in conjunction with the clinical parameter studies, these issues result in a confounding combination of information. Like statistics where the odds that an event may occur under one situation are analyzed in a myriad of situations, the results are not additive, but synergistic. This is where the art of periodontal prognosis begins and why our opinions vary so widely. The decision to extract or preserve a tooth should be one based on knowledge of the literature, accurate clinical information (clinical parameter data and medical-social history), past clinical experiences and consideration of the patient's values.

FIGURE 2. A fractured anterior central incisor. For this tooth to be restored, 2 mm of ferrule space and 2 mm of biological width would be needed. How much root anchorage would be available for resistance to occlusal and functional load? Will the esthetics be acceptable? What will happen 10-plus years later when the tooth fracture and you have to consider implant placement at that point? If these considerations are obvious, why do we not consider similar situation for other teeth?

FIGURE 3. Radiograph of a fractured endodontically treated tooth at the base of the post on No. 10 and a perforation on tooth No. 11. How good is retreatment?

ENDODONTIC THERAPY

Classically, when a tooth has a pulpal involvement secondary to tooth fracture and carious lesion, endodontic therapy has been the treatment of choice. However, dental implants have become an alternative for such therapy. In a systematic review of the endodontic literature, the survival rate of root canal treatment followed by coronal restoration ranged 81.2 percent to 100 percent over the period of three to 25 years.[23] In this same review, the survival rates of single-tooth implants and restored endodontically treated teeth for five to 7.8 years were statistically similar.[23]

The authors concluded the decision to treat a compromised tooth endodontically or replace it with an implant should be based on factors other than treatment outcome. Endodontic factors to be considered include the presence/absence of periapical lesion, the type of endodontic treatment, and the postendodontic restorative situation. A case in point is the situation presented in **FIGURE 3** with a wide post on tooth No. 10 that has a fracture at the base and a perforation of the tooth. Endodontic treatment is not a singular treatment but one that requires other post-treatment procedures. When the outcome analysis or survival statistics are analyzed in addition to the endodontic procedure and when they are analyzed over a long length of time frame, the synergistic combination of failures may favor the decision for strategic extraction. Endodontic treatment of a new case is also different from those with other endodontic complications.

The presence of preoperative periapical lesions has been shown to decrease endodontic success rate by at least 10 percent.[24] A recent study reported that in the absence of such lesions, the healing rate was 94 percent compared to 79 percent.[25] Approximately 45 percent of the lesions slowly reduced in size. This has been interpreted by some as slow but progressing healing. Approximately 6 percent of the teeth still had a persistent lesion 10 years after treatment.[25]

Endodontic retreatment can significantly reduce the 97 percent success rate seen with initial endodontic therapy. Surgical retreatment of a poorly endodontic filled tooth can reduce the success rate by as much as 13 percent to 29 percent, with a reported mean healing rate of 78 percent.[26,27] These findings are consistent with a recent review which suggests the chance of success ranged from 37 percent to 85 percent, with an average of 70 percent.[28,29] In one study of endodontic retreatment, perforations were seen 12 percent of the cases.[30] The outcome and prognosis were so poor that these teeth were excluded from analysis.[30] These studies suggest that surgical

retreatment because root perforation and poor root filling quality is a strong predictor of poor endodontic outcome.

Though periapical lesions, root perforations, and poor endodontic fill are factors that complicate endodontic evaluation, the restorability of the endodontically treated tooth is of greater importance. Although a systematic review suggests that root canal treatment followed by coronal restoration has a similar success as implants.[23] The review has limited value because of the short mean time (7.8 years) used to evaluate tooth survival, the assumption that all endodontic treated teeth will be coronally restored, and monitoring occurred only after restorations were placed. The evaluation period may be too short to support the assumption is that all endodontic treated teeth can be successfully restored.

Clinical reality is that not all endodontically teeth are restored and other factors, such as post-placement fracture or perforation, types of posts inserted, form of supracoronal restorations and prosthetic issues, were not and may have resulted in overstating the success rate. In a survey of 12 studies with a six-year follow-up, 10 percent of teeth with posts had complications.[31] Other complications that concur with conventional single crowns include crown fracture (7 percent); loss of retention (2 percent); posts and cores loosening (5 percent); root fracture (3 percent); and caries (3 percent). Several studies reported that 24.2 percent to 85 percent of root canal-treated teeth were extracted because they were not properly restored.[32-34] Until there are more outcome studies which evaluate these individual factors, equating the success rate of endodontically treated teeth to that of implants should be accepted with the caveat that there are limitations to this comparison.

Prosthesis Therapy

There are limited longitudinal studies assessing the survival of fixed partial dentures to replace missing teeth. Additionally, the results are difficult to analyze because of different definitions of failure and follow-up periods. The one meta-analysis that assessed the overall effectiveness of FPD therapy reported that less than 15 percent of FPDs had been removed or needed replacement at 10 years; the figure rose to nearly one-third after 15 years.[35] In another study, the three most commonly reported FPD complications were caries (18 percent of abutments), need for endodontic treatment (11 percent of abutments), and loss of retention (7 percent of prosthesis).[31] These three most common complications are costly financially but also often require additional procedures which increases the chances for failure.

VETERAN PRACTITIONERS know that not every patient can accept the "best" treatment.

Implants

The efficacy and predictability of endosseous implants in treating partial and total edentulous cases have been well documented.[36-38] Regardless of the implant system used, functional success was achieved in more than 90 percent of the patients. In situations involving limited bone volume, socket or ridge preservation, guided bone regeneration (GBR), and distraction osteogenesis can be effective ridge enhancement techniques; nevertheless, the principle challenges in implant dentistry are to regenerate adequate bone volume and clinical esthetics.[39-40]

Though implant survival and function success rates are high, there are clinical complications. According to a review by Goodacre et al., the most common surgical complications were hemorrhage related, mostly of hematomas and ecchymosis (24 percent); neurosensory disturbance (7 percent); and mandibular fracture (0.3 percent).[41] However, most of the bleeding and neurosensory situations were transitory and had no effect on long-term implant success.[41] Other complications included implant loss in irradiated maxillae (25 percent), in Type IV bone (16 percent), and in diabetic patients (9 percent).[41] These latter complications and those observed with mandibular fracture are more accurately identified as issues relating to case selection and evaluated as implants placed in compromised sites or in high-risk patients.

Prosthetic complications included loosening of the overdenture retentive mechanism (33 percent), resin veneer fracture with fixed partial dentures (22 percent); implant loss with maxillary overdentures (21 percent); overdentures needing to be relined (19 percent); and overdenture clip/attachment fracture (16 percent).[41] It is interesting to note that most prosthetic complications are related to the use of implants with either overdentures or fixed removable prosthesis. Though these issues may be classified as complications, most of them are normal events associated with prosthetic maintenance and are generally correctable. From a functional perspective, esthetic complications occurred with a mean incidence of 10 percent and phonetic complications a mean incidence of 7 percent. From this survey, Goodacre et al. concluded that implants and implant prostheses had a trend toward a greater incidence of complications compared to single crowns, FPD, all-ceramic crowns, resin-bonded prosthesis,

and post and cores[41] (**FIGURE 4**). Although the incidence rate may be higher, most of the situations identified can be resolved with no long-term negative consequences. Lastly, the data collected included a wide cross section of implants used in compromising situations, such as removable denture design or in high-risk patients.

FIGURE 4. This tooth fractured. On examination, it had root caries, a previous history of endodontic treatment, minimal alveolar bone loss, and radiographically had a 12 mm root length. Which treatment will have a longer survival rate? Would you choose a conventional restorative approach with a new post and crown versus extraction and an implant-supported crown?

Discussion

Choosing the best treatment plan for our patients is an important facet of our practice. In general, it would appear that following the precepts of evidence-based dentistry and comparing therapeutic outcomes of implant versus traditional therapies often will result in a decision favoring implant replacement therapy. Sometimes, however, it is known that the best treatment plan is the one the patient will accept. Veteran practitioners know that not every patient can accept the "best" treatment. California law only tells us that we must inform the patient of the risks, benefits, and alternatives of treatment not that everyone has to have the best.

Strategic extraction has been, and will continue to be, a subject of debate with no clear algorithm for decision making. In the review of periodontal, endodontic, and prosthetic options, the conclusion is that this decision-making process is difficult. As outcome data is compiled, one can start to understand that any clinical situation may have a multitude of factors that need to be considered before a treatment plan is developed. An example is a carious pulpal exposure on a tooth with a furcation involvement. Instead of just considering the outcome of endodontic treatment, one needs to consider the periodontal prognosis of the furca, the success rate of the post-core installation, and the long-term crown survival.

With many situations, one may know the probability of successful outcome for any single aspect; but when there are so many confounding factors, the possibility of successful treatment decreases. In addition, the patient's concerns over losing a tooth, possible changes in esthetics, the length and cost of treatment, and others, must be considered in the decision-making process.

Because of the high success level of dental implants, there are concerns that teeth with a guarded prognosis will be prematurely extracted to be replaced with dental implants.[5] Though the authors share some of these concerns, the critical premise on which strategic extraction should be based is, do not take a stance of "watchful waiting." That is, do not postpone extraction until the situation deteriorates to the point where other options are eliminated or compromised. In most situations, implants are a good functional and esthetic option. A major key to implant success is adequate bone volume; ideally, native bone. Strategic extraction should be considered if other therapeutic options compromise the potential to obtain or preserve this bone volume. Situations when this guiding principle may not apply are elderly patients where there are other serviceable options, when satisfactorily esthetic results cannot be achieved, or when the patient objects to a perceived premature tooth loss.

Currently, one of the main limitations to successful implant placement is inadequate bone volume at the recipient site. One's ability to work with compromised sites has improved with the variety of techniques available for increasing bone volume through ridge preservation, augmentation, sinus grafting, and distraction osteogensis.[39,40] Incorporating recombinant biological modifiers such as human recombinant bone morphogenetic protein and platelet-derived growth factors can enhance bone formation.[42-46] Should these recombinant biologic modifiers become an integral part of implant site preparation, this may change how we define the critical time point to implement strategic extraction.

Conclusion

There is an ingrained tendency for dentists to try to save teeth. This review applying the precepts of evidence-based dentistry would suggest there are many occasions where strategic extraction is an appropriate alternative. This review will also indicate that these decisions are not always easy. Although periodontists are viewed by the dental profession as experts in forecasting tooth prognosis, we have no infallible method of making these decisions. As we increasingly accept evidence-based dentistry as a basis for practice decisions, we have discovered there are limited outcome studies that are the foundation for this approach to treatment. Further complicating the decision-making process is that many clinical situations require us to consider a multitude of confounding factors.

Nevertheless, we recognize there is a critical point where elective or strategic extraction is the best solution for dealing with compromised dentition. Because of the high success rate of dental implants, this critical point has shifted toward an earlier strategic extraction to preserve the bone volume necessary for implant place-

ment. Additionally, with the availability of recombinant biologic modifiers, this critical point may shift again. The critical point for each practitioner will reflect individual interpretation of the outcome studies discussed in this paper and personal experience. It is important to re-emphasize the patient's age, personal preferences, and finances must always be part of the decision-making tree.

In summary, due to the acceptance of dental implants, the emergence of biologic modifiers as potential enhancers of implant site preparation, and the growing reliance on evidence-based dentistry, our profession needs to change our view of prognosis and its clinical implications for treatment. ■■■■

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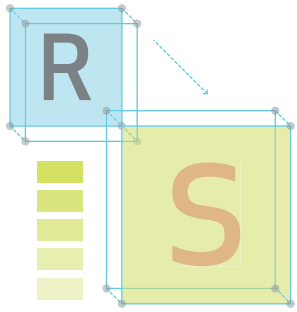
CDA JOURNAL, VOL 36, Nº3



Esthetic Crown Lengthening: Appropriate Diagnosis for Achieving Gingival Balance

RICHARD T. KAO, DDS, PHD; SCOTT DAULT; KENNETH FRANGADAKIS, DDS; AND J.J. SALEHIEH, DDS

ABSTRACT A gummy smile poses a restorative challenge for dentists attempting to achieve ideal esthetics. Many have advocated the use of a gingivectomy or laser-assisted gingival contouring procedure. However, this simplistic approach can potentially create a mucogingival defect or a biological width violation. To avoid these periodontal-restorative complications, it is important during treatment planning to assess the anatomical relationship that resulted in the gummy smile and choose the appropriate surgical treatment to eliminate this condition.

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Elements of the esthetically pleasing, well-balanced smile have been extensively reviewed.[1-4] It is commonly accepted that the maxillary anterior teeth should be completely displayed during a full smile, with a maximum of 2 mm of gingiva revealed above the central incisors. The gingival crest of the maxillary central incisors and cuspids should be at the same level and create a line parallel to the interpupillary line. The lateral incisors should be slightly coronal to this line (<1 mm) (**FIGURE 1A**). The displayed teeth should be symmetrical with the proximal of the central incisors aligned with the facial midline. The teeth should fit the rule of "golden proportion" with the incisive edges of the maxillary teeth parallel to the lower lip.[5]

In anterior esthetic cases, surgical modification of the dentogingival complex is often needed to improve the alignment of the gingival crest and provide the proper framework to achieve esthetic success. This is especially true in the situation of the gummy smile where the patient displays excessive gingiva when smiling (**FIGURES 1B-C**). Elimination of a gummy smile and sometimes the use of veneers can dramatically enhance a patient's appearance. However, the gummy smile can only be resolved with esthetic crown lengthening. If veneers are placed and no surgical alteration is made, they may be long in appearance with the incisive edge too severe, risking fracture of the veneer (**FIGURE 2**). Additionally, excessive subgingival placement may result in chronically inflamed gingival tissue.

FIGURE 1A. The ideal smile with the central incisors and cuspids aligned and the lateral incisor either at or slightly apical to this line.

1B.

1C.

FIGURES 1B-C. Two examples of gummy smiles with excessive gingival display.

FIGURE 2. Esthetic crown lengthening was not performed prior to the placement of these veneers. In an attempt to increase coronal height, the incisive edge was extended. This resulted in the fracture of the veneer on tooth No. 9. Also note the inflamed gingival tissue with the subgingival extension of the veneer on tooth No. 8.

Many courses in esthetic dentistry and laser surgery recommend gingivectomy procedures for a gummy smile. However, this can be problematic. It is important for the restorative dentist to recognize that the coronally positioned gingival crest associated with the gummy smile is sometimes associated with a similarly positioned alveolar crest. Also, if the zone of attached gingiva is minimal (2 to 3 mm), a gingivectomy procedure can result in a mucogingival defect.

Therefore, it is essential that the dentist properly diagnose the anatomical relationship that caused the gummy smile and select the appropriate surgical treatment for esthetic crown lengthening.

The topic of crown lengthening in the esthetic zone has been recently reviewed; therefore, this paper will elaborate on the anatomical basis for a gummy smile, the surgical options for its correction, and the selection of appropriate treatment.[6]

Delayed Passive Eruption: Diagnosis of the Anatomical Relationship

Tooth eruption consists of an active and a passive phase. Active eruption is the movement of the teeth in the occlusal direction, whereas passive eruption is the exposure of the teeth by apical migration of the gingiva. Delayed passive eruption or altered passive eruption is the failure of the gingival tissue to adequately recede to the proper level relative to the cementoenamel junction. The consequence of this is short crowns and gingival excess.[7] Though both terms are used, the term delayed passive eruption will be used in this paper. In limited population studies, this clinical condition occurs 12.1 percent of the time with a distribution of 7 percent in men and 14 percent in women.[8,9]

Delayed passive eruption conditions are classified into two categories for differential diagnosis and appropriate treatment:[2-10]

ATTACHED GINGIVA — CROWN RELATIONSHIP

Type I. The gingival margin is incisive to the CEJ with a wider zone of attached gingiva. Since there is an excess of attached gingiva, crown lengthening can be achieved via gingivectomy as long as 3 to 5 mm of attached gingiva are preserved.

Type II. The gingival margin is incisive to the CEJ, but the width of attached gingiva is normal. In this situation, the attached gingival width must be preserved and crown lengthening is achieved by apical positioning of the gingiva.

ALVEOLAR CREST — CEJ RELATIONSHIP

Subgroup A. The underlying alveolar crest is located 1.5 to 2.0 mm apical to the CEJ. In this case, esthetic crown lengthening can be performed without osseous resection.

TABLE 1

Treatment of Gummy Smile

Gingival Width Alveolar Crest Location	Category	Treatment
Wide zone of AG >1.5-2.0 mm apical to CEJ	Type I-A	Gingivectomy with gingivoplasty as needed
Wide zone of AG At CEJ	Type I-B	Gingivectomy with gingivoplasty to ideal gingival position Osseous resection to establish biological width in relationship to the newly positioned gingival crest
Normal zone of AG >1.5-2.0 mm apical to CEJ	Type II-A	Apically positioned gingival tissue
Normal zone of AG At CEJ	Type II-B	Flap and osseous resection to establish biological width in relation to the proposed gingival tissue positioning Apically position gingival tissue

* Modification of table by Cohen.[2]

3A.

3B.

FIGURES 3A-B. Pretreatment presentation showing gingival excess and extrusion of teeth Nos. 8 and 9.

FIGURE 3C. Esthetic crown lengthening was performed in conjunction with incisive odontoplasty.

FIGURE 3D. Post-treatment appearance with the patient opting not to have veneers placed.

Subgroup B. The alveolar crest is at the CEJ. For this group of defects, esthetic crown lengthening requires 2 to 3 mm of osseous resection to establish the ideal biological width. If resection is not performed, usually there will be a rebound effect where the gingival tissue will heal incisively to the osseous crest. Sometimes the gingival crest may return to its presurgical position. The healing process may take up to two to three months. In situations where complete healing is not permitted and veneers are placed too early, violation of the biological width is possible, potentially resulting in chronically inflamed gingival tissue.

Given that there are two types of gingival width and alveolar crest relationships, four combinations can result in a gummy smile (**TABLE 1**). The dentist must properly diagnose the type of anatomical relationship in order to select the appropriate surgical approach.

Differential diagnosis of the four possible types of anatomical relationships associated with delayed passive eruption is accomplished primarily by measuring the zone of attached gingiva and by sounding or transgingival probing of the alveolar crest through the gingival sulcus under local anesthesia. Measuring the zone of attached gingiva determines the type of attached gingiva-anatomic crown relationship. Transgingival sounding of the alveolar crest determines its relationship to the gingival crest, the CEJ, and the mucogingival junction. The location of these anatomical landmarks will indicate whether there is gingival excess (Type I) or normal gingival width (Type II) and the location of alveolar crest in relationship to the CEJ. The surgical treatments to correct these defects are based on this differential diagnosis.

Treatment of the Gummy Smile

Esthetic crown lengthening approaches for the four types of delayed passive eruption are significantly different (**TABLE 1**). In the authors' experience, the most prevalent type of attached gingiva-anatomical crown relationship is Type I (both Subgroup A and B) with a wide zone of attached gingiva. Treatment for Type I-A delayed passive eruption is primarily a gingivectomy procedure (**FIGURES 3A-D**). When the gingival thickness is relatively thin, this may be all that is required to establish the ideal gingival framework. However, when the gingiva is thick, additional gingivoplasty may be necessary to blend the newly created buttressing gingival margin. These cases can also be esthetically enhanced with orthodontic/restorative treatment in conjunction with an esthetic crown lengthening procedure (**FIGURES 4A-C**). For Type I-B cases, a

FIGURE 4A. Gingival excess (Type I-A) displayed.

FIGURE 4B. Gingivectomy was performed toward the end of orthodontic treatment.

FIGURE 4C. Final appearance after veneers were placed.

gingivectomy is performed to establish the ideal gingival crest position. This is followed by reflection of the gingival flap and osseous resection to establish the 2 to 3 mm apical to the newly established gingival crest (**FIGURES 5A-D**).

Examples of this type of treatment can be seen in **FIGURES 6A-D**. The management of Type II-B differs in that the gingivectomy procedure should be omitted and the preserved attached gingiva should be apically positioned.

The ability for esthetic crown lengthening to correct a gummy smile can be limited in the case of skeletal maxillary excess. In these cases, clinical crown length can be increased and the amount of gingiva displayed decreased, but there will usually still be some excessive gingiva. These cases can only be managed with orthognathic surgical treatment. The leveling of the CEJs of anterior teeth may also necessitate the use of orthodontic extrusion or intrusion. These are augmentative procedures that may need to be considered and these options should be reviewed with the patient during the treatment planning process.

Summary

Esthetic dentistry is an art. In mastering this art, the clinician must think about strategies to ensure the optimal esthetic result. In the situation of the gummy smile, excessive gingival display and short teeth compromise dental esthetics. Though some have advocated gingivectomy for the management of this problem, this paper emphasized that the width of attached gingiva and the location of the underlying alveolar crest need to be considered.

Restorative dentists must evaluate cases on an individual basis to discern the anatomical reason for the gummy smile. Depending on the combination of the

FIGURE 5A. Technique for esthetic crown lengthening for Type I-B gingival excess cases. Bleeding points are placed at the ideal gingival crest position.

FIGURE 5B. Gingivectomy is performed and the underlying osseous crest determined.

FIGURE 5C. The flap is reflected and osseous resection is performed to achieve adequate distance for biological width.

FIGURE 5D. The flap is sutured back to the ideal position.

6A.

6B.

FIGURES 6A-B. Pre- and post-treatment of esthetic crown lengthening to eliminate gummy smile and veneers placed to close space from papilla loss.

6C.

6D.

FIGURES 6C-D. Pre- and post-treatment esthetic crown lengthening may need to go back to the second bicuspid area in order to achieve the necessary esthetic appearance along the posterior corridor.

width of attached gingiva and location of the alveolar crest, the category of delayed passive eruption can be correctly diagnosed. It is this diagnosis that will define the surgical approach for the esthetic crown lengthening procedure. ■■■■

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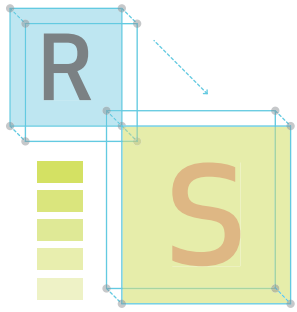

Thick vs. Thin Gingival Biotypes: A Key Determinant in Treatment Planning for Dental Implants

RICHARD T. KAO, DDS, PHD; MARK C. FAGAN, MS, DDS; AND GREGORY J. CONTE, MS, DMD

ABSTRACT During the treatment planning process, it is important to recognize differences in gingival tissue can affect treatment outcomes. The concept that thick and thin gingival biotypes have different responses to inflammation and trauma was previously introduced. In this paper, this concept is expanded in that gingival biotypes dictate different procedures for implant site preparation. With appreciation of these differences, preparatory steps can be taken to create a more ideal implant placement site.

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Previously, the importance of taking into consideration the differences in gingival tissue during treatment planning has been emphasized. Specifically, it was pointed out how thick and thin gingival biotypes respond differently to inflammation, restorative trauma, and parafunctional habits.[1,2] These traumatic events result in various types of periodontal defects, which respond to different treatments. The authors also pointed out how periodontal surgery techniques have made it possible to change a thin gingival biotype into a thick gingival form. This provides a more favorable restorative environment and increases the predictability of treatment outcomes.

In this paper, the authors extend their earlier observations of thick vs. thin gingival tissues and describe why it is important to appreciate tissue biotypes during implant treatment planning.

Thick and Thin Gingival Biotypes

Historically, Ochsenbein and Miller have discussed the importance of "thick vs. thin" gingiva in restorative treatment planning.[1] In a population study, thick periodontal biotypes (85 percent) were found to be more prevalent than thin scalloped forms (15 percent).[3] Subsequently, the authors published a paper that further analyzed thick and thin tissue biotypes in terms of their gingival and osseous architecture.[2]

Thick gingival tissue is probably the image most associated with periodontal health (**FIGURE 1A, TABLE 1**). The tissue is dense in appearance with a fairly large zone of attachment. The gingival topography is relatively flat with the suggestion of a thick underlying bony architecture. Surgical evaluation of these areas often reveals relatively thick underlying osseous forms (**FIGURE 1B**).

TABLE 1

Characteristics of Thick Gingiva

- Relatively flat soft tissue and bony architecture
- Dense fibrotic soft tissue
- Relatively large amount of attached gingiva
- Thick underlying osseous form
- Relatively resistant to acute trauma
- Reacts to disease with pocket formation and infrabony defect formation

TABLE 2

Characteristics of Thin Gingiva

- Highly scalloped soft tissue and bony architecture
- Delicate friable soft tissue
- Minimal amount of attached gingiva
- Thin underlying bone characterized by bony dehiscence and fenestration
- Reacts to insults and disease with gingival recession

1A.

1B.

FIGURES 1A-B. The clinical presentation of thick gingiva and the type of osseous architecture associated with this gingival tissue type.

2A.

2B.

FIGURES 2A-B. Clinical presentation of thin gingiva is characterized by thin friable tissue. It is associated with clefts, perforation, and gingival recession.

TABLE 3

Comparison of Tissue Response to Inflammation, Surgery and Tooth Extraction

	Thick Gingival Biotype	Thin Gingival Biotype
Inflammation	Soft tissue: Marginal inflammation; cyanosis; bleeding on probing; edema/ fibrotic changes Hard tissue: bone loss with pocket formation/infrabony defects	Soft tissue: Thin marginal redness and gingival recession Hard tissue: Rapid bone loss associated with soft tissue recession
Surgery	Predicable soft and hard tissue contour after healing.	Difficult to predict where tissue will heal and stabilize
Tooth Extraction	Minimal ridge atrophy	Ridge resorption in the apical and lingual direction

FIGURE 2C. The osseous architecture associated with this gingival tissue type is characterized by fenestration and dehiscence.

Thin gingival tissue tends to be delicate and almost translucent in appearance (**FIGURES 2A-B, TABLE 2**). The tissue appears friable with a minimal zone of attached gingiva. The soft tissue is highly accentuated and often suggestive of thin or minimal bone over the labial roots. Surgical evaluation often reveals thin labial bone with the possible presence of fenestration and dehiscence (**FIGURE 2C**).

In the authors' previous paper, it was suggested that since these two tissue biotypes have different gingival and osseous architectures, they exhibit different pathological responses when subjected to inflammatory, traumatic, or surgical insults[2] (**TABLE 3**). These different responses dictate different treatment modalities. It also was noted that current periodontal surgical techniques have the potential to improve tissue quality, thereby enhancing the restorative environment. The paradigm shift proposed was that by taking into consideration the gingival tissue biotype during treatment planning, more appropriate strategies for periodontal management may be developed, resulting in more predictable treatment outcomes.

Tissue Biotype in Implant Treatment Planning

If osseous and gingival tissues are different for thick and thin tissue biotypes, it seems logical that these distinctions would significantly influence implant site preparation and treatment planning. This is consistent with previous observations that the stability of the osseous crest and soft tissue is directly proportional to the thickness of the bone and gingival tissue.[4,5] Thick bony plates associated with thick biotypes and thin plates with potential fenestrations and dehiscence associated with thin biotypes respond differently to extraction and have a different pattern of osseous remodeling following this procedure. The trauma induced by the extraction procedure is more likely to result in fracture of the labial plate in the thin biotype than in the thick one. Also, the remodeling process that follows over the next few months will result in more dramatic alveolar resorption in the apical and lingual direction for the ridge associated with thin biotypes.

Even after initial alveolar ridge remodeling, the gingival tissue and bone are more likely to continue to recede, especially if the implant is labially inclined. This underscores the importance of appreciating gingival tissue biotypes during implant treatment planning. Furthermore, when these tissue biotypes are carefully considered, various periodontal and surgical strategies can be employed to improve the treatment outcome either by minimizing alveolar resorption or by providing a better tissue environment for implant placement.

Extraction of Teeth in Thick vs. Thin Biotypes

Though extractions should always be atraumatic, teeth with thin gingival biotypes merit more attention due to their association with thin alveolar plates. Possible strategies that should be considered include:

- Minimizing leveraging forces toward the thin labial plate. Most of the manipulation should be focused on the interproximal area.
- Sectioning the root(s) from the tooth, when possible, to improve the likelihood for elevation.
- Using periotomes to expand and elevate the tooth with controlled force focused on the periodontal ligament space. The placement and elevation force should be focused on the interproximal space so leverage force is exerted on either the buccal or lingual plate.
- Using a ratchet extraction device to apply reciprocating force on adjacent teeth while extruding the amputated root tip out the socket (**FIGURE 3**). This may be the most effective and atraumatic approach for the broken tooth. The tooth is amputated to the level of the cementoenamel junction. After preparation of a post space, an "anchoring" device is used to engage the root. This device is passed through a quadrant tray with contact bite registration and impression material for the adjacent teeth. After the impression material has set, the anchoring device is ratcheted against the top of the quadrant tray. This strategy is atraumatic and applies no forces on the surrounding alveolar bone.

FIGURE 3A. Tooth No. 9 has a fractured root.

FIGURE 3B. The crown is removed and the anchor post is placed into the root tip

FIGURE 3C. The anchor post is placed through a perforation in an impression tray containing bite registration material. Using the tray as a base, the anchor post is ratcheted such that the root is elevated.

FIGURE 3D. The extracted root. This technique is advantageous since there is no force placed on the socket and surrounding bone

Atraumatic extraction and preservation of the alveolar plate are essential if the site is to be used for implant placement. Excessive force is likely to fracture the alveolar plate and result in bone resorption and unpredictable bone healing. This is more pronounced with the thin alveolar plate associated with thin gingival biotypes. When compromise of the alveolar plate is suspected, it is essential to utilize ridge preservation or augmentation protocols.

Ridge Preservation in Thick vs. Thin Biotypes

Prevention of postextraction alveolar bone loss is critical in assuring implant success. Given the thin alveolar plate associated with thin periodontal biotypes, it is not unusual to see more extensive ridge

FIGURE 4A. Lower left lateral incisor No. 23 was extracted and extensive bone loss was present. A 12-mm tenting bone screw was placed to support the graft material and prevent collapse of the membrane.

FIGURE 4B. Bone graft material and a resorbable membrane were placed, *(Biomend Extend. Zimmer Dental. Carlsbad, Calif.)*

FIGURE 4C. Re-entry at five months, which illustrates bone regeneration up to the top of the bone screw.

remodeling when compared to the thicker alveolar plate associated with thick biotypes. Not only is atraumatic extraction critical to minimize this postextraction remodeling, it is important to consider strategies to preserve the alveolar bone, such as socket preservation or ridge preservation procedures. A number of studies have shown that without intervention, significant alterations in most extraction ridge dimensions will occur.[6-9]

This loss can be 1.5 to 2.0 mm over the first 12 months with most loss occurring during the initial three months.[9] A variety of approaches can be employed to address this problem, but most involve grafting the extraction socket and using membranes to support missing/perforated bony walls. Ridge preservation should be considered for most thin biotype cases and in thick biotype cases where excessive trauma or a previous history of endodontic surgery/fistula tracts may have compromised the alveolar plate.

Classically, socket or ridge preservation involves the use of a graft material placed in the socket followed by a variety of other substances such as demineralized freeze-dried bone allograft, mineralized freeze-dried bone allograft, xenograft (mostly of bovine source), and alloplastic materials (β-tricalcium phosphate, durapatite, hydroxyapatite). Since the site will be used for implant placement approximately three months to four months after grafting, it is important to select a graft material that resorbs quickly since only newly formed bone will contribute to the osseointegration of the dental implants. For that reason, slow resorption graft materials such as xenografts and nonresorbable alloplastic materials (durapatite, hydroxyapatite) should be avoided. When there is excessive volume of nonresorbable graft materials, there is inadequate room for bone ingrowth to provide implant osteointegration.

Additionally, the ridge preservation strategy is only successful if the graft material is retained in the extraction socket. A variety of approaches can be utilized to achieve socket closure. These include the use of barrier membranes, tenting pins, collagen plugs, connective tissue grafts, free gingival grafts, acellular dermal grafts, and advancement of the buccal flap. An advanced case of socket preservation with regeneration of the labial plate and vertical dimension is seen in **FIGURE 4**. Whereas simple cases with intact buccal and lingual plates can be easily managed with grafting and socket coverage, advanced cases may require space-maintaining devices such as tenting pins and membranes. All of these options work to a certain extent and the selection should be based on individual cases/requirements.

When excessive bone is lost to resorption, leaving a narrow ridge with a large buccal deficiency or decreased vertical height, a block graft is generally the technique that yields predictable results.[10-11] The block graft material can be of autologous or allograft origin. Autologous graft material is commonly harvested from either the mandibular ramus or mandibular symphysis. Allograft block grafts can be obtained from several commercial providers. The advantage of this technique is that the graft is placed as a block instead of in particulate form, providing increased structural support.

A case of block grafting is presented where there is a narrowed anterior maxillary ridge defect (**FIGURE 5A**). These situations generally require two-stage surgical procedures that included a bone graft surgery followed by implant placement after graft healing. In this situation, it is critical that soft tissue incisions be carefully planned to allow for flap relaxation over the increased volume gained by the graft and to ensure tensionless primary closure. Once adequate access was gained, the graft and recipient bed were prepared to obtain intimate, broad contact between the surfaces.

The recipient bed was perforated to enhance revascularization and the graft was stabilized using fixation screws to maintain close bone contact and prevent graft rotation (**FIGURE 5B**). Adequate primary fixation is essential for graft survival. Particulate bone can be packed around the block and a resorbable collagen membrane can be placed over the entire graft. The soft tissue flap is then advanced and sutured for primary closure. After a healing period of five to six months, the site can be re-entered and integration of the graft to the recipient bone confirmed. Using an appropriate surgical stent, implants can then be properly placed into the widened ridge (**FIGURE 5C**).

FIGURE 5A. Extensive defect noted upon flap elevation.

FIGURE 5B. The area was prepared and a block allograft was trimmed and fixated with two bone screws *(J Block Cortico-Cancellous Bone Allograft, Zimmer Dental).*

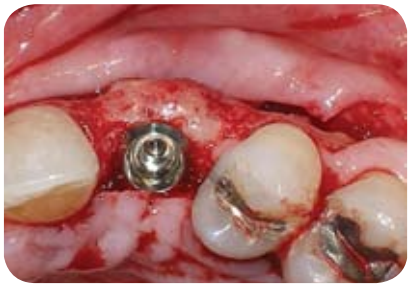

FIGURE 5C. Re-entry at six months. Note the excellent ridge width obtained and the ideal implant placement in the augmented site.

FIGURE 6A. The initial defect after tooth extraction. The defect is mainly a three-wall defect with almost complete loss of facial bone.

FIGURE 6B. The defect was filled with FDBA and a tenting pin was placed for space maintenance.

FIGURE 6C. A pediculated connective tissue graft was used to cover the grafted defect, maintaining soft tissue height and width.

FIGURE 6D. On re-entry, there is both adequate volume of hard, as well as soft, tissue for implant placement.

In this second case of deficient alveolar ridge, it is essential to rebuild both the hard and soft tissue components in a single procedure to improve the esthetics and to minimize surgical visits (**FIGURE 6A**).

This case illustrates a three-wall defect, which has better regenerative potential than the one-wall type discussed previously. For this defect, particulate bone can be used as long as two critical components of regeneration are included: space maintenance and adequate soft tissue closure. In order to maintain the defect space, a tenting pin was placed in the socket in an orientation to help support both the facial and vertical dimensions. Particulate freeze-dried bone allograft material was packed into the socket around the tenting pin, slightly overfilling the defect (**FIGURE 6B**), and a resorbable collagen membrane was trimmed and placed over the graft material.

Soft tissue closure over the membrane and graft is critical for proper healing. If the facial flap is advanced over the defect, the vestibular tissue will be pulled coronally, possibly resulting in a lack of adequate attached tissue, and thereby creating a "thin" case that will compromise future implant placement.

A technique for covering the socket after tooth extraction using a pediculated connective tissue graft was described by Mathews.[12] Utilizing this closure technique over the grafted socket permitted complete soft tissue coverage. Additionally, it maintained both vertical and horizontal soft tissue components, and increased the thickness of facial attached tissue (**FIGURE 6C**). After healing for five to six months, the site was re-entered and an implant was placed (**FIGURE 6D**). This case illustrates the transformation of a severely "thin" defect into a more advantageous "thick" periodontium.

Immediate Implants in Thick vs. Thin Biotypes

Whether a practitioner chooses to place an implant as a delayed or immediate treatment will depend on the conditions of each case. A delayed implant approach might be taken when there is not enough thickness in periodontal tissues to predictably minimize alveolar resorption secondary to healing, or a lack of anchoring bone to ensure stabilization. The decision is also dependent on the practitioner's comfort level in available reconstructive techniques. For a thin biotype case, practitioners must be aware of the possibility of significant resorption, which may have an impact on esthetics.

Furthermore, the loss of peri-implant structures may result in thin, trans-

FIGURE 7A. Initial presentation of maxillary left central with fractured root. Relatively minor facial inflammation and recession are present.

FIGURE 7B. Incisal view of immediate implant placement after tooth extraction.

FIGURE 7C. Radiograph of implant prior to implant exposure.

FIGURE 7D. Final crown restoration.

lucent tissue over the implant, which appears grayish, especially if the facial plate is lost and implant threads are exposed. In these cases, further bone and soft tissue grafting procedures may be necessary. However, once an implant is in place, it may be difficult to regain pre-extraction tissue contours.

In a thick biotype environment, immediate placement of an implant can be completed with predictable results.[13] There also is evidence that placement of an immediate implant can help preserve the osseous structures.[14] Even in cases where there is relatively thick tissue present, simultaneous soft and hard tissue preservation/augmentation techniques along with immediate implant placement may be necessary to achieve the best esthetic outcome.

Proper treatment planning between the implant surgeon and restorative dentist is essential when optimal esthetic results are desired. An illustrative case is a patient presented with a fracture in the root of the maxillary left central incisor (**FIGURE 7A**). After appropriately evaluating periodontal tissue characteristics and other necessary surgical and restorative information, a treatment plan was developed that called for extraction of the tooth and immediate implant placement (**FIGURE 7B**).

After hard tissue grafting to fill the facial gap of the socket, closure of the implant-socket was completed with a pediculated connective tissue graft.[12] A radiograph (**FIGURE 7C**) was taken prior to exposure of the implant. The implant was then exposed and the patient was referred back to his restorative dentist for placement of the final crown (**FIGURE 7D**).

Summary

In this paper, the authors continue to develop the thesis that evaluation of gingival tissue biotypes is important in treatment planning. Since thick and thin gingival biotypes are associated with thick and thin osseous patterns, the two tissue types will respond differently to the trauma of extraction and have different patterns of osseous remodeling following the procedure.

By understanding the nature of the tissue biotype, the practitioner can employ appropriate periodontal and surgical procedures to minimize alveolar resorption and provide a more favorable tissue environment for implant placement. This is especially important in thin periodontal biotypes where the thin alveolar plate is highly susceptible to remodeling. Additionally, these techniques when appropriately applied can save on treatment time and cost for patients. ■■■■

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CDA JOURNAL, VOL 36, Nº3

Course Abstracts From the Upcoming 2008 Spring Scientific Session

The following speakers will give presentations at the 2008 Spring Scientific Session. For more information on the Session, please go to cda.org, and click on "Conferences & Education," then "Scientific Sessions."

Dr. Buchanan is the founder of Dental Education Laboratories, a hands-on training center serving general dentists and endodontists.

Dr. Buchanan will present the following lecture at the Spring Scientific Session on Saturday, May 3, from 10 a.m. to 12:30 p.m. at the Hilton Anaheim Hotel, Room California C. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

L. STEPHEN BUCHANAN, DDS

The Art of Endodontics: Rationale for Treatment, Access and Negotiation

This lecture will review the rationale for treating cases of endodontic origin. It will include discussion on how to create ideal access forms that preserve the most tooth structure yet still ensure straight-line access into each orifice. It will also provide information on techniques for consistently negotiating canals to their terminus, including how to properly bend a file to get around impediments.

Dr. Buchanan will present the following lecture at the Spring Scientific Session on Saturday, May 3, from 2 to 4:30 p.m. at the Anaheim Convention Center, Ballroom C. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

L. STEPHEN BUCHANAN, DDS

Live Endodontic Demonstration

This lecture will demonstrate the new GT Series X rotary shaping files and two separate 3-dimensional filling techniques: GTX carrier-based and the continuous wave of condensation technique using the System-B/Elements Obturation unit. Throughout the procedure, state-of-the-art multimedia will be used to walk attendees through the steps necessary to ideally treat root canals in the safest, most efficient and reproducible fashion

Dr. Buchanan will present the following fee workshop at the Spring Scientific Session on Sunday, May 4, from 8 a.m. to noon at the Anaheim Convention Center, Room 213 C. The workshop will offer 4.0 C.E. units in Dental Board of California Category I.

L. STEPHEN BUCHANAN, DDS

The Art of Endodontics: Hands-on Course

In this hands-on workshop, attendees will learn firsthand the effectiveness of the GT Series X Files, using extracted teeth to create ideal shapes and practice 3-dimensional filling techniques for obturation. All instruments will be provided with the exception of extracted teeth.

Ms. Castagna and **Ms. Moore** are co-founders of The Practice Source, a management consulting company.

Ms. Castagna and Ms. Moore will present the following fee workshop at the Spring Scientific Session on Friday, May 2, from 10 a.m. to 12:30 p.m. at the Hilton Anaheim Hotel, Room Huntington A/B/C. The workshop offers 2.5 C.E. units in Dental Board of California Category II.

DEBBIE CASTAGNA AND VIRGINIA MOORE

The Doctor as CEO: Plan Your Way to Success and Profitability

Attendees at this lecture will learn how to use an annual plan as a road map to practice success and profitability, including how to forecast expenses accurately and determine production goals that will help answer basic, but vital, questions about one's dental practice. Among the topics that will be addressed are overhead expenses, pensions and taxes.

Ms. Castagna and Ms. Moore will present the following fee workshop at the Spring Scientific Session on Friday, May 2, from 2 to 4:30 p.m. at the Hilton Anaheim Hotel, in Room Huntington A/B/C. The workshop offers 2.5 C.E. units in Dental Board of California Category II.

DEBBIE CASTAGNA AND VIRGINIA MOORE

Foolproof Appointment Scheduling: the 10 Things Every Staff Member Will Need to Schedule Successfully

This lecture will discuss efficient processes and procedures for scheduling. Topics will include pre-blocking basics, scheduling to goal, determining perfect appointment lengths, keeping patients active, the patient hand-off, the quick-call system, and verbal skills for handling scheduling challenges. How scheduling situations and patients are handled has a profound effect on virtually every aspect of a practice, including productivity and profitability — not to mention stress. Attendees will learn how to put systems and processes in place to help make decisions ahead of time to deal with challenging situations, resulting in a foolproof and straightforward scheduling process with a consistently successful outcome.

Ms. Castagna and Ms. Moore will present the following lecture at the Spring Scientific Session on Sunday, May 4, from 9:30 a.m. to 1:30 p.m. at the Anaheim Convention Center, Ballroom E. The lecture offers 2.5 C.E. units in Dental Board of California Category II.

DEBBIE CASTAGNA AND VIRGINIA MOORE

Rejuvenate Your Practice — It's Easier Than You Think

This lecture will discuss the five things everyone wants from their job; how to hold staff meetings that are productive, solution-oriented and fun; how to structure an appointment scheduling system that reduces frustration and stress, and increases productivity and profitability; and what compromises a "remarkable" recare department, and how to implement this kind of system.

Dr. Feuerstein is the technical editor of *Dental Economics*.

Dr. Feuerstein will present the following lecture at the Spring Scientific Session on Friday, May 2, from 10 a.m. to 12:30 p.m. and continue from 2 to 4:30 p.m. at the Hilton Anaheim Hotel, Room California A. Each section of the lecture offers 2.5 C.E. units in Dental Board of California Category I.

PAUL FEUERSTEIN, DMD

New Technology for the Dental Practice

This course reviews the newest high-tech advances for dental practices. Content includes digital and intraoral cameras, digital radiography, caries and oral disease detection, computer imaging, shade taking, patient education, new ConeBeam CT technology, software and implant planning, new 3D intraoral digital impressions and CAD systems, and the newest products. Discussion will also include the latest devices, what the future may hold, and how to make a more educated purchase decision for the practice.

Dr. Feuerstein will present the following fee workshop at the Spring Scientific Session on Saturday, May 3, from 10 a.m. to 12:30 p.m. at the Anaheim Convention Center, Room 209 A/B. The workshop offers 2.5 C.E. units in Dental Board of California Category II.

PAUL FEUERSTEIN, DMD

Products You Need for a High-tech Practice Room

In this workshop, participants will touch, feel and try out a variety of tech devices, cameras and digital products in a nonsales environment. They will see the basic high-tech tools needed for your practice. Tabletop demonstrations of representative products from many manufacturers will teach and demonstrate. Attendees can try various digital devices and software that will help create a modern dental practice, and learn to make intelligent purchase decisions for the practice.

Dr. Feuerstein will present the following fee workshop at the Spring Scientific Session on Saturday, May 3, from 2 to 4:30 p.m. at the Anaheim Convention Center, Room 209 A/B. The workshop offers 2.5 C.E. units in Dental Board of California Category II.

PAUL FEUERSTEIN, DMD

3D X-rays, Impressions and Treatment Planning — Up Close and Personal

Company representatives of new technologies will be on hand to demonstrate the future of den-tistry. Cone beam CT, implant planning software, digital impressions, and CAD restorations will be discussed and demonstrated. Attendees will get a close look at CBCT scans, interpretation and treatment planning, and digital impressions, and receive a foundation to learn more about these products and make intelligent practice purchase decisions.

CDA JOURNAL, VOL 36, Nº3

Ms. Gunn is an advanced certified QuickBooks Proadvisor.

Ms. Gunn will present the following fee workshop at the Spring Scientific Session on Thursday, May 1, from 9:30 a.m. to noon and continue from 1:30 to 4 p.m. at the Anaheim Convention Center, Room 210 C. The workshop offers 5.0 C.E. units in Dental Board of California Category II.

SUSAN GUNN

Getting the Most out of QuickBooks in Your Practice

This lecture will show attendees how to maximize QuickBooks beyond tax accounting, into a highly effective yet simple practice management tool for financial analysis and goal planning. Attendees will learn to create a practice management chart of accounts, develop organized accountability between QuickBooks and practice software, download credit card transactions, pay bills vs. write checks, and reconcile bank statements. Topics will also include analyzing payroll services, taking the mystery out of paying employees and taxes, understanding reports, and avoiding common mistakes.

Ms. Gunn will present the following fee workshop at the Spring Scientific Session on Friday, May 2, from 9:30 a.m. to 12:30 p.m. at the Anaheim Convention Center, Room 210 C. The workshop offers 3.0 C.E. units in Dental Board of California Category II.

SUSAN GUNN

For Your Eyes (and Ears) Only

This workshop will discuss the eye-opening facts revealed in a nationwide embezzlement survey including: Embezzlers can be not only staff, but also trusted advisers such as CPAs and family members; what can happen when employees are hired without background or reference checks; why be wary of staff members who stir up bad feelings in the practice or routinely complain about co-workers; the real cost of embezzlement and why dentists often end up selling their practices; and what NOT to do if you suspect embezzlement in your practice. Attendees will explore case studies of practice vulnerabilities that entice dishonesty, sometimes in those who are trusted most. They will learn easy ways to weave accountability threads throughout their systems and procedures, and implement practical safeguards to help their practices avoid becoming the victim of financial dishonesty or deceit.

Ms. Gunn will present the following lecture at the Spring Scientific Session on Friday, May 2, from 2:30 to 5 p.m. at the Anaheim Convention Center, Room 210 A/B. The lecture offers 2.5 C.E. units in Dental Board of California Category II.

SUSAN GUNN

It's More Than Just Turning It On

Even computer professionals find it hard to stay current with the advances and changes in technology today, so it's not surprising that most practices do, too. But a working knowledge of hardware and software basics is critical to a practice's success. This lecture provides practical information on computer usage and maintenance, including internet and identity theft protection, optimizing your computer's effectiveness as a practice management tool, setting up a sensible computer maintenance schedule, and making that all-important decision: When is it time to pull the plug? Attendees will also receive advice on secure passwords, backups, internal and external cleaning, updates vs. upgrades, and virus protection. Real-life stories punctuate the presentation, providing common-sense, bottom-line information that every practice needs to keep technology problems from disrupting the schedule and potentially affecting the bottom line.

Dr. Koerner maintains a private practice with an emphasis on oral surgery in Utah.

Dr. Koerner will present the following lecture at the Spring Scientific Session on Friday, May 2, from 9:30 a.m. to noon and continue from 1:30 to 4 p.m. at the Hilton Anaheim Hotel, Room Pacific A. Each section of the lecture offers 2.5 C.E. units in Dental Board of California Category I.

KARL R. KOERNER, DDS, MS

Oral Surgery 1: Making Surgical Extractions Faster and More Predictable

This course presents ideas, instruments, and procedures that help simplify exodontia, removing much of the uncertainty that can present in the mind of the dental surgeon. It reviews many things to do that are commonly taught in oral surgery residency programs, but it also covers things not to do. These are called "absolutes" — things that always result in adverse consequences. Also included in the course is socket bone grafting for ridge maintenance and immediate repair of sinus perforations from an extraction. Which materials are the most predictable and which just have good marketing? What barrier membranes are best? How long are they needed to cover the graft?

Dr. Koerner will present the following fee workshop at the Spring Scientific Session on Saturday, May 3, from 9:30 a.m. to 12:30 a.m. and again from 2 to 5 p.m. at the Anaheim Convention Center, Room 213 B. Each section of the workshop offers 2.5 C.E. units in Dental Board of California Category I.

KARL R. KOERNER, DDS, MS

Oral Surgery Workshop

Participants in this workshop will perform several procedures with dental instruments on a lifelike model of the mouth. A surgical extraction is done on a simulated "bombed out" tooth. It is sectioned, and any fractured roots are retrieved by using the most effective instrumentation. Then, a quality bone graft material (a type that turns hard in only four months) is prepared and placed in the socket. It is covered with a protective, nonresorbable membrane then secured and stabilized with Teflon nonresorbable sutures. In addition, a partial bony impaction is removed step-by-step. With this procedure, incisions are critical. If done incorrectly, significant nerves and blood vessels can be damaged, causing serious complications. Once the flap is reflected, bone is appropriately excised. Sectioning is done. Then the parts are withdrawn until the entire tooth is out. Dry socket prevention and treatment are also covered.

CDA JOURNAL, VOL 36, Nº3

Dr. Kohner is a periodontist who teaches seminars on crown lengthening and soft tissue grafting for the Perio Institute.

Dr. Kohner will present the following fee workshop at the Spring Scientific Session on Thursday, May 1, from 9:30 a.m. to noon and continue from 2 to 4:30 p.m. at the Anaheim Convention Center, Room 213 B. The workshop offers 5.0 C.E. units in Dental Board of California Category I.

JAMES S. KOHNER, DDS

Hands-on Crown Lengthening Workshop

This course provides a thorough review of the principles and clinical procedures needed to perform crown lengthening in all its variations, including indications, contraindications, and management of surrounding bone. Surgical techniques, biologic width, and preservation of esthetics in the tissue contours are taught to allow participants to diagnose and perform crown lengthening if they so chose. Participants will do flap surgery on pig jaws and osseous recontouring on anatomically correct models. Videos of the surgery will be shown. Attendees will see how to make predictable impressions every time, save chair time and be more profitable. A treatment planning session using radiographs will illustrate how to make crown length decisions from radiographs alone. While most of the workshop will focus on posterior mechanical issues, a section is devoted to understanding and managing anterior esthetic considerations.

Dr. Kohner will present the following lecture at the Spring Scientific Session on Friday, May 2, from 9:30 a.m. to noon at the Anaheim Convention Center, Room 208 A/B. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

JAMES S. KOHNER, DDS

Benefits of Crown Lengthening to Enhance Restorative Results

This presentation will focus on the methods, limitations, and benefits of functional crown lengthening procedures. Whether attendees do them themselves or refer them out, they will leave with a better understanding for helping patients enjoy those benefits. This course is filled with case examples, surgical videos, and a treatment planning exercise to evaluate the appropriate treatment for a variety of illustrations. Attendees will learn how to make more predictable impressions and avoid surprises with crowns or bridges that do not fit well.

Dr. Kohner will present the following lecture at the Spring Scientific Session on Friday, May 2, from 1:30 to 4 p.m. at the Anaheim Convention Center, Room 208 A/B. The lecture offers 2.5 C.E. units in Dental Board of California Category II.

JAMES S. KOHNER, DDS

Benefits of Anterior Crown Lengthening in Improving Esthetic Results

This presentation will focus on the methods, limitations, and benefits of anterior crown lengthening procedures. The concepts needed to better understand the potential treatment for, or limitations of, the "gummy" smile will be discussed. Whether attendees do them themselves or refer them out, they will leave with a better understanding for helping patients enjoy those benefits. This course is filled with case examples and surgical videos. The lecture will cover how understanding the measurements of the biologic width and how it impacts decision making before removing anterior gingiva will allow the dentist to better meet patients' esthetic demands and avoid the surprise and aggravation of red, swollen gums around recently placed crowns. Discussion of laser use in managing soft tissue dimensions will also be included.

Dr. Kwan is a periodontist and CEO of Perioscopy, Inc.

Dr. Kwan will present the following lecture at the Spring Scientific Session on Thursday, May 1, from 9 to 11:30 a.m. and continue from 1 to 3:30 p.m. the Anaheim Convention Center, Ballroom C. Each section of the lecture offers 2.5 C.E. units in Dental Board of California Category I.

JOHN Y. KWAN, BS, DDS

Practicing Periodontics From the Center to the Edge

This course will provide exposure to a periodontal practice that embraces minimally invasive dentistry. A review of magnification and illumination systems will precede an overview of oral plastic surgery procedures performed using the operating microscope, from mucogingival reconstruction to immediate implants with provisional restorations. Video presentation through the microscope will give the attendee a chance to share the magnified view of the surgeon. A healthy periodontium is essential to more than just a healthy mouth. It is now linked to the health and well being of the body. Are there options regarding how managing the tooth that is ailing or failing? Is nonsurgical treatment effecting? What are the disinfection options? Are hand instruments no longer needed for scaling and root planing? One of the most exciting tools for periodontal debridement is the periodontal endoscope. With it, one can microvisually debride diseased roots without surgically opening the tissue.

Dr. Kwan will present the following fee workshop at the Spring Scientific Session on Friday, May 2, from 9:30 a.m. to noon and again from 1:30 to 4 p.m. at the Anaheim Convention Center, Room 213 C. Each section of the workshop offers 2.5 C.E. units in Dental Board of California Category I.

JOHN Y. KWAN, BS, DDS

Manual Tuning Workshop for Micro-ultrasonics

Micro-ultrasonic instrumentation is becoming mainstream in dental hygiene. The technical aspects of use are being taught but manual tuning does not seem to be well understood. Attendees will try out various machines and learn to manually tune them. They will begin to understand why many believe that manual tuning is the best way to tailor vibrations for a wide variety of clinical needs. An added bonus will be a chance to play with the periodontal endoscope.

Dr. Lingen is an associate professor in the Department of Pathology, at the University of Chicago, Pritzker School of Medicine.

Dr. Lingen will present the following lecture at the Spring Scientific Session on Saturday, May 3, from 9:30 a.m. to noon at the Hilton Anaheim Hotel, Room Pacific B. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

MARK W. LINGEN, DDS, PHD

Soft Tissue Lesions of the Oral Cavity: Everything You Forgot About Since Dental School but Were Afraid to Ask

The purpose of this talk is to review the basic categories of soft tissue lesions that are encountered in the head and neck region. Although the common lesions of the head and neck do not carry significant morbidity, the clinician must be able to successfully differentiated from the more serious conditions of this region. This lecture will discuss the necessary techniques for performing a comprehensive oral exam; review common white, red, yellow, ulcerated and pigmented lesions of the oral cavity; and emphasize the development of differential diagnoses for each of the lesions presented.

Dr. Lingen will present the following lecture at the Spring Scientific Session on Saturday, May 3, from 1:30 to 4 p.m. at the Hilton Anaheim Hotel, Room Pacific B. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

MARK W. LINGEN, DDS, PHD

Oral Cancer 2008: New Technologies for Early Detection and Prevention

Oral cancer is the sixth most common malignancy in the world. Despite numerous advances in treatment, the survival rate has remained unchanged for the past 50 years. Therefore, early diagnosis and effective chemopreventive strategies against the development of future neoplasms are essential. The purpose of this talk is to provide the participants with the most up to date information regarding the detection and prevention of oral cancer. This course will review the clinical appearance of potentially premalignant lesions, discuss the necessary techniques for performing a comprehensive oral exam, introduce developing technologies for the diagnosis of oral cancer, present the major chemopreventive initiatives that are being tested in clinical trials, and emphasize the role of dental professionals in early detection and chemoprevention.

Ms. McKenzie is CEO of McKenzie Management, a dental management consulting firm.

Ms. McKenzie will present the following lecture at the Spring Scientific Session on Thursday, May 1, from 9:30 a.m. to 12:30 p.m. at the Anaheim Convention Center, Ballroom D. The lecture offers 3.0 C.E. units in Dental Board of California Category II.

SALLY MCKENZIE

The 5 Ms of a Successful Team

How well dental teams implement the 5 M's of a successful dental practice — message, materials, measurement, manpower (team power), and management — has a huge impact on that one very important m: money. Dentist need to evaluate their message. What is the team saying to patients about the care, the staff, the office? And, most importantly, has the team considered the messages they are conveying in every interaction from the first phone call, to the emergency appointment, to the routine visit. Many dentists have completely overlooked one of the most effective materials available? It's costing practices a fortune in lost revenue. It is often said that a company is only as good as its people; the same is true for a dental practice. The quality of employees reflects the quality of the care. If dentists measure their teams, they'll ensure that they consistently represent the best the dentist has to offer.

Ms. Novotny is the founder of Master Connection Associates, a strategic business consulting company.

Ms. Novotny will present the following lecture at the Spring Scientific Session on Friday, May 2, from 10 a.m. to 12:30 p.m. at the Anaheim Convention Center, Ballroom B. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

CINDY NOVOTNY

The Role of a Dental Assistant in Building a Better Practice

After completing their education, dental assistants have the skill and knowledge that gives them the ability to assist the dentist on the medical side of the practice but this in only part of the job. A valuable dental assistant understands the combination of art and science when it comes to perfecting his or her career. There's pressure in the profession, personality conflicts within the practice, issues in dealing with the doctor, and overcoming negativity, fear and concern from patients. In this session, attendees will learn skills that will help them with the art of service: how to deal with different personalities, how to overcome angry patients, and how to create a comfortable and welcoming atmosphere in the chair.

Ms. Novotny will present the following lecture at the Spring Scientific Session on Friday, May 2, from 2 to 4:30 p.m. at the Anaheim Convention Center, Ballroom B. The lecture offers 2.5 C.E. units in Dental Board of California Category II.

CINDY NOVOTNY

The Role of the Front Desk in Building a Better Practice

First impressions are lasting impressions and it is a critical job of the front desk to build lasting relationships with the patients so that the practice does not lose their business and grow their business based on referrals. A successful front desk is all about attitude, energy and appearance. In this session, attendees will learn how to improve the perception of the front desk by maintaining a positive attitude, multi-tasking while still being polite, and managing the process of appointments and customer service at the same time.

CDA JOURNAL, VOL 36, Nº3

Dr. Sheets is co-executive director of the Newport Coast Oral Facial Institute.

Dr. Sheets will present the following lecture at the Spring Scientific Session on Friday, May 2, from 10 a.m. to 12:30 p.m. at the Hilton Anaheim Hotel, Room California D. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

CHERILYN G. SHEETS, DDS

Meeting the Demands of Today's Esthetic Restorative Practice

Excellence in esthetic reconstructive dentistry requires a mastery of clinical skills and a deep understanding of the art and science of dentistry. Yet, achieving high level results can sometimes prove to be challenging. This course will simplify these objectives by outlining the diagnostic guidelines and clinical protocols that maximize esthetic treatment outcomes for the simple to the very complex clinical cases. In this course, the dentist will learn guidelines for a complete esthetic analysis prior to the commencement of treatment; clinical guides such as the diagnostic wax-up, reduction guides, and provisional restorations for more predictable esthetic outcomes; and preparation protocols that enhance the esthetic outcome of porcelain restorations.

Dr. Sheets will present the following lecture at the Spring Scientific Session on Friday, May 2, from 2 to 4:30 p.m. at the Hilton Anaheim Hotel, Room California D. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

CHERILYN G. SHEETS, DDS

Replicating Nature With Advanced Esthetic Treatment Options

Today, many patients are able to benefit from the positive psychological impact that an attractive smile has on self-esteem and confidence from esthetic reconstructive dentistry. This presentation will outline the steps to ensure a natural esthetic result in a broad range of simple to complex esthetic treatment situations. Numerous illustrations will be shared that emphasize intricacies and variations of diagnosis, treatment sequencing and maintenance techniques to achieve these goals. In this course the dentist will learn advanced esthetic solutions using porcelain bonded restorations, how to use combinations of esthetic treatment options in one case, develop effective communication tools with the laboratory technologist for improved results, and how to control the psychological aspects of esthetically demanding patients.

Dr. Smiler is a diplomate of the American Board of Oral and Maxillofacial Surgery and maintains a private practice in Encino, California.

Dr. Soltan is a diplomate of the International Congress of Oral Implantologists and maintains a private practice in Riverside Calif. Riverside Calif.

Drs. Smiler and Soltan will present the following lecture at the Spring Scientific Session on Friday, May 2, from 9:30 a.m. to noon at the Anaheim Convention Center, Room 304 C/D. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

DENNIS G. SMILER, DDS, MSCD, AND MUNA F. SOLTAN, DDS

Successful Bone Grafts With Bone Marrow Aspirate Stem Cells: An Office Procedure

This presentation introduces the platinum standard for bone graft success that emphasizes autogenous osteogenic bone marrow stem cells. This protocol combines bone marrow aspirated stem cells with graft material to form bone. The procedure uses the patient's self-renewable stem cells within bone marrow to facilitate viable bone cell growth. Results of scientific studies, histomorphometric analysis and stem cell markers show this point-of-care technique is effective with excellent results in bone regeneration. Attendees will learn the rationale, anatomy, and technique for obtaining adult stem cells from bone marrow aspirate; the science of stem cells, osteoblasts, and osteoclasts; and the surgical protocol for the procedure. Harvesting bone marrow stem cells is a simple in-office safe predictable procedure with minimal post harvesting edema or pain. It is cost-effective, less invasive because it avoids the need for a second surgical site, and proven more effective than autogenous bone.

Drs. Smiler and Soltan will present the following lecture at the Spring Scientific Session on Friday, May 2, from 1:30 to 4 p.m. at the Anaheim Convention Center, Room 304 C/D. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

DENNIS G. SMILER, DDS, MSCD, AND MUNA F. SOLTAN, DDS

Balloon Subantral Membrane Elevation: Sinus and Socket Lift for the Nonsurgical Clinician

For the nonsurgical clinician, the Balloon Subantral Membrane Elevation technique is an appropriate procedure to lift the sinus membrane. It easily elevates the membrane with minimal trauma accessing the antral floor for augmentation. This technique is particularly useful in areas difficult to reach and when teeth are adjacent to the edentulous area. There is reduced morbidity, blood loss, operative time, post operative pain, and complications. The procedure is accomplished with a limited incision, minimal mucoperiosteal flap reflection and a small osseous window to expose the sinus membrane. The mucoperiosteal flap is elevated exposing the buccal bone beyond the mucogingival attachment. The antral balloon is placed under the membrane and gently inflated with 2–4cc of sterile saline. The procedure results in an antral space bordered superiorly by the reflected membrane; medially by the medial wall of the sinus; and anteroposteriorly by the nonreflected membrane and the roots of the adjacent teeth. This augmentation procedure has been a highly successful and predictable procedure. It can be accomplished through the implant osteotomy site in conjunction with implant placement. This lecture includes PowerPoint program including videos case presentations.

CDA JOURNAL, VOL 36, Nº3

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Dr. Soltan is a diplomate of the International Congress of Oral Implantologists and maintains a private practice in Riverside Calif. Riverside Calif.

Drs. Smiler and Soltan will present the following fee workshop at the Spring Scientific Session on Sunday, May 4, from 9 a.m. to noon at the Anaheim Convention Center, Room 213 A. The workshop offers 3.0 C.E. units in Dental Board of California Category I.

DENNIS G. SMILER, DDS, MSCD, AND MUNA F. SOLTAN, DDS

Balloon Subantral Membrane Elevation Hands-on Workshop

This three-hour hands-on interactive workshop is designed for the nonsurgical clinician. The workshop is a combination of lecture material, handouts, videos of selected procedures, and hands-on model surgery. The balloon subantral membrane elevation technique makes the antral floor accessible for bone graft augmentation with minimal flap though the buccal wall or crestal approach from the prepared implant site. The clinician can add 10-15 mm bone height. Drs. Smiler and Soltan will instruct each participant in how to diagnose the patient for this procedure, to interpret CT-scans, to place implants into graft site, to perform sinus and socket lift surgery with the aid of antral balloon, and to deal with complications. Consoles, instruments, balloons, graft materials, and implants are provided. The course objectives are to provide the clinician with knowledge, surgical skills, flap design, and understanding of the surgical requirements for balloon subantral membrane elevation.

Ms. Taylor is a consultant with The JP Institute and is in private practice.

Ms. Taylor will present the following lecture at the Spring Scientific Session on Friday, May 2, from 9:30 a.m. to noon and again from 1:30 to 4 p.m. at the Anaheim Convention Center, Ballroom E. Each section of the lecture offers 2.5 C.E. units in Dental Board of California Category I.

JILL TAYLOR

CSI: Perio Uncovered and Sentenced

This lecture will be a periodontal investigation in which attendees will learn how to process a "crime scene" using the latest science based investigative tools. Participants will learn how to "assess the crime scene" by factoring in clues from past chart notes and the patient's medical history. They will learn to differentiate between health and disease at "the scene of the crime" through five basic screenings, plus when more sophisticated testing is needed to treat periodontal disease. Clues will be provided to challenge the dental professional's role in identifying risk factors for oral cancer, recognizing where suspicious lesions are found, and implementing sound screening protocols, thus making appropriate referrals for optimum oral health and increasing case presentation for restorative and esthetic dentistry. Awareness of updated technologies, techniques for optimal lesion detection, and philosophies via proven research and population statistics within the medical and dental professions is critical to properly treat patients. Attendees will learn effective means of "sentencing" periodontal disease in patients by creating individualized treatment plans, arresting the disease process and supporting comprehensive care with restorative and aesthetic options. The ability to find hidden disease and make a difference in total body health and wellness of patients will increase patient relationships tenfold

Ms. Wallace's chairside career has included general and cosmetic dentistry, and she has been employed by Ultradent Products since 1996.

Ms. Wallace will present the following lecture at the Spring Scientific Session on Thursday, May 1, from 9:30 a.m. to noon and continue from 1:30 to 4 p.m. at the Anaheim Convention Center, Ballroom B. Each section of the lecture offers 2.5 C.E. units in Dental Board of California Category II.

VICTORIA WALLACE, CDA, RDA

The Secrets to Becoming a Successful Dental Assistant

This lecture is aimed at dental assistants who want a successful career. A successful dental assistant can make a very good income but must work at it. This can be accomplished by always being one step ahead of the dentist and thinking like a dentist. Attendees will better understand common dental procedures, know how to manage and troubleshoot dental products, and know how to proceed without being asked.

Ms. Wallace will present the following lecture at the Spring Scientific Session on Saturday, May 3, from 9:30 a.m. to noon at the Anaheim Convention Center, Ballroom B. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

VICTORIA WALLACE, CDA, RDA

Totally Bonding: Do's and Don'ts to Help Create the Ultimate Bond

This course is full of information to help the clinician and assistant better understand and perform the bonding process. Explaining the different types of systems and how they work is just a small part of this program. This program is for both the doctor and assistant, and is recommended for clinicians new to dentistry. Attendees will learn to understand the different classifications of resin systems, troubleshoot existing issues with bonding, and decide which type of system should be used for different procedures, i.e., light-cured, self-cured and dual-cured resins.

Ms. Wallace will present the following lecture at the Spring Scientific Session on Saturday, May 3, from 1:30 to 4 p.m. at the Anaheim Convention Center, Ballroom B. The lecture offers 2.5 C.E. units in Dental Board of California Category I.

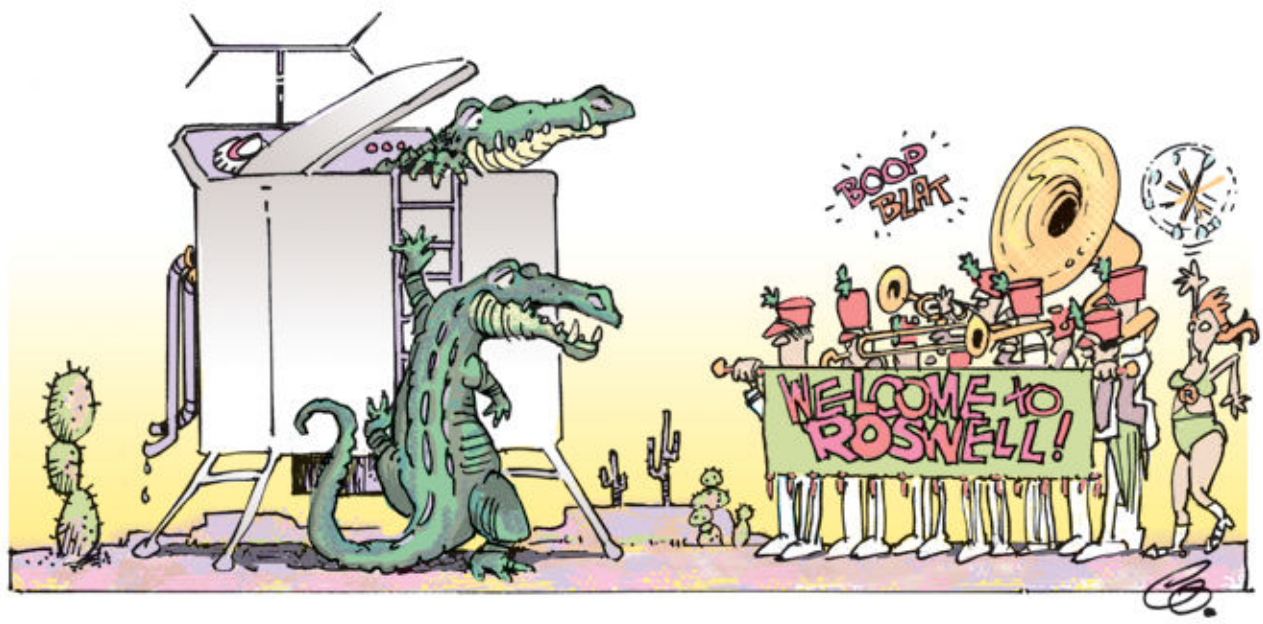
VICTORIA WALLACE, CDA, RDA

Doing Whitening Right ... Happy Patients and With Great Results

Whitening is still a big practice builder if done right. This course will educate the whole team on whitening options and proper procedure protocol, and will answer many whitening troubleshooting questions so patients will be comfortable and satisfied with their whitening procedure. Attendees will learn the differences between all the whitening options available, how to troubleshoot whitening issues, and how to feel better about promoting whitening in their office, which in turn will help build the practice.

CDA JOURNAL, VOL 36, Nº3

SNAP! Liti-gators and a Lawsuit With Teeth



When aliens landed in Roswell, N.M., in July 1947, their mission was not that of exploration, but to found a new religion.

Robert E. Horseman, DDS

ILLUSTRATION BY CHARLIE O. HAYWARD

It was in the late '60s when digital watches first appeared in upscale stores like K-Mart and Sears. Nobody at that time knew what digital meant, but it was supposed to be the opposite of analog, an equally obscure term destined to join buggy whips as the ranking symbols of old-fashioned technology.

What is known is this: When aliens landed in Roswell, N.M., in July 1947, their mission was not that of exploration, but to found a new religion. Everyone in the galaxy knows you can't go broke sponsoring a new sect. Their belief was based not on people, but numbers, specifically ones and zeros. Called Microsoft by converts, it was immediately popular, especially with toddlers who had mastered digits up to four. Adults soon caught the fever, mainly because they didn't have to dress up and go to church. Sprawled in front of a monitor, attired in their underwear if they wished, graven images could be worshiped on the screen right in front of them. The digital revolution was born.

But I digress.

The hope of possessing a wristwatch with little red numbers flashing on a black background was more than any advanced techie such as myself could resist. No daily winding, no mainspring. Instead, a tiny battery stimulated a microscopic piece of quartz, or two pintz, to vibrate at a precise frequency and ... well, there was more, but it was enough to know that a single button on the case turned the red numbers off and on and it was advertised as so simple a child could set it for time.

The child could; I couldn't.

In a very short time, digital watches had evolved to the point a half-dozen

CONTINUES ON 229

DR. BOB, CONTINUED FROM 230

buttons around the periphery activated functions that seemed to have no relationship to time. The only feature with any link to the past was the word Timex on the face. As if they didn't enjoy enough power already, the under-10 set could manipulate these buttons with irritating success much as they could line up a Rubik's Cube in 45 seconds. Paradoxically, as they evolved into teens, they could not be taught that wearing a baseball cap backwards wasn't cute anymore. The average adult, unless gifted with degrees in physics and nuclear electronics with a major in Caribbean voodoo, was hopelessly lost in the digital milieu. As a religion, the only tenet it shared with others was that of Hell.

Nearly 10 years passed during which things got worse with the introduction of the personal computer (see Roswell/Microsoft). In response to the demands of a frustrated public whose ability to acquire hardware far exceeded its understanding of how to operate it, the "For Dummies" series of booklets appeared.

What a godsend! Without embarrassment, one can now pick up everything from *Programming DVD Player/Recorders for Dummies* to *Astrophysics and Its Relationship to Massive Subnuclear Cyber Hydroponics for Dummies*. *You Lost Me at HELLO: iPhone Operation for Dummies* is a bestseller.

The long overdue *Dentistry for Dummies* is scheduled to appear in kiosks toward the middle of this year. Just in time, too, if you follow Reuters reports from London. The "dummies" in this case were a couple of British dentists named Dr. Simon Moore and Dr. Tim Rumney who ran afoul of copyright laws, but luckily escaped by the skin of their teeth (Nasmyth's membrane).

It seems Drs. Moore and Rumney chose a Kermit-colored lime green crocodile as their practice logo. The croc featured a mouth full of the kind of teeth one would expect from dentists who had done a full-mouth rehab on the reptile as a third-year dental student research project and could probably do the same for you. Proudly displayed on a sign outside their building and highlighting their office stationery, the logo was duly registered with the UK Intellectual Property Office.

That's when the trouble began. Across the Channel in France, the famous French tennis player Jean René Lacoste, resting quietly in his grave since 1996 when he died at age 92, stirred restlessly. Nicknamed "the Crocodile" because of his pugnacity on the court, he became CEO of La Société Chemise Lacoste, a company that produced the tres chic crocodile-embroidered tennis shirt. An argument persists to this day as to whether the reptile is a crocodile or an alligator. A large dissident group stated they would as soon have the posterior of a hippopotamus stitched on their shirts as an idiotic green saurian. Dentists, on the other hand, have always had an understandable professional interest in crocs and alligators.

Confirming that litigators in the UK and France can be as hungry as their counterparts here in the colonies, the French fashion giant Lacoste promptly sued the two lads from Cheltenham, southwest England, claiming copyright infringement.

The verdict: Wellington versus Napoleon revisited. Le humiliation!

France: You have stolen le crocodile sans gene (without embarrassment, remorse). That's 42,597,432 francs, s'il vous plait!

UK: Come off it, mate! Your croc's got a red tongue; ours has big, white teeth. Yours has a knobbly back; ours has a smooth-as-a-baby's-bottom back. Our logo says "The Dental Practice"; yours is tacked onto a bloody tennis shirt. Tout comprendre c'est tout pardonner (translation: Give over).

France: Sacre bleu!

American dentists are well-advised to not tangle with global copyright laws but to stick with our own concept of the perfect smile wherein everyone will have exactly the same look and nobody can sue anybody for infringement. Dummies rule! ■■■■