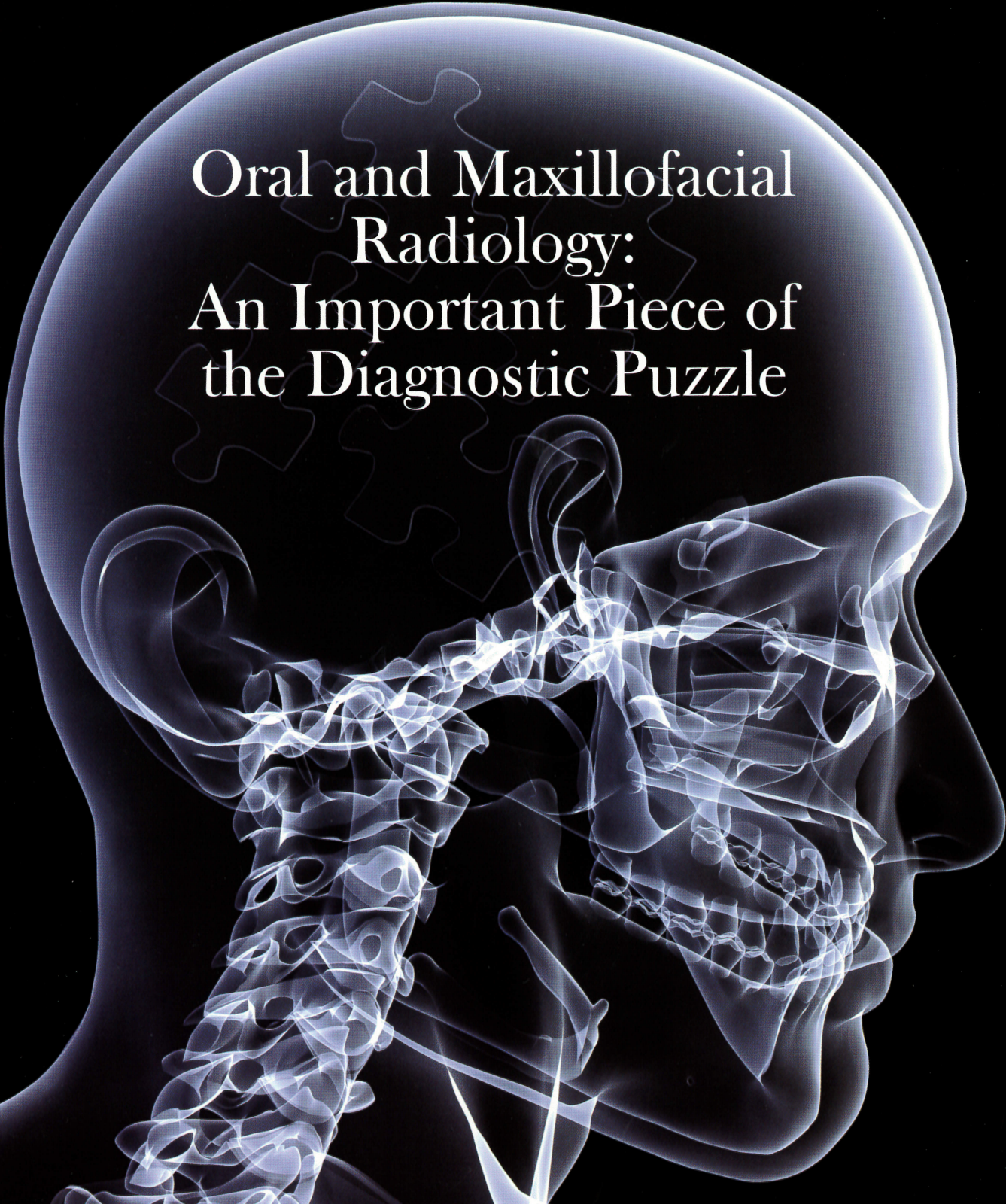


JOURNAL

of the

MASSACHUSETTS DENTAL SOCIETY

Summer 2008



Oral and Maxillofacial
Radiology:
An Important Piece of
the Diagnostic Puzzle

GREEN DENTISTRY

THE ENVIRONMENT AND “GREEN” ISSUES HAVE BEEN HOT TOPICS LATELY, AND FOR good reason. Recycling, natural fuels, increased ocean levels due to melting glaciers and polar ice caps, and rising global temperatures with consequent climate changes have all received their share of press. To a certain extent, dentistry has already had to confront many environmental issues, such as Occupational Safety and Health Administration (OSHA) regulations. Disposal of medical waste and hazardous chemicals, prevention of environmental contamination by use of backflow inhibitors and amalgam separators, and proper handling of medicaments and packaging have become routine procedures for most offices.

Many of these changes came about out of necessity: The threat of government regulation and public pressure forced dentistry to react. The profession has always been conscientious, but more can be done. It is time for us to take control and be proactive. The fact is that on a daily basis, our profession produces a significant amount of waste. At the end of any given workday, look at how many trash bags are filled and estimate how many disposed gloves are within those bags. How many used impression trays, evacuator/suction/air-water syringe tips, patient napkins, tray covers, and barrier films have been used that day? Clearly, these items and many, many more must be trashed after every single use.

We know that the materials we just listed are not recyclable, at least not at this time. But if the profession acted as a united body, the strength in numbers (and potential positive media attention) would force manufacturers to listen. For example, the technology must exist to create polymers that can be integrated into plastics and render them biodegradable—without compromising their quality. This should include research and development on biodegradable materials in the manufacture of gloves. As a profession, we should put pressure on the manufacturers and dental supply companies to develop more environmentally friendly products.

It is up to us to start paying attention to this waste issue. As a unified profession, we can do our share to help the planet. We need to find a means to start changing our materials and our trash patterns, while still providing our patients with a sterile treatment environment.

On a smaller scale, dental offices should also assess their own practices. Every office should encourage employees to set up on-site recycling centers to accommodate the cans, glass, newspapers, and magazines that the employees bring into the office daily. All the paper generated from mail and intraoffice communication should be shredded and recycled.

It really does not take much effort to start making “green” changes for the greater good. The time-tested rallying cry to “Think Global, Act Local” applies now more than ever. ■



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FOR WOMEN ONLY: SOME THOUGHTS ABOUT YOUR MONEY

ALTHOUGH WOMEN CONTROL MORE THAN HALF of the financial assets in the United States, many of them do not actively participate in the management of these assets. Those women who have not been encouraged to learn about, think about, or discuss money and investing can all too often be exploited or dismissed by the people they choose to manage their assets. In some cases, their capital is managed by people who do not appreciate their concerns and are not interested in engaging them in the investment process.

Women—whether single, married, or divorced—need to plan for a retirement that will likely be longer than a man's, since women generally live longer than men. If married, women need to plan for the possibility of widowhood for at least some of their retirement years. At some point in their lives, many women will be the sole financial decision makers for their households.

According to the Social Security Administration, nearly 60 percent of all women are in the workforce. With more women working, that means more are paying Social Security taxes and earning credit toward retirement. However, even as fully recognized and highly compensated professionals, women may move in and out of the workforce. As a result, women spend a smaller percentage of their lives collecting a paycheck. Thus, women have a lower base to start from and generally more retirement years to fund.

Today, as more and more women are discovering, managing money is as important as earning it. More women are taking control of their finances than ever before. However, they still tend to lag behind men when it comes to saving and investing.

Getting Started

So, where do you start? With a plan based on your current situation. Take stock of your assets—your home, investments, business interests, and savings. Then look at your liabilities,



including your mortgage, car, or other consumer loans, student loans, and credit card debt. Your assets minus your liabilities constitute your net worth. If you are just entering the workforce and perhaps saddled with student loans, this figure might be a negative number. However, it's still a place to start. Assuming that you are working and living within your income, you can begin to save even small amounts, as well as begin paying down your debt.

As you acquire assets, such as saving accounts, certificates of deposit, or a house or condominium, it helps to understand your investment options. Find and meet with a qualified financial services professional to help you analyze your situation and needs, and set up a plan to achieve your goals.

By all means, take advantage of qualified retirement plans, including individual retirement accounts (IRAs), 401(k)s, 403(b)s, company pension plans, and Keogh plans. These are all excellent ways to save for retirement. They are funded with pretax dollars, they appreciate on a tax-deferred basis, and many company plans match employee contributions. If you are self-employed, similar benefits are available by setting up a simplified employee pension (SEP) IRA or a savings incentive match plan for employees (SIMPLE).

If you are one of those fortunate people who have substantial assets, make sure they are managed in a way that is consistent with your objectives. Take an active role in the management of your finances. Work with your financial professional to develop and implement an investment portfolio with which you are comfortable.

These are just a few suggestions to help get you started on the road to financial freedom. Don't hesitate, and don't delay. It is never too early or too late to start taking control of your financial life. ■



GEORGE GONSER, MBA

Mr. Gonser is the managing director of MDSIS.

HEALTH CARE AGENDAS OF THE CANDIDATES

HAVE WE HAD ENOUGH OF THE PRESIDENTIAL ELECTION YET? Despite the media barrage, I do find the politics of 2008 and the presidential campaign intriguing. With the possibility of the first African American–Caucasian president or potentially the oldest president, the 2008 presidential election may be one of the most fascinating in recent memory, or possibly ever.

Along with the Iraq war and the economy (and those ever-rising gas prices), the state of the country's health care system and health insurance coverage will be one of the top issues debated over the next few months leading up to the November election.

So, for the two candidates, Senator Barack Obama (D-IL) and Senator John McCain (R-AZ), what are their arguments and positions on some of the key items related to health care?

What is your game plan for health care coverage?

While many are clamoring for a single-payer system, each of the candidates seems to be shying away from it. Sen. McCain wants a plan that is universally accessible, affordable, and diverse, and that encourages personal responsibility, education, and choice, all without requiring taxes to be raised. Sen. Obama wants to provide insurance to all through existing private insurance companies and a new public insurance program.

Will there be a mandatory insurance requirement similar to the requirement in Massachusetts as part of the Massachusetts Health Care Reform?

Sen. Obama's proposal would require insurance for children only, while Sen. McCain's plan would not require all individuals to purchase insurance.

Will there be an employer mandate similar to the one in Massachusetts?

Sen. Obama's program would require employers that do not make a contribution to the cost of health care coverage for their staff to pay a percentage of payroll toward the cost of a

national health care plan. Sen. McCain's plan would encourage people to purchase their own insurance using tax credits and health savings account expansion.

Will there be economies of scale for purchasing collaboratives or pools?

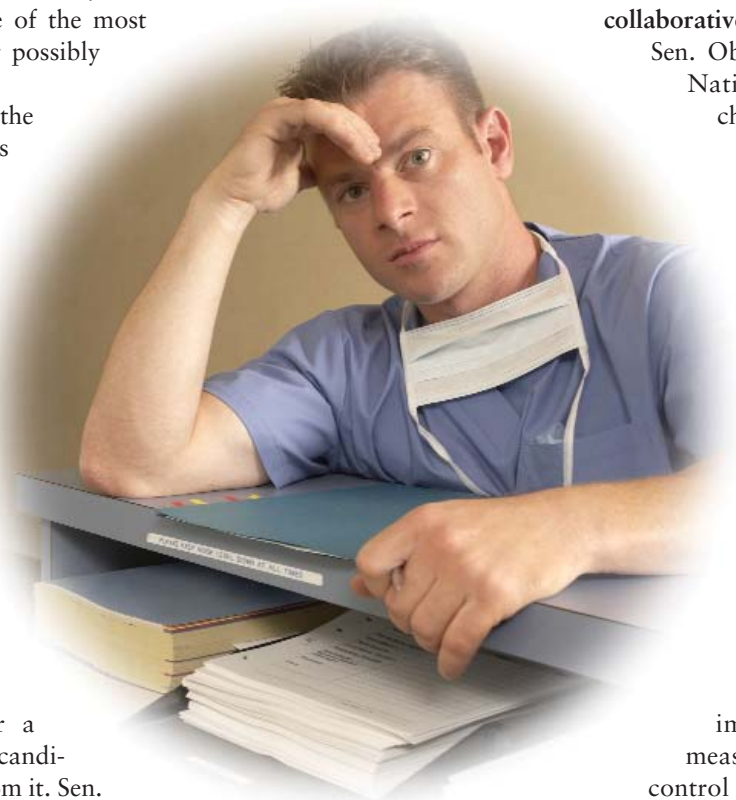
Sen. Obama's plan would establish a National Health Insurance Exchange program, which would allow for citizens to enroll in a new public plan or purchase a private plan. Sen. McCain's plan would allow small businesses and the self-employed to buy health insurance through various strictly regulated associations and organizations.

How will these health care initiatives be paid for?

This is the million- (or maybe I should say billion- or trillion-?) dollar question. Sen. McCain would implement cost containment measures and rein in the out-of-control costs of the Medicare and Medicaid programs. Sen. Obama's plans are estimated to cost in the \$60 billion range, to be funded by improving efficiencies in the health care system and by terminating the Bush tax cuts for those earning more than \$250,000.

The two candidates have outlined ambitious, creative goals for their health care agendas. But will they work, can we afford any of them, and even if one of their programs is approved, how long will it take to be implemented? Many of you may remember "Hillary Care" back in the early days of the Clinton administration and the myriad challenges and roadblocks that resulted in its ultimate defeat. What lessons have been learned from that defeat, and will this round of health care initiatives take hold? Even though Senator Hillary Clinton (D-NY) bowed out of the presidential race in early June, the health care issue is not going anywhere.

These issues will undoubtedly make for fantastic political theater in the months ahead, as well as crucial health care policy for our future. ■



Massachusetts Dental Society Beacon Hill Day



May 21, 2008

On Wednesday, May 21, 2008, more than 135 dentists, dental students, and associates gathered for Beacon Hill Day 2008. This year is the sixth consecutive year that the Massachusetts Dental Society has hosted a day dedicated to advancing a prodentistry agenda at the State House. While each Beacon Hill Day has been special, this year's record attendance made the event a huge success.

The day began with the inaugural Morning Briefing Session hosted by the MDS-PAC/MDS-People's Committee at the Suffolk Law School in Boston. Attendees of this session received a full briefing on the Society's legislative agenda from Bob Alconada, MDS director of governmental affairs. The audience received helpful tips on effectively communicating with legislators.

"[The Morning Briefing Session] was a great opportunity for MDS members to receive in-depth information about our bills," says Paula Friedman, DDS, chair of the Council on Public Affairs. "I am very pleased that the MDS-PAC/MDS-People's Committee sponsored this important addition to Beacon Hill Day."

MDS dentists and their guests then walked up the hill for a luncheon in the State House with legislators and their aides. The Great Hall was filled to capacity. "I don't think we could have asked for a better turnout," said MDS President Milton Glicksman, DMD, as he addressed attendees. "This is the kind of crowd we need to make sure our voices are heard in the State House, and I'm sure the echoes will still be reverberating even after we've left."

State Representative Robert A. DeLeo, chair of the House Committee on Ways and Means, delivered the keynote address at the luncheon in the Great Hall. Chairman DeLeo emphasized the importance of engaging legislators and informing them about dentistry and oral health issues in the Commonwealth. He reminded the audience that dentists are the experts on oral health and that their elected officials must hear from them in order to make informed decisions about issues surrounding oral health.



Mucous Retention Cyst of Maxillary Sinuses

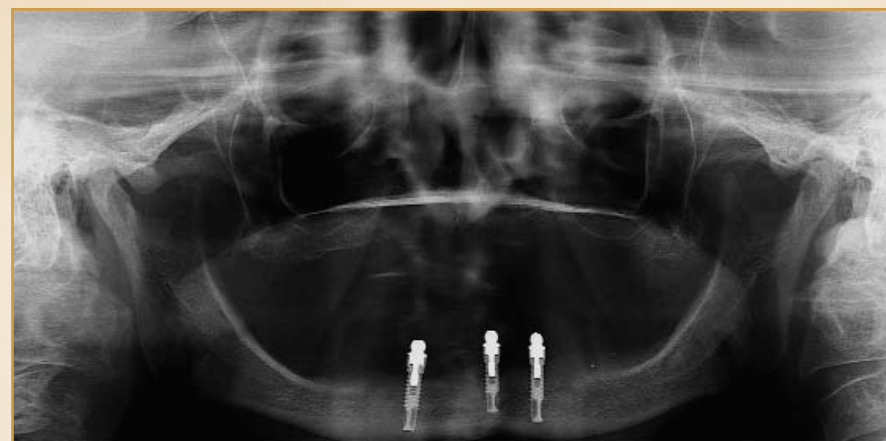


Figure 1. Panoramic radiograph showing mucosal thickening in maxillary sinuses bilaterally.



Figure 2. Panoramic radiograph showing dome-shaped radiopacities in maxillary sinuses bilaterally.

Maxillary sinuses (also called maxillary antra) are air-filled cavities that are of particular importance to dentists due to their proximity to dental structures. Diseases of the sinus can mimic odontogenic diseases, and odontogenic diseases can spread to the sinuses and mimic sinus diseases.¹

Diseases of maxillary sinuses, like mucosal thickenings and mucous retention cysts, are fairly common occurrences.^{2,3} Part of or the entire maxillary sinus may be visualized on dental radiographs, and with mucous retention cysts being a fairly common incidental finding, it is important for the dental practitioner to understand the radiological features of this entity.

Mucous retention cysts are a result of enlargement of a mucous gland caused by blockage of a mucous gland duct in the floor of the maxillary sinus. Radiographically, these cysts appear as dome-shaped relative radiopacities in the maxillary sinus with the base along the floor of the maxillary sinus. There is no bony cortex around the radiopacity and no destruction, expansion, or thinning of the walls of the maxillary sinus. The majority of mucous retention cysts are asymptomatic and tend to remain unchanged over long periods of time.

ARUNA RAMESH, BDS, DMD, MS
TARUNJEET PABLA, BDS, MS

Dr. Ramesh is head and associate professor and Dr. Pabla is assistant professor for the department of general dentistry in the division of oral and maxillofacial radiology at Tufts University School of Dental Medicine. They are also diplomates of the American Board of Oral and Maxillofacial Radiology.

Editors' Note

The JOURNAL OF THE MASSACHUSETTS DENTAL SOCIETY is pleased to introduce this new department to our readers. "Oral and Maxillofacial Radiology" is written for the purpose of raising the dental practitioner's awareness of radiology as a diagnostic tool beyond normal preventive aspects. We hope you find this a useful addition to the JOURNAL and your library.



Figure 3a. Panoramic radiograph showing mucous retention cyst in maxillary sinuses bilaterally.

Case 1

Panoramic radiograph of edentulous patient showing thickening of mucosa on the floor of maxillary sinuses bilaterally. (See Figure 1.)

Case 2

A 27-year-old male patient with symptoms exhibiting as pain and tenderness in the face lateral to nose bilaterally and referred pain in maxillary posterior teeth. The panoramic radiograph shows multiple dome-shaped relative radiopacities in maxillary sinuses bilaterally. The patient was referred to an ear, nose, and throat (ENT) specialist for follow-up and management. The patient reported improvement of dental symptoms after treatment of sinonasal disease. (See Figure 2.)

Case 3

A 25-year-old male reported for evaluation of pathology in the mandible. Mucous retention cysts in maxillary sinuses bilaterally were incidental findings on the panoramic radiograph (see Figure 3a). Cone beam computed tomography (CBCT) scans obtained for evaluation of dental pathology also confirmed the same finding (see Figures 3b, 3c, and 3d). The patient had no referred dental symptoms at that time.

Conclusion

Certainly, patients should not be referred to an ENT specialist for every instance of antral mucosal thickening or mucous retention cyst, nor should the dentist ignore conditions that require referral and management. A dentist's reputation is greatly enhanced by giving appropriate referrals that can make a difference in a patient's well-being. ■

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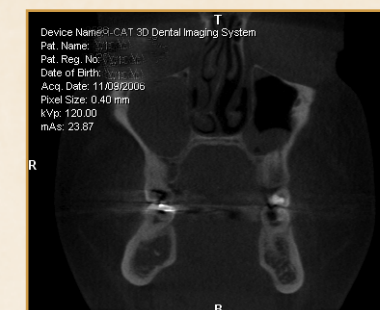


Figure 3b: CBCT coronal view showing mucous retention cysts in maxillary sinuses bilaterally.

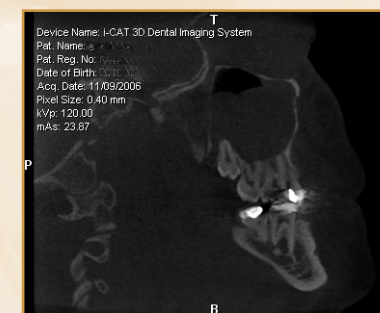


Figure 3c: CBCT sagittal view showing mucous retention cyst in right maxillary sinus.

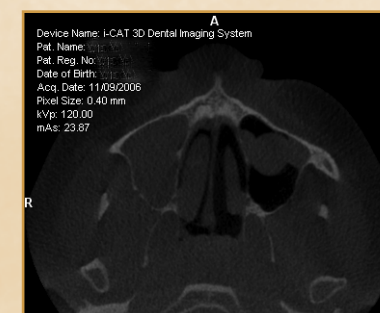


Figure 3d: CBCT axial view showing mucous retention cysts in maxillary sinuses bilaterally.

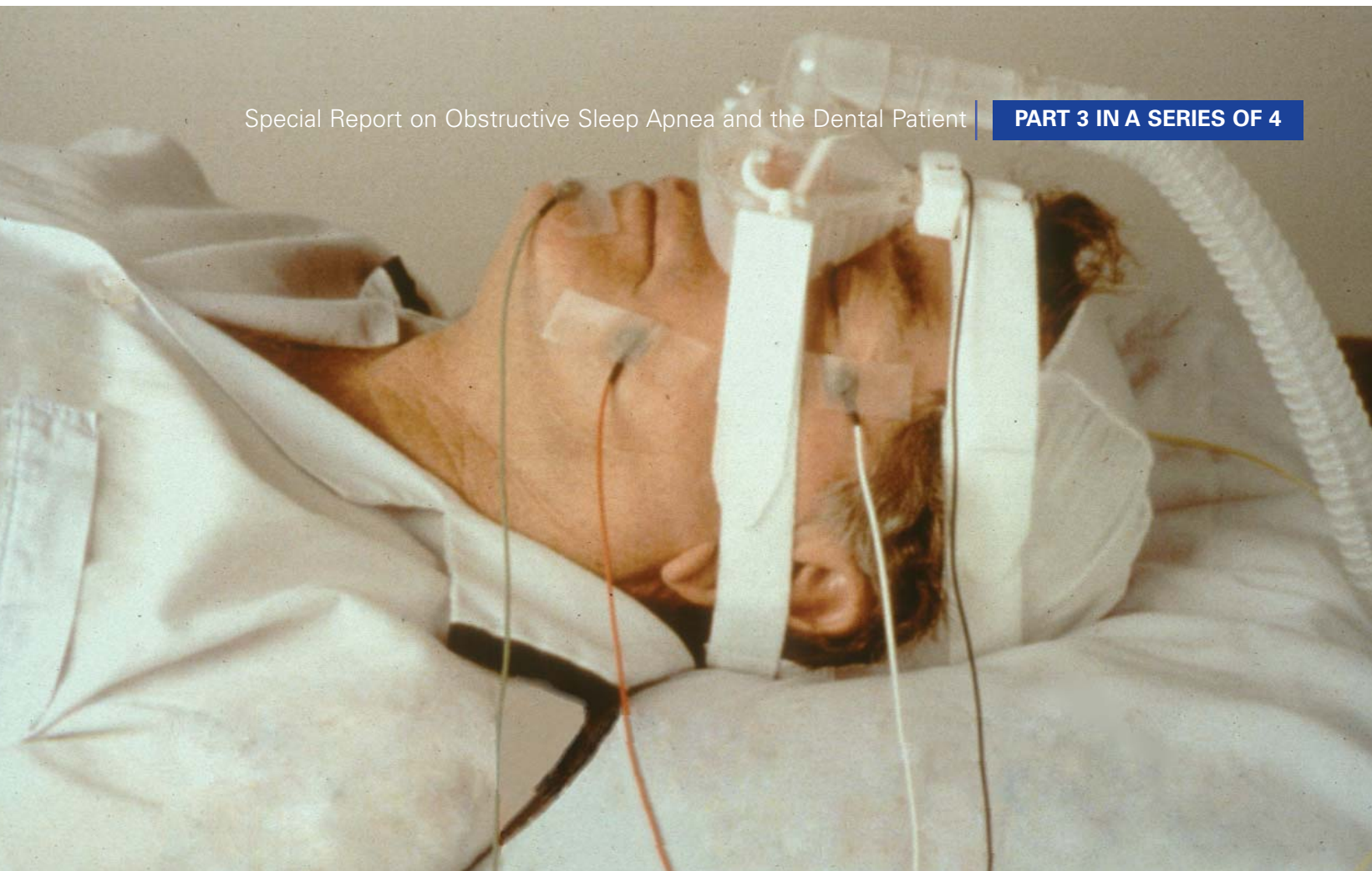


Figure 1. Example of a continuous positive airway pressure (CPAP) device during a titration polysomnogram. (Image courtesy of the American Academy of Dental Sleep Medicine.)

Therapeutic Options for Obstructive Sleep Apnea

Editors' Note

See the first and second articles in this Special Report on obstructive sleep apnea in the Spring 2008 issue of the JOURNAL OF THE MASSACHUSETTS DENTAL SOCIETY.

Obstructive sleep apnea (OSA) could be compared to a plumbing problem. When homeowners are faced with a clogged sink drain, television advertisements tell them to buy a can of compressed air to "blow the clog away." This is effectively how continuous positive airway pressure (CPAP) treats obstructive sleep apnea. Calling the "Roto-Rooter man" will bring a plumber who will excise the offending blockage with blades on the end of a snake. This is similar to an otolaryngologist who offers a number of

soft-tissue surgeries to help alleviate upper airway blockage at night. Dentists who use oral devices actually rely on the "pipe" being flexible and use devices that are effectively "pipe stretchers." Maxillofacial surgeons will use bony advancement of the lower face to alter the position of multiple muscle attachments and increase the absolute upper airway lumen. All medical treatments for OSA are mechanical therapy of a mechanical blockage; none of the present treatments actually cures OSA.

B. GAIL DEMKO, DMD

Dr. Demko is an expert advisor on sleep apnea to the Food and Drug Administration. She maintains a private practice in Auburndale.

CPAP is the most effective and widely accepted therapy for OSA. It was first introduced by Colin Sullivan, MD, in 1981 when he published an article presenting clinical data about a device that used a vacuum cleaner motor to inflate the upper airway of five patients with severe sleep apnea.¹ This was the first therapy offered, other than permanent tracheotomy.

Over the last 25 years, CPAP units have gone very high-tech. They have quiet turbine blowers with electronic controls that allow them to match the patient's breathing rate rather than forcing the patient to match a pace set by the machine. Humidifiers have been added to prevent nasal drying; masks come in hundreds of sizes, materials, and styles, all to increase the patient's comfort. For patients whose symptoms are alleviated by CPAP, these machines are seen as a godsend. (See Figure 1.)

Multiple studies have been done looking at the impact CPAP has on the physical parameters of patients with OSA. CPAP improves oxygenation, decreases blood pressure, improves cardiac parameters,² improves insulin sensitivity,³ minimizes daytime sleepiness, and allows severely affected patients to return to normal function. The success of CPAP in patients with mild OSA and upper airway resistance syndrome is much more controversial. Those with minor disease do not have a consistent improvement in excessive daytime sleepiness⁴ and may find that CPAP interferes with their sleep as much as the breathing events do; while they may no longer snore or have oxygen desaturations, they may actually feel more tired.

CPAP is not the panacea that physicians would like patients to believe, but it is the most consistent option now available. CPAP pressures can "back pressure" sinuses, eustachian tubes, and tear ducts, or inflate the esophagus, which can cause abdominal bloating. Retrognathic patients find that the straps used to stabilize the mask often retrude the mandible, increase the retrolingual obstruction, and require higher CPAP pressure to maintain airway patency. While 90 percent of patients can be returned to normal breathing with CPAP, many patients may not be able to tolerate the treatment.⁵ (See Figure 2.)



Figure 2. Use of a CPAP device with a chin strap minimizes mouth leaks. However, compliance may be an issue with some patients.

Behavioral changes—alterations in lifestyle that the patient can initiate without medical intervention—are the least effective of all treatment modalities; this may be related to patient compliance. It is the patient who must initiate and maintain the changes, often without significant support from medical providers. Weight loss, change in sleep position (for those who show a decided propensity for breathing events in a supine position), avoidance of alcohol, smoking cessation, routine bedtimes with adequate sleep time, no shift work, and no electronic devices in the bedroom (including a clock) are often hard for patients to adopt.⁶

Surgical Treatment

Surgical treatment of OSA encompasses three aspects. For patients who are morbidly obese and dealing with metabolic syndrome, gastric bypass or lap-banding



Figure 3. Throat form, post-UPPP surgery.

procedures have become common. The side effects can be considerable, and there are a certain proportion of patients who will redevelop OSA regardless of maintaining the postsurgical weight loss.⁷ Otolaryngologists have developed more than eight soft-tissue surgeries to address various sites of upper airway obstruction and symptom complaints of patients. The American Academy of Sleep Medicine recommends approximately half of these surgeries for the treatment of OSA, but accepts all of them for the treatment of snoring. The surgeries include removal of the uvula, the caudal aspect of the soft palate, as well as the tonsils. (See Figure 3.) The attachment of the genioglossus muscle can be advanced, the hyoid moved forward, or the base of the tongue resected.

The surgical definition of success has, in the past, been to reduce the number of breathing events by half and to bring the total number below 20 per hour. This means that the patient may still have moderate OSA. If surgical outcomes were based on the same criteria of clinical success as are those for CPAP (fewer than five breathing events per hour), the success rate of soft-tissue surgery would be approximately 13 percent.⁸ Various upper airway surgeries negatively impact future CPAP use due to an increased incidence of mouth leak. Maxillofacial surgeons now use variations on conventional maxillomandibular advancement (MMA). Correctly termed "telegnathic surgery," the patient no longer needs to have a skeletal abnormality to benefit from advancement of his or her lower face. This form of surgery is clinically successful in approximately 75 percent of the patients treated. The drawback to surgical treatment, as with others, is that effectiveness decreases with time⁹ and patients must be aware that, in years to come, they may have to face CPAP as an ultimate treatment.

For children with OSA, adenotonsillectomies are the recommended surgical approach, but it should be noted that this form of surgery is less effective in African American children and children who are obese.¹⁰ Rapid palatal expansion, nonextraction orthodontics, and functional appliance therapy may help prevent adult onset OSA in children who have malocclusions or a strong family history of OSA. (See Figures 4 and 5.)



Figure 4. A narrow palate constricts the tongue space and the floor of the mouth.



Figure 5. Photograph illustrating rapid palatal expansion.



Figure 6. A display of mandibular repositioning devices commonly used in the treatment of obstructive sleep apnea.

Mandibular Repositioning Devices

Dentists now join the ranks of surgeons and physicians in providing medical treatment for a medically recognized disease. The most common form of oral device is one that advances the mandible. All of the mandibular repositioning devices (MRDs) fulfill two criteria: they hold the mandible forward in relation to the maxilla, and they minimize vertical repositioning of the mandible. (See Figure 6.) The desired outcome is to give the body of the tongue more space to move out of the airway, to increase upper airway size, and to reduce compliance in the walls of the upper airway. Since the

genioglossus (gg) muscle is attached at the tubercles in the anterior aspect of the mandible, advancing the mandible will put traction on the gg and bodily move the tongue forward. The palatoglossus muscle, which makes up the anterior pillars of the soft palate and inserts into the lateral aspect of the tongue, may transfer tension to the soft palate and help decrease snoring.

Researchers have found that when an MRD is in place, the most significant alteration in airway size is in a lateral aspect behind the soft palate.¹¹ The most likely explanation appears to be the small connective tissue fibers that run from the internal aspect of the rami to

the lateral walls of the upper airway and pull laterally on the retropalatal upper airway walls as the mandible is advanced. In the published literature, alteration in vertical dimension of occlusion (VDO) does not appear to have significant impact on MRD success,¹² but those studies did not take into account the vertical overbite disparities or mandibular plane angle variations within the subject population.

The purpose of minimizing vertical repositioning of the mandible is to prevent triggering the anti-tongue biting reflex. At night, increased mandibular opening occurs as the level of sleep deepens. When the mandible begins to close, a reflex mechanism pulls the tongue posteriorly to prevent tongue biting and can increase airway narrowing. MRDs alter the topography of the upper airway and improve tongue space. They change the dynamic relationships between various anatomical structures, but research into the actual biomechanics behind this is in its infancy.

Of the more than 90 appliances available worldwide, more than 30 are accepted by the Food and Drug Administration (FDA) for the treatment of mild to moderate OSA. None of them is accepted for use in patients under the age of 18 due to the propensity for permanent mandibular advancement.

At present, all MRDs are retained by the dentition; some have used endosseous implants to anchor the devices, but implant-retained devices are not commercially available. An MRD can be a “monobloc” (nonadjustable), but the majority of MRDs allow the patient to alter the relationship between the jaws to minimize TMJ discomfort and maximize effectiveness.

A patient must have an adequate range of natural mandibular protrusive movement to be an acceptable candidate for MRD therapy. Measurement of protrusive range can be made with such devices as a George Gauge™ or a gothic arch tracer (GAT). In Sweden, researchers have used serial lateral cephalometric radiographs to determine extremes of mandibular movement. The average patient can move about 10 mm; those with condylar ankylosis may move less than 1 mm, while some may be able to move more than 21 mm. Any patient who has a mandibular protrusive range

of less than 6 mm is not expected to be successful with an MRD.

There is no perfect jaw position that can be generalized to a population, but research does show that efficacy of MRD therapy is “dose dependent” on advancement: For most patients, the more the mandible is advanced, the more effective the appliance will be. Published research states that 75 percent of an individual patient’s range of forward protrusion should be effective in treating that patient. It must be remembered that statistical analyses look at averages or means to help draw conclusions, but in an individual case, the patient may need to move as little as 50 percent or as much as 125 percent of his or her natural range to achieve normal breathing.

Each patient has a unique mandibular position that facilitates free nocturnal breathing; at present, the state of the art does not allow us to predict which position will be effective and each patient needs to titrate his or her mandible until the symptoms resolve. We can’t even predict which patients will be successful with MRD therapy. Large statistical analyses show that only 42 percent of patients who receive an MRD will be returned to normal breathing, while 52 percent can be brought below 10 breathing events per hour.¹³ Patients with severe OSA are less likely to be returned to normal breathing, while patients with minor sleep-disordered breathing are most effectively treated.

MRDs have been proven to be effective in controlling many of the sequelae of OSA. Studies have shown that not only is blood pressure reduced, but there is a reduction in natriuretic hormones, excessive daytime sleepiness (EDS), and automobile accidents.¹⁴⁻¹⁶

All MRDs are variations on orthodontic appliances, such as the Herbst. However, when treating OSA, the mandible is held forward with an appliance only at night because permanent repositioning of the mandible will eventually lead to soft-tissue relapse and a need to advance further the patient’s mandible for proper breathing.

Since the devices are tooth-borne, with resulting pressure on the teeth and alteration of the position of the condyle in the fossa, their use can produce side effects such as tooth movement and mobility, changes in interdental contacts,



Figure 7. Condyle with no MRD in place.

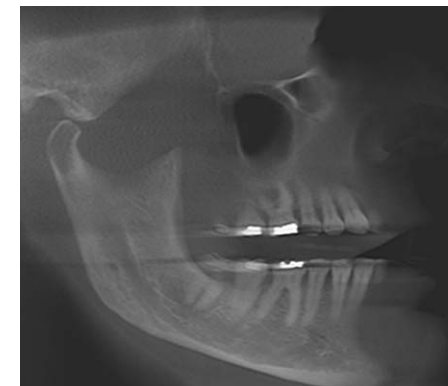


Figure 8. Condyle position with MRD in place.

and permanent repositioning of the mandible. (See Figures 7 and 8.)

Conclusion

Obstructive sleep apnea is a common medical disorder with far-reaching medical complications. Effective treatment requires a team approach among physicians, surgeons, dentists, and patients. No one therapeutic approach is guaranteed to be effective or acceptable to each patient. Lifestyle, severity of disease, treatment side effects, and patient personality all play a role in determining the appropriate treatment modality for the individual patient. Dentists are a part of the medical team, and thus it is our responsibility to offer our patients improved health and quality of life. ■

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The Treatment of Obstructive Sleep Apnea with Oral Devices



Figure 1. Hybrid therapy using a monoblock oral device to retain a Mirage Swift™ nasal interface.

Oral device therapy for the treatment of obstructive sleep apnea (OSA) is one of three options for treating this common medical disease, and the only method fully within the purview of dentistry. In unselected patients, “all comers treated” oral devices are 42 percent effective in returning patients to normal breathing, defined as fewer than five breathing events per hour and control of all symptoms.¹ Although clinically less effective than continuous positive airway pressure (CPAP) treatment, which is known to return 90 percent of patients to normal breathing, the compliance rate for oral devices is more than double that with CPAP.

Definitions of treatment compliance vary. Physicians define compliance with CPAP to include any patient who uses the device four hours per night for five nights out of seven. By this standard, nearly 70 percent of patients are CPAP compliant.² However, in the literature of oral device therapy for OSA, compliance is defined by use of the oral device seven hours per night (or complete sleep time) for seven nights per week. Using dental therapy criteria, patients receiving an oral device are 70 percent compliant at the end of a year and CPAP users are 30 percent compliant.

Of the more than 30 oral devices accepted by the Food and Drug Administration (FDA) for the treatment of OSA, all but a few fall under the category of mandibular advancement devices (MADs). The FDA accepts MADs for the treatment of

mild and moderate obstructive sleep apnea in patients over the age of 18.³ The American Academy of Sleep Medicine (AASM) guidelines allow mandibular repositioning device (MRD) use as a first choice of therapy in patients with mild or moderate OSA and in patients with severe sleep apnea if the patient is unable to use CPAP, due to claustrophobia, chronic nasal or sinus infections, or other issues.⁴ Treatment of OSA with oral devices is recognized by medical providers and the FDA alike.

It is not known exactly how MRDs effectively treat obstructive sleep apnea, and research into the changes in airway dynamics continues. It is known that advancement of the mandible advances the genial tubercles with alteration in the position of the genioglossus and suprahyoid muscles.

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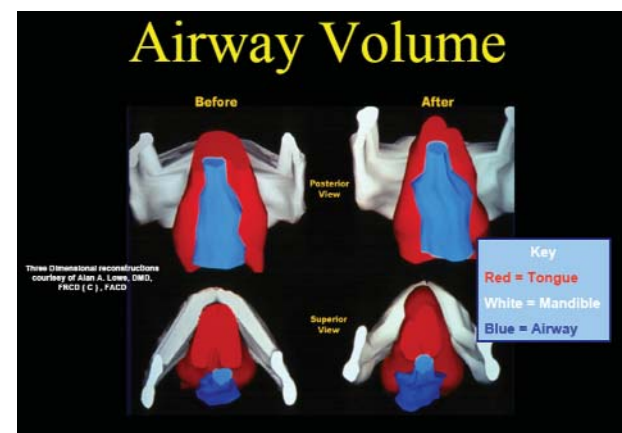


Figure 2. The change in airway shape and cross section with placement of a Klearway mandibular advancement device. (Image courtesy of Alan Lowe, DMD, PhD.)

Repositioning of the tongue affects the action of the palatoglossus muscle, which is thought to increase tension on the soft palate. Work by both Alan Lowe, DMD, PhD, of Vancouver, Canada,⁵ and Richard Schwab, MD, of Pennsylvania, has shown that in awake patients, mandibular advancement increases the width of the upper airway (UA) retropalately much more than it does in an anteroposterior dimension anywhere in the UA.⁶ Research by anesthesiologists studying the ease of intubation of anesthetized patients using manual advancement of the mandible also supports Lowe’s and Schwab’s findings.⁷

There is evidence that MRDs are more effective retropalately because many patients with OSA may also have compromised UAs during the day and compensate by assuming a forward head position (FHP) over these daytime hours. FHP opens the UA retroglossally and hypoglossally due to the physics of muscle position and pivoting of the head at the base of the skull; this compensation is lost at sleep onset.⁸ Additional theories of action include reduced compliance of the UA walls and an increase in tongue space, but the exact mechanisms are unknown.

MRD Guidelines

All commercially available MRDs are retained by the dentition. Therefore, guidelines of the American Academy of Dental Sleep Medicine (AASDM) suggest a patient have at least eight periodontally sound, well-restored teeth per arch to anchor the device and spread out deleterious forces. When a device is placed, there is an increase in vertical dimension of occlusion (VDO) dictated by anterior (vertical) overbite and the design of the device. VDO can be increased from 4 mm to 20 mm. Though published studies state that alterations of VDO do not statistically alter the effectiveness of an oral device,⁹ clinically there are some patients in whom the alterations of VDO may be more important than actual mandibular advancement.

Problems arise with a fully edentulous patient. Though there is one device that is retained on the mandibular teeth only, all the pressure of advancement is directed against the premaxilla. If the

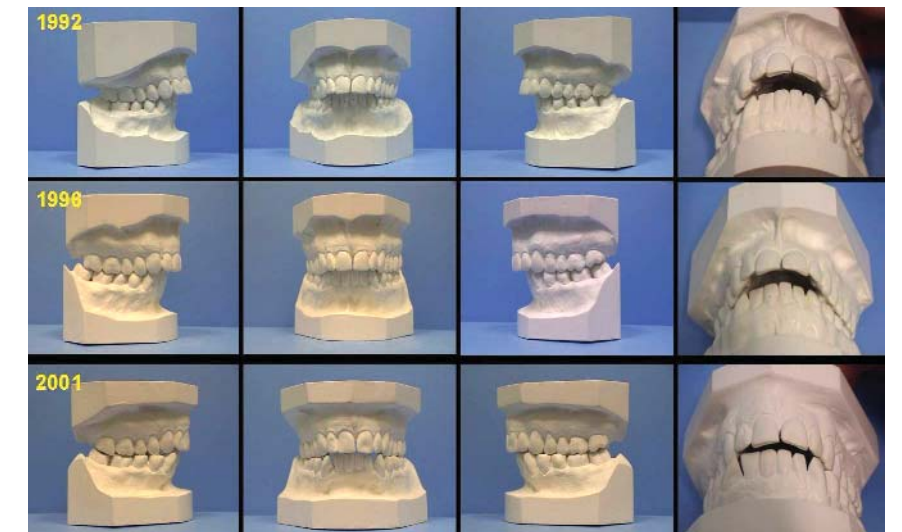


Figure 3. Alteration in tooth position over nine years of oral device use. (Image courtesy of Alan Lowe, DMD, PhD.)

patient wears a complete maxillary denture with this device, there is a significant chance of developing denture sores in the premaxilla. If the patient does not wear a complete maxillary denture at night, there is a decrease in VDO, which is expected to negatively impact tongue space and device efficacy.¹⁰ Some practitioners have altered existing commercially available devices to allow implant retention using Hader™ bars and semi-precision anchors, but the overall bulk of these devices makes oral placement difficult. A better solution might be restoration of the edentulous ridge with an Implant Borne Bridge™ (IBB) or fixed bridge and fabrication of the conventional MRD over the restoration.

With the present research data, it is impossible to predict which patient will respond effectively to an MRD. Some papers have conflicting data while other findings remain unsubstantiated by second publications. Various researchers have found that patients who respond better to MRD therapy are of normal weight, female, retrognathic, and under the age of 65; have a smaller UA on cephalometric radiograph;¹¹ and have a preponderance of breathing events in the supine position.¹²

When looking at physical attributes that correlate with MRD failure, the traits mentioned include a hypoplastic maxilla; a neck circumference greater than 17 inches in women and greater than 20 inches in men; a steep mandibular angle; chronic nasal congestion; and a limited range of mandibular protrusive

movement (<6 mm). At present, patients who receive an MRD are instructed to advance the mandibular portion of their device at a rate determined by the dentist. Most often, the patient will advance his mandible until there is symptomatic relief not overshadowed by unwanted side effects. At that point the patient is referred back to the sleep physician for follow-up testing to determine empirical efficacy using polysomnography. It is becoming more common for dentists to use portable monitoring (e.g., oximetry) to help patients reach the goal of normal nocturnal breathing prior to empirical testing. Being aware of which patients may have a lower chance of success allows the practitioner to limit that patient’s expectations.

Since MRDs are known to effectively treat OSA 42 percent of the time,¹ that means 58 percent of patients maintain pathologic nocturnal breathing. No studies definitively show that mild OSA (>5 to <15 breathing events per hour) has a negative impact on long-term health if the symptom of excessive daytime sleepiness (EDS) is controlled, so many physicians will accept a final apnea-hypopnea index (AHI) of <15. While this may include more than 60 percent of patients, residual disease will require many patients to move on to a different form of therapy.

Hybrid Therapy

Another use of oral devices is to improve acceptance of CPAP by using the two modalities in combination. This is



Figure 4. Formation of an anterior open bite after five years using a modified Herbst MRD.



Figure 5. Patient who has been wearing a Klearway MRD for 10 years. No alteration in tooth or jaw position.

known as hybrid therapy. Patients who are unable to use CPAP because of an air leak out of the oral cavity may choose to use an oral device that keeps the mouth closed and minimizes mouth leaks. If high pressures—a CPAP pressure of 10 cm of water is comparable to a 40 mph wind—cause “back pressuring” of the sinuses, eustachian tubes, or esophagus with concomitant stomach bloating, an MRD can be used to move the tongue

base forward and open the UA enough to allow for a decrease in overall CPAP pressures.

Oral devices have also been used to hold nasal pillows and nasal masks so a patient intolerant of tight straps can comfortably use the more effective CPAP. One oral device, OPAP™, is designed to deliver CPAP intraorally through a palatal conduit; this device is well tolerated by patients with chronic

nasal obstruction. Other patients use CPAP at home, but the more portable oral device when traveling. Oral devices can be used to potentiate all other modalities of OSA therapy, including surgery.¹³

Side effects are part and parcel of all medical therapy. Surgical intervention encompasses a whole host of morbidity, including mortality. Drug intervention frequently has a side effect rate of greater than 10 percent and may be severe enough in any one patient to require cessation of that medication. Dentists are relatively immune to this mind-set; we expect a restoration to last greater than 10 years, our full-coverage restorations to have a 50 µ cement line, and endodontic therapy to be effective 99 percent of the time.

Obstructive sleep apnea is a medical disease, and MRDs carry medical-level side effects. It is often difficult for a dental practitioner new to treating OSA with MRDs to be unconcerned when published data shows side effects that affect up to 85 percent of long-term patients.¹⁴ Side effects of MRD therapy must be balanced by its ability to control a disease that can cause myocardial infarction, cerebrovascular accident, or heart failure. When a patient walks into your office with a smile on his or her face, as well as bright eyes, and says, “Thank you, Doctor, you have given me back my life,” it makes the day-to-day impact of minor side effects much less important.

Long-Term Side Effects

All oral devices used to restrict interarch movements, retained by the dentition, place orthodontic forces on the dental structures. Mandibular advancement moves the condyle out of the glenoid fossa and may move it completely forward of the eminence.¹⁵ VDO is always altered. All side effects appear to stem from these actions.

Common short-term, easily controlled side effects may include minor TMJ discomfort, excessive salivation, dry mouth, minor tooth discomfort, allergic reaction to device components, and altered morning occlusion. Adjustment of the device, changes in jaw position, and morning exercises may be all that is necessary to alleviate patient complaints.

It is the long-term changes that necessitate a well-written informed consent to ensure the patient is well aware of the potential problems related to oral device therapy. Long-term tooth movement may include lingualization of maxillary incisors, labialization of mandibular incisors, and distalization of maxillary molars while the mandibular molars move forward.¹⁶ Molars may extrude,¹⁷ but creation of posterior open bites is more common than anterior open bites. Correction of long-term side effects may require orthodontic therapy, surgical intervention, and a return to CPAP use.

As with treatment efficacy, research data is unclear as to which patients are more likely to suffer significant side effects. While patients with prior orthodontic therapy are more likely to have long-term tooth movement, tooth movement is virtually guaranteed in patients who have undergone adult orthodontic therapy.

There is some question that the design of the device and how it transmits forces from one arch to the other may impact the incidence of side effects. The material used to fabricate the device may also affect the frequency and severity of tooth movement. Patients with a steep anterior (vertical) overbite appear less likely to develop unwanted tooth movement.¹⁸ Side effects are said to be “dose dependent” on overall mandibular advancement,¹⁹ but inadequate advancement is comparable to decreasing the dose of the medication to a level potentially ineffective to control the disease for which the medication was prescribed.

Insurance Matters

A dentist must be aware that OSA is a medical disease and only a physician can diagnose this entity. Treatment with oral devices is considered medical treatment and, as such, is covered by the patient’s medical insurance, not his or her dental insurance. Most major providers will cover the cost of oral device therapy for patients, and even Medicare has guidelines in place for oral device therapy.

In-network providers receive more compensation from the insurance company, but an out-of-network provider can balance bill for the entire fee. However, being an in-network dental provider does not make a dentist an in-

network medical provider, so each dentist must check with the medical insurers in his or her area. Some insurance companies will not contract with general dentists as medical providers, while others will. Another call a dentist needs to make is to his or her malpractice carrier. Some carriers provide the \$1 million to \$3 million coverage required by medical insurers; others will not cover suits related to the treatment of OSA.

Conclusion

This article raises many concerns about dental treatment of obstructive sleep apnea, and may give a few dentists pause, but OSA is a potentially life-threatening disease that is often controlled with the use of an easily fabricated oral device. Physicians underprescribe oral devices because they cannot find providers in their local area to work as part of their medical team.

The American Academy of Dental Sleep Medicine, the only organization recognized by the American Dental Association for dentists interested in treating patients with OSA, has treatment protocol and guidelines in place that are easily accessed by its members.

It may appear daunting to add this area of treatment to your dental practice, but the positive rewards of improving a patient’s overall health and quality of life more than outweigh the petty bureaucratic annoyances. ■

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Atypical Orthodontic Treatment of Severe Class II Malocclusions in the Adult

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Figures 1a and 1b. Maxillary first premolar extraction (1a) versus second premolar extraction (1b). (Image printed with permission from the *Journal of Clinical Orthodontics*.)

The Class II malocclusion in the nongrowing patient can be treated in one of three ways: nonextraction with distalization mechanics; extraction; or a combination of orthodontics and orthognathic surgery.

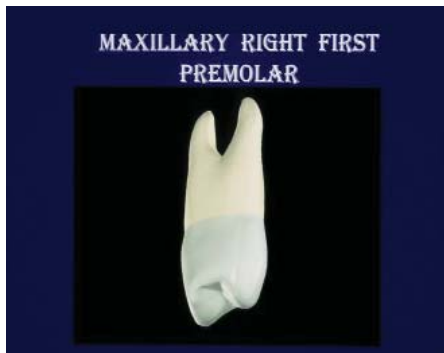
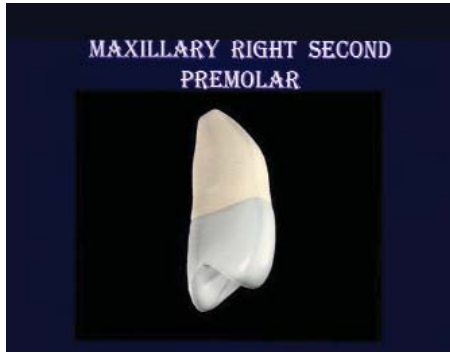
The nonextraction/distalization mechanics method unnecessarily prolongs treatment time and results in redundant tooth movements, which may lead to irreversible dental root damage and possible adverse periodontal sequelae.^{1,2} Moreover, distalization of maxillary posterior teeth to gain anterior space can adversely affect the vertical, sagittal, and transverse relationship of the dental arches. The orthodontic/orthognathic surgical approach to treating these malocclusions is indicated in only the most severe skeletal dysplasia patients. Dentoalveolar camouflaging of milder Class II skeletal relationships is possible in most instances without surgery.

Extraction treatment may involve removal of four premolars or, when the mandibular dental arch can be treated successfully without extractions, the removal of only two maxillary premolars accepting a Class II molar relationship. Typically, the first premolars are extracted to resolve anterior malalignment and/or an overjet.

However, after experiencing the unacceptable problems with the first premolar extraction method discussed in this clinical perspective, the author prefers the atypical treatment modality of extracting maxillary second premolars in these patients.³

With the patients discussed in this article, maxillary second premolars were extracted for orthodontic purposes. The decision to extract the second premolar is based on several important factors. First, this avoids the unsightly extraction space distal to the canines (see Figure 1a). Second, the first premolar is a physically stronger dental unit with its longer bifurcated roots⁴ (see Figures 2a and 2b). Third, the clinical crown of the first premolar is generally longer than that of the second premolar and is therefore a better esthetic dental unit adjacent to the canine (see Figure 3). Fourth, the second premolar is closer in mesiodistal width to the first molar mesiobuccal cusp than the first premolar. Therefore, residual posttreatment space distal to the canine is less likely when the second premolar is removed. Lastly, the second premolar extraction is a simpler procedure than the more difficult first premolar extraction. Moreover, the buccal plate is often damaged when the first premolar is extracted. The canines protect the periodontal health of the first premolar during mandibular excursions (canine guidance).

Continued on p.28



Figures 2a and 2b. Contrast of physical size and shape of maxillary first versus second premolars.



Figure 3. Note the difference in clinical crown heights between the first and second premolars.



Figures 4a–4e. Patient had a Class II, division 1 malocclusion with bimaxillary malalignment, a moderate overjet, and a moderately deep overbite. Maxillary second premolars were extracted, followed by 16 months of fixed-appliance treatment with the Amalgamated Technique (AT).

Some periodontists prefer that the first premolars be extracted in these cases despite the reasons cited for second premolar extractions in this clinical perspective. Their primary concern is the potential vulnerability to periodontal breakdown of the first premolars due to their bifurcated roots' proximity to the alveolar bone crest. While I fully appreciate this point of view, I have not observed this as a problem after following these cases in my practice for decades in otherwise periodontally uncompromised dentitions.

The patients shown in this paper all had manageable nonextraction mandibular dental arches. The four treated patients included in this article represent diverse and complex orthodontic problems. All patients were treated with the Amalgamated Technique (AT), which is a light-wire Edgewise biomechanically sound technique introduced to the orthodontic community in 1976 by the author.⁵⁻⁷

Retention of the corrected malocclusions was attained with nighttime removable appliance wear for a year or longer in some cases. ■

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Figures 5a-5e. Patient had a severe Class II, division 1 malocclusion with crowding, a deep overbite, and poor periodontal health. After extraction of maxillary second premolars, he was treated with the Amalgamated Technique for 19 months.



Figures 7a-7d. A 40-year-old female with a Class II, division 1 anterior open-bite malocclusion was treated in 17 months with the Amalgamated Technique after maxillary second premolar extractions.

Figures 6a-6d. This 48-year-old Class II, division 2 patient was treated with the Amalgamated Technique for 14 months after extraction of maxillary second premolars. He had an impinging overbite and severe maxillary anterior crowding with mild mandibular incisor malalignment. His mandibular right first molar crown was later redone and elevated into occlusion.



Detecting Computer-Enhanced Dentistry

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Abstract

Recent developments in digital imaging in dentistry and easy-to-use editing software present many occasions for altering or fraudulently changing digital images of products, patients, their dental conditions, treatments, and radiographs. Though seemingly impossible to detect when carefully done, there are numerous clues of digital editing that can be detected by the alert practitioner.

Introduction

In the last few years, more dentists and publications have increasingly switched from standard film photography and radiography to computer-generated digital techniques.^{1,4} Digital photography (DP) and digital radiography (DR) are produced by an electronic sensor linked to a computer, which generates and manipulates the virtual image either by light or X-ray exposure. Sophisticated editing software can magnify, shade, duplicate, and infinitely change the image.^{1,4}

Image modification is not new. Since the 1870s, images on photographic film have been manipulated to show desired, artificial changes.^{5,6} The creation of “spirit images,” burning, dodging, airbrushing, cropping, reverse printing, and adding new subjects (e.g., a filled endodontic canal or whiter teeth) on an existing photo image has always been possible with photographic film. The famous disappearances of “vanishing commissars” in photos from Stalinist Russia, fantasy motion pictures (e.g., *Titanic* and the *Harry Potter* movie series), TV shows, and the “retouched” photos of the many tabloid newspapers are prime examples.^{4,6}

Until recently, these changes were technologically demanding and expensive to do.⁶ Often they were done poorly, showing obvious signs of manipulation. However, with the advent of DP, DR, and inexpensive, easy-to-use editing software, quality changes are as simple and inexpensive to achieve as pressing a computer key or pointing a mouse.^{4,6} Most photographers and publications will use editing software to “clean up” images:

from cropping and eliminating “red eye” in portraits to repositioning the Egyptian pyramids (*National Geographic*) in order to fit the page better.⁵ Many dentists and dental publications do the same.

Today, a digital photo or radiograph may show a virtual (false) reality that is considerably different than actual reality. Therefore, there is a need for the practitioner to know how to detect virtual (computer-generated) images and distinguish them from reality.⁷ The quality of treatment and research, the descriptions of commercial products, and the desire for honest cosmetic predictions for our patients depend on these skills.

What Digital Photography Can Do

Popular software such as Photoshop, Paint Shop Pro, Microsoft Digital Image Suite, iPhoto, Picasa 2, and hundreds of bundled digital camera photo programs have found their way into many offices and homes.⁶ If one buys a digital camera, it most likely comes with a functional editing program that allows the manipulation of photos. Using these programs, one can cut, paste, erase, combine, overlay, reshade, and otherwise retouch any photo taken. One can enhance a patient’s photo showing better shaped, positioned, or whiter teeth, and use this as a marketing tool or prognostic inducement for additional treatment.^{1,4,7}

Alternately, this means one can also create decay, cracks, and abscesses on DR images of normal teeth in order to mislead other professionals, third-party payers, and the courts.^{1,4,7,8}

Digital photography/radiography software allows the operator to change the presence, shade, color saturation, brightness, and contrast of bone or tooth structure in a digital image.^{4,6} Restorations, teeth, and pathology can be virtually created, removed, or modified in the digital image. In some cases, this activity may approach the level of fraud where images of restorations or treatments (e.g., endodontics or extractions) can be created by computer and submitted as evidence in trials or sent to third-party payers as proof of actual diseased conditions or previously billed treatments.^{1,4,7}

Virtual Examples

Figures 1 through 6 are digital images of actual radiographs. Figures 1F through 6F are corresponding digital images that have been edited to show pathologic changes, healing, and

restorations that have not actually occurred. They are computer simulations.

Figure 1F shows computer enhancements to Figure 1 where a tooth has been virtually extracted, the bone of the extraction socket partially healed, and two virtual restorations placed. Note the root fragment left in Figure 1F's extraction.

Figure 2F shows a reedited Figure 2 where virtual endodontic treatment was performed, the periapical radiolucency partially healed (smaller size), and four restorations placed. Nothing was really done except for computer simulations.

Figure 3 shows distal decay in the upper second premolar and no other decay. Figure 3F demonstrates a virtual crown that "restored" distal caries in the upper second premolar; also note the virtual decay on the upper second (distal) and third (mesial) molars and mesial decay on the lower second molar.

Figure 4F presents virtual treatment of Figure 4 where a root appears to have been extracted, partial healing of the socket accomplished, and a three-unit fixed bridge made—all within a few minutes of computer work.

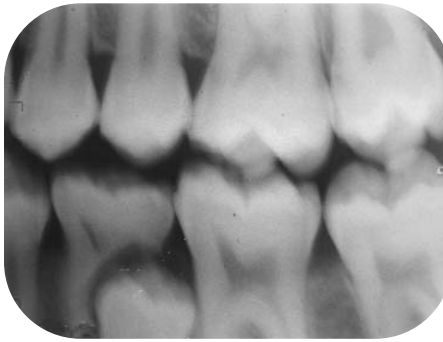
Figure 5F shows the addition of an extra endodontic filling and crown on the first bicuspid of the perfectly natural tooth in Figure 5.

Figure 6F shows whiter teeth than what actually appears in Figure 6. This can be used as proof of the power of "Virtual Product X," which bleached the patient's teeth in a few seconds, except the active ingredient came from the computer.

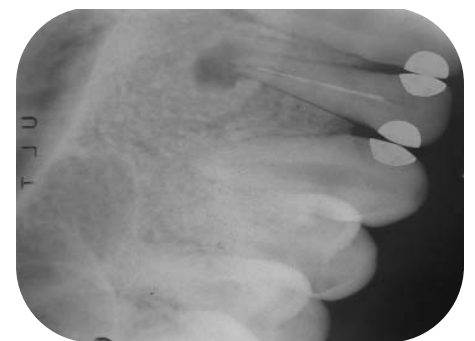
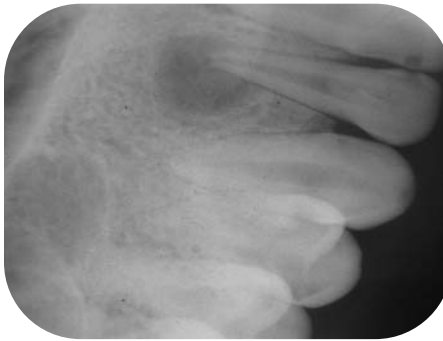
How to Detect Computer-Enhanced Images

Increasingly, sophisticated photos of dental products and techniques are often appearing in dental literature in the form of advertisements or research treatment results. Many of these images are computer-generated and retouched. The discriminating practitioner must be able to identify the virtual from the real so that he or she may view the material presented on a sound, accurate scientific, rather than virtual, basis. There are a number of classic techniques one can use to detect computer enhancements in digitally produced photos and radiographs.

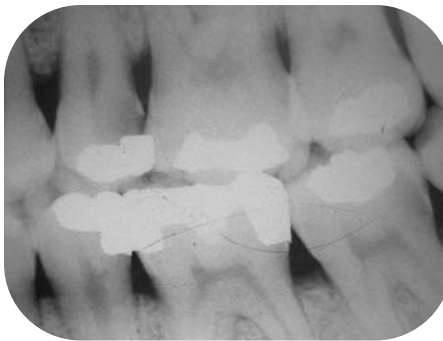
- If it looks too good to be true, it probably is. Wild claims (supported by impressive photos) that defy your own experience can indicate potential com-



Figures 1 and 1F. Computer-generated extraction of deciduous tooth and creation of two restorations.



Figures 2 and 2F. Virtual endodontics, periapical healing, and four restorations.



Figures 3 and 3F. Computer-created crown and three carious lesions (molars).



Figures 4 and 4F. Virtual removal of root, bone healing, and creation of a three-unit fixed bridge.

puter editing. Perfect margins, shading, alveolar bone regrowth, and other signs of perfection should raise questions. Whether it is seen in a lecture on clinical dentistry or in a magazine or journal touting whitening, etc., one must be cautious. In the real world, nothing is perfect. Any photo that becomes suspect.⁵⁻⁸

- Computers are made to make straight lines and perfect angles. This seldom occurs in real life, and is a dead giveaway for deception. The straight edges and perfect angle of the virtual molar mesial occlusal restoration in Figure 1F is a very good example. Compare the irregular shape of real restorations in Figure 3 with the



Figures 5 and 5F. Computer-generated endodontics and crown on first premolar.



Figures 6 and 6F. Virtual tooth whitening.

straight, even artifacts in Figure 1F. The four virtual restorations in Figure 2F are another example. They are too perfectly rounded and of similar size and shape—a rarity in real life. A close examination of the margin of the virtual crown in Figure 3F presents a jagged border. This is an unrealistic attempt to eliminate a straight line, and thus detection that the image has been modified.^{2,5,6}

- Many digitally enhanced DR restorations appear as one solid color. Most natural restorations will show various degrees of radiopaqueness (density), as the restoration becomes thinner or thicker when placed on or in a real tooth. Actual restorations are seldom all one color or shade. Compare the real crown in Figure 5 or the restorations in Figure 3 to the restoration images of Figures 1F, 2F, and 3F. There are subtle differences in the real restoration's peripheral density.
- Look for “Frankenstein” images where, in many photos, the head of a subject appears to be stitched onto the body or a virtual tooth is inserted into a jaw. Changes in shading, angles, and seams can identify this kind of manipulation. Relative uniform lighting requires that shadows appear in the same direction and on all areas of the photo. If they do not, then editing should be suspect. Look at the reflections of light on the skin of the patient in Figure 6 as compared to virtual

Figure 6F. In Figure 6F, there are more highlights on the skin around the lips, indicating that the shade of the entire photo was lightened in order to make the teeth appear whiter.¹⁻⁸

- Look for imperfections in geometry and whether the vanishing point is “off.” Check if the quality of the image is the same throughout the photo. If it is not, then something may have been added. Look for reoccurring patterns and objects, as well as discontinuities in the background. A lazy editor may use standard shapes to fake restorations rather than spend the time to draw each restoration individually. Figure 2F shows virtual restorations of similar size and perfect shape. These were digitally enhanced.^{5,6}
- Often, enhancements to images can become apparent if you use “false color image” editing. Radically changing the contrast and brightness can also be tell-tale signs. Using your computer to radically change the colors (false coloring) of the suspected photo will serve to identify otherwise subtle changes. This process can be done in just a few seconds with most photo editing software.⁵⁻⁸
- Look for artifacts of the editing process. These may include tracks, brush marks, cavities, and unnatural compression. Rough texture transitions and uneven pixilation (the small dots that make up the image) across the image is strong evidence of editing.⁶

- Experienced image editors can detect “metadata,” short digital fingerprints formed on every digital image. In addition to storing information on the exact date of creation and the modification of a file, metadata can link the photo to the camera used, ownership (e.g., “watermarking”), and a variety of manipulations that may have been used to modify the raw image. Unfortunately, an editor bent on deception can remove this data and thus play an infinite cat-and-mouse game of detecting and hiding or scrubbing evidence of image manipulation. Unless you wish to spend considerable sums of time and money for this service, this level of detective work is seldom practical in dentistry.^{5,6,8}
- Look at the size (megabytes) of the image file. Enhanced images will have a considerably larger file size than those that have no changes.

Conclusion

Because digital imaging has become so popular in dentistry, images of photos and radiographs may be edited to show different conditions than what is seen in reality. Photos can be enhanced to show whiter and straighter teeth, smoother skin, or a well-blended margin on a crown. Digital radiographs can be changed to show additional pathology or treatment. There are numerous signs of this manipulation, which an informed practitioner can detect. ■

Acknowledgment

The authors wish to thank Andent, Inc., for permission to publish the photos in this article.

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144th MDS House of Delegates Annual Session

May 16, 2008 • Renaissance Boston Waterfront Hotel

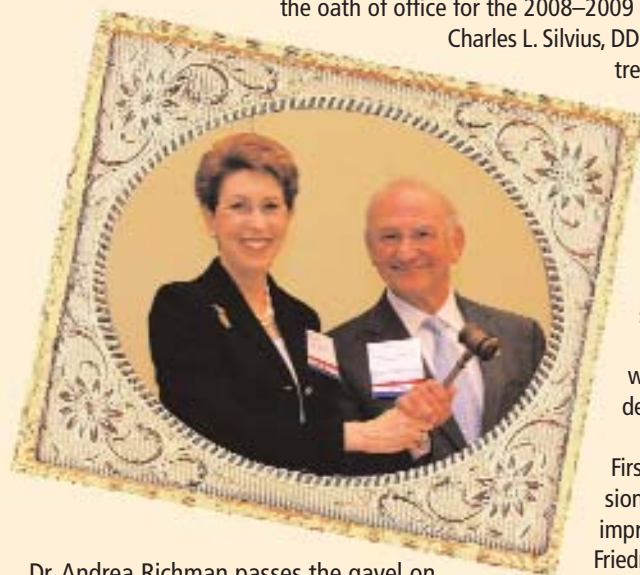
The 144th Massachusetts Dental Society House of Delegates Annual Session was convened on May 16, 2008, at the Renaissance Hotel in Boston, with Speaker of the House Thomas P. Torrisi, DDS, presiding over his first House of Delegates. Milton A. Glicksman, DMD, was inducted as MDS president, succeeding Andrea Richman, DMD, who was the first woman president in MDS history. Other officers elected and taking the oath of office for the 2008–2009 term were: David S. Samuels, DMD, president-elect; John P. Fisher, DDS, vice president; Charles L. Silvius, DDS, secretary; Anthony N. Giamberardino, DMD, assistant secretary; Charles A. Gagne, DDS, treasurer; and David A. Schmid, DDS, assistant treasurer. This Annual Session also saw the addition of four new Trustees: James Jervinis, DMD, for the North Shore District; June Warren Lee, DDS, for the South Shore District; Stephen Shea, DDS, for the Wachusett District; and Edward Swiderski, DDS, for the Worcester District. Additionally, four new Guest Board Members were elected: Cherie C. Bishop, DMD; Elissa Heard, DMD; Amelia Grabe Lane, DMD; and Scott Lightfoot, DDS, MS. (For more information on the Annual Session, including Dr. Glicksman's presidential address and a full list of resolutions, please see the July-August MDS News or visit the MDS News section at www.massdental.org.)

The 148 delegates in attendance approved five resolutions, including one to waive the dues for the Allied Dental Health Professional membership category for all dental auxiliaries who are employed by current MDS member dentists.

The House of Delegates also heard several reports, including a report from ADA First District Trustee and MDS Past President Robert A. Faiella, DMD, and a "mega" discussion on the efforts by the Council on Public Affairs (CPA) to construct the Society's vision to improve oral health care in Massachusetts over the next five years. CPA Chair Paula K. Friedman, DDS, along with CPA members, led a discussion on topics to be included in the document and solicited comments and suggestions from the delegates. The delegates expressed a desire to continue with reform measures and funding increases to MassHealth and elevate community water fluoridation as a priority. This vision, which the MDS expects to release in the fall, is intended to create a framework for public policy discussions regarding oral health care in the Commonwealth with state officials in the legislative and regulatory arenas.

Lundy Bancroft, a nationally known author, speaker, and activist on domestic violence and child abuse, was honored with the 2008 Allard Award, which the Council on Access, Prevention, and Interprofessional Relations (CAPIR) bestows on an individual who heightens awareness of abuse and neglect and of domestic violence. And as in previous Annual Sessions, 50-year members were honored with an award ceremony at the luncheon.

Alan S. Resnek, DDS; Jaroslaw W. Rozankowsky, DDS; Samuel Rubin, DDS; Seymour Schiff, DDS; George M. Silva, DMD; Albert J. Simkins Jr., DDS; John V. Smallcomb, DDS; Preston L. Smith, DDS; Cyril S. Sokale, DDS; J. Henry Stempien, DMD; Paul F. Thomas, DMD; Robert J. Thomas, DDS; Samuel J. Thomas, DDS; Arthur A. Weiner, DMD.



Dr. Andrea Richman passes the gavel on to MDS President Dr. Milton Glicksman.



50-Year Members

Joseph M. Arcidi, DDS
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Joseph F. Beck, DMD
Anthony J. Benison, DMD
Richard E. Brown, DMD
A. William Buckley Jr., DMD
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Alan S. Resnek, DDS
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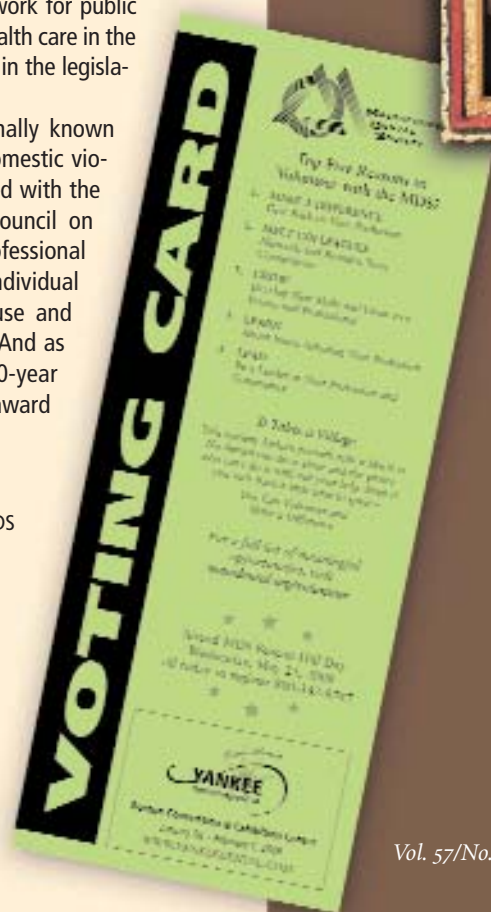
2008–2009 MDS Officers. Back row (left to right): Drs. Thomas Torrisi, Charles Silvius, Anthony Giamberardino, Charles Gagne, and David Schmid. Front row (left to right): Drs. John Fisher, Milton Glicksman, Andrea Richman, and David Samuels.



Dr. Paula Friedman speaking about the MDS's efforts to draft the Society's vision to improve health care in the state over the next five years.



Delegates get ready to take part in voting procedures.



MDS Past Presidents gathered for the annual Past Presidents Breakfast, held before Annual Session.

A Clinico-Pathologic Correlation

AMIR NAIMI, DDS

MARIA. B. PAPAGEORGE, DMD, MS

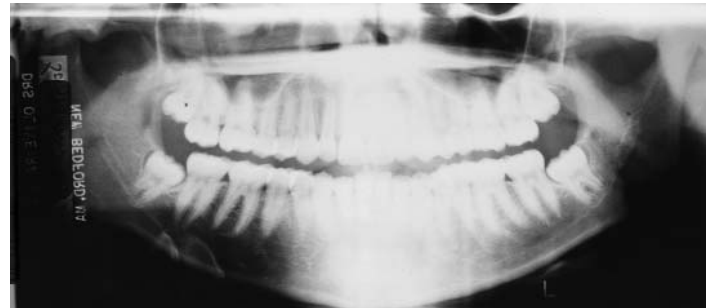
Dr. Naimi is chief resident and Dr. Papageorge is professor and chair of the oral and maxillofacial surgery department at Tufts University School of Dental Medicine.

Case Presentation

In April 2007, an otherwise healthy 25-year-old female was referred to our department for management of a recently diagnosed mucoepidermoid carcinoma involving the right retromolar pad. She had undergone removal of her impacted third molars in 2001 by the referring clinician. Following third molar surgery, she required local debridement of both right and left lower extraction sites for persistent symptoms that were thought to be related to bone spicules. Following the debridement procedures, she ultimately healed and was found to be asymptomatic for a period of a few years. She then returned to the referring surgeon for evaluation of a slow-growing "bubble" of a few weeks' duration, which she noticed in the right retromolar area. After evaluation of the site, the surgeon performed an incisional biopsy. Histopathologic evaluation of this biopsy revealed a diagnosis of low-grade mucoepidermoid carcinoma.

Upon presentation to our facility, the patient denied any symptoms related to the lesion, with the exception of the minor discomfort that she associated with the biopsy. On clinical examination she appeared well developed and free of any apparent distress. There was no evidence of cutaneous lesions or swelling in the head and neck region. Her opening and mandibular range of motion were within normal limits and pain-free. A raised red macule measuring approximately 1.5 cm x 1 cm was noted in the right retromolar area extending toward the lingual aspect of the mandible. There appeared to be no bony expansion in the area, nor was there any evidence of mucosal breakdown within the lesion. No other lesions were noted within the oral cavity, and the dentition appeared sound and uninvolved. Palpation of cervical lymph nodes levels I through VI did not reveal any positive findings, nor was there any evidence of motor or sensory deficits.

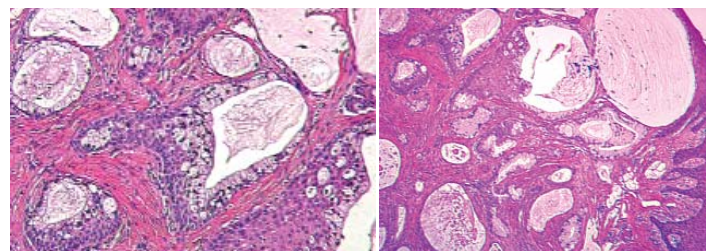
A panoramic radiograph taken at the time of consultation did not reveal any osseous changes in the area of interest (see Figures 1a and 1b). The patient subsequently underwent CT scan imaging to evaluate bony involvement and cervical lymph



Figures 1a and 1b. Panoramic radiographs taken before extractions (1a) and at the time of consultation (1b).

node metastasis (see Figures 3 and 4). This imaging did not indicate spread of the tumor into the mandible. However, two cervical lymph nodes in levels I and II were enlarged at 1 cm and 1.4 cm, respectively. The patient was subsequently evaluated by Tufts Medical Center's head and neck tumor board, and it was decided to manage the tumor surgically with possible postoperative radiation therapy.

Even though we had a histopathologic evaluation for this patient upon presentation, it is always important to have a thorough differential diagnosis before any further treatment is rendered. The following are some of the possible pathologic entities that could demonstrate a similar clinical presentation to the one the patient described.



Figures 2a and 2b. Microphotographs of H&E slides of a mucoepidermoid carcinoma showing an admixture of mucus, intermediate, and epidermoid cells. (Photos courtesy of Dr. Lynn Solomon.)

Differential Diagnosis

Epithelial fibroma
Peripheral giant cell granuloma

Histopathologic Examination

Histopathologic evaluation of the submitted specimen revealed stratified squamous epithelium overlying fibrous connective tissue and minor salivary gland lobules. Invasive glandular neoplastic nests and cysts were noted within an inflammatory background. Both epidermoid and mucous cell differentiation was noted, but the mucus-producing cells were noted in greater numbers. Additionally, cytologic atypia was noted to be minimal (see Figure 4).

Diagnosis

Low-grade mucoepidermoid carcinoma

Discussion

Epithelial fibroma is the most common lesion of the oral cavity, and usually presents as a painless mucosa-colored firm mass. It is not a true neoplasm and its etiology is hyperplasia secondary to trauma. Fibromas can occur anywhere in the oral cavity, with the buccal mucosa as the most common site followed by the tongue and gingival, respectively. Microscopically, fibromas consist of a central fibrous connective tissue covered by stratified squamous epithelium. The treatment for these lesions involves surgical excision with very rare recurrence.

The peripheral giant cell granuloma is also a rather common soft-tissue lesion of the oral cavity. Similar to fibroma, the peripheral giant cell granuloma is not a true neoplasm but rather a reactive lesion in nature. The most common location for this lesion is within gingiva or the edentulous alveolar ridge. It is usually asymptomatic; however, ulcerations may occur secondary to trauma. Histology of the peripheral giant cell granuloma demonstrates multinucleated giant cells with a background of ovoid mesenchymal cells. Mucosal cells are seen on the surface and are typically being separated by a thick band of fibrous connective tissue from the giant cell proliferation zone. The peripheral giant cell granuloma is treated with surgical excision to the level of the underlying bone. If there is dentition in the area, thorough scaling should be performed to minimize the chance of recurrence. Overall, there is a 10 percent recurrence rate to be treated with re-excision.¹

Salivary gland tumors are a relatively rare and complex group of lesions accounting for only 1 to 3 percent of all head and neck tumors.^{2,3} The majority of these tumors occur in the parotids with an incidence rate of 64 to 80 percent.^{3,4} Tumors of other major salivary glands are less common with an approximate incidence of 8 percent in the submandibular gland and only 1 percent in the sublingual gland.³ The majority of tumors found within the parotids and the submandibular glands are benign in nature. Sublingual gland tumors, on the other hand, are mostly of the malignant variety.¹

The incidence of neoplasm in the minor salivary glands varies based on different series and is estimated to range from 9 to 23 percent of all tumors, making them the second most common source for salivary gland pathology.⁵⁻⁷ The posterior

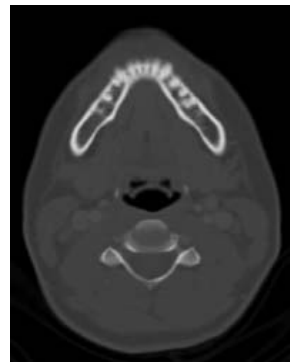


Figure 3. Axial CT image demonstrating intact cortical bone in the area of the lesion, indicating no invasion of tumor inside the bone.



Figure 4. Axial CT image with soft-tissue enhancement showing enlarged lymph node in level IIb.

palate is where most of the estimated 750 minor salivary glands are found, and hence it is the most common site for this type of pathology.¹ This is followed by the lips, buccal mucosa, tongue, floor of the mouth, and retromolar areas. In contrast to major salivary gland neoplasms, a large portion of minor salivary gland tumors are malignant in nature. This number reaches 50 percent in the palatal lesions, with up to 91 percent of those in the retromolar areas. Upper lip tumors have the lowest malignant potential of approximately 20 percent.¹

In general, the most common benign tumor of salivary gland origin is pleomorphic adenoma. Mucoepidermoid carcinoma and adenoid cystic carcinoma make up the most common malignant lesions.^{1,4} A complete list of common salivary gland tumors is provided in Table 1.

Mucoepidermoid carcinoma, as mentioned above, is one of the most common malignancies involving the salivary glands. According to most large series, approximately 70 percent of these tumors occur in the parotids.^{3,4} Intraoral minor salivary glands of the palate account for roughly 15 percent of these tumors, making the palate the second most common location for these tumors.⁸ Other intraoral sites, such as the retromolar pads, are rare sites of occurrence for this type of pathology. However, mucoepidermoid carcinoma is one of the most com-

Table 1. Most Common Benign and Malignant Tumors of Salivary Gland Origin

Benign Lesions

Pleomorphic adenoma
Papillary cystadenoma lymphomatosum (Warthin's tumor)
Basal cell adenoma
Canalicular adenoma
Myoepithelioma

Malignant Lesions

Adenoid cystic carcinoma
Mucoepidermoid carcinoma
Carcinoma ex pleomorphic adenoma
Acinic cell carcinoma
Clear cell carcinoma

***As with any other pathological finding,
early detection of salivary gland tumors is essential
in obtaining optimal treatment outcome.***

mon malignant lesions to be described in this location. The age distribution is found to range widely from the second to the sixth decades of life. Additionally, most large series demonstrate a female predilection. The presentation is usually an asymptomatic swelling that is often fluctuant and has a bluish hue that could resemble a mucocele. Although tumors vary with respect to their biological behavior, most tumors are diagnosed after being noticed several months to a couple of years after the initial occurrence.

Histologically, mucoepidermoid carcinomas are comprised of epidermoid cells, mucus-producing cells, and often intermediate cells.¹ The mucus-producing cells vary greatly in morphology, but all demonstrate foamy cytoplasm with mucin stains. The relative number of each group of cells, the degree of atypia, and the amount of cystic formation are used as criteria to grade these tumors. Based on these criteria, tumors with more cystic architecture, minimal cytologic atypia, and high proportion of mucus cells are considered low grade.^{8,9} In contrast, a high-grade tumor is made up of mostly solid islands of epidermoid and intermediate cells with a lot of mitotic activity. Intermediate-grade tumors naturally have features that fall somewhere in between the high- and low-grade tumors. This categorization is not universal; some authorities do not consider the proportions of cells a prognostic factor, and subsequently use a point system to designate grading of the tumors.⁸

Treatment of mucoepidermoid carcinoma is dependent on the location, grading of the tumor, clinical stage, and presence of cervical nodal disease. The primary treatment of these tumors is surgical with chemotherapy and radiation on an adjuvant basis. With regard to margins of excision, most authorities advocate 1 cm clinical margins. Low-grade tumors have a good prognosis, with the cure rate approaching 90 to 95 percent. Unfortunately, more aggressive high-grade tumors have only a 30 to 50 percent survival rate.¹ Interestingly, an intraosseous variety of salivary gland tumors have also been described in small numbers.

There are a few theories regarding the pathogenesis of intraosseous salivary gland tumors. One theory is that during development, some salivary gland epithelium gets trapped with the osseous structures of the maxilla or the mandible. This theory has been questioned due to the fact that routine evaluation of jawbones does not exhibit any salivary epithelium. Another potential source of intraosseous salivary tissue in the maxilla includes minor glands in the maxillary sinuses. The final and perhaps most likely source of intraosseous salivary gland tumors is odontogenic epithelium. This is confirmed by the presence of mucus-producing cells in the lining of most odontogenic cysts.^{1,10}

In our patient's case, the lesion was treated with a wide local excision of the lesion with 1 cm clinical margins. After removal of the soft-tissue lesion, a sagittal section of the lingual aspect of the mandible was also resected. Frozen sections of the clinical margins intraoperatively did not reveal any invasion by the tumor. The defect was then reconstructed using a split-thickness skin graft from the lateral thigh, and a bilateral supraomohyoid

neck dissection was performed to address the possible cervical nodal disease. The patient tolerated the procedure well and her postoperative period was uneventful. The final histopathologic examination of the surgical specimens confirmed the diagnosis of low-grade mucoepidermoid carcinoma. Tumor invasion was noted within 1 mm of two of the resected margins and to one cervical lymph node in level IIA, which contained mucoepidermoid carcinoma.

Due to the close histological margins and microscopic disease in the cervical lymph nodes, it was decided to treat the patient with adjuvant chemoradiation. She subsequently underwent chemotherapy with cisplatin and received 62 Gy of radiation. She tolerated the chemoradiation relatively well with no serious side effects. The patient is currently disease-free, and with the exception of improving trismus, she has no complaints. The plan for her future management includes close clinical follow-up and surveillance imaging at regular intervals to rule out recurrence. She is additionally seeing oral medicine specialists at Tufts for management of postradiation dental changes from xerostomia.

Conclusion

Salivary gland tumors account for a small proportion of all head and neck tumors. Diagnosis and management of these tumors requires a thorough understanding of the local anatomy and the tumors' biologic behaviors. As with any other pathological finding, early detection of salivary gland tumors is essential in obtaining optimal treatment outcome. Frequent and thorough head and neck examination by the dental community is invaluable in timely detection of salivary gland and other maxillofacial pathology. ■

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STAFNE DEFECT

THE LINGUAL MANDIBULAR SALIVARY gland depression (Stafne defect) classically presents in the posterior mandible below the inferior alveolar canal, approximately 1.5 cm anterior to the gonial angle. Upon clinical examination, a corresponding lingual defect may be palpable in some individuals.

The Stafne defect is characterized by a cortical invagination that may contain mature and otherwise unremarkable salivary gland tissue, connective tissue, lymphoid tissue, and skeletal muscle. These static, asymptomatic lesions are thought by some to represent congenital anomalies^{1,2} and by others to be focal bone atrophy secondary to ischemia.³ Still others believe these lesions represent acquired defects secondary to resorption of the lingual cortical bone in response to pressure exerted by adjacent salivary gland tissue.⁴

The classic presentation of most Stafne defects allows the diagnosis



Figure 1. Stafne defect of the anterior mandible. At biopsy, the lesion contained unremarkable mixed salivary gland tissue. (Image courtesy of Dr. David Greene.)

to be made almost exclusively by radiographic interpretation. Similar lesions of the anterior mandible are rarely reported. In contrast to lingual mandibular salivary gland depressions occurring in the posterior mandible, Stafne defects of the anterior jaw may pose a diagnostic challenge. Such lesions may present as a radiolucency superimposed over the tooth roots, as a periapical radiolucency, or at the site of a previous tooth extraction mimicking a residual cyst.⁵

As these lesions cannot be distinguished from other radiolucent lesions, including odontogenic cysts and tumors, on radiographic examination alone, surgical exploration with submission of lesional tissue for histopathologic examination is frequently employed for definitive diagnosis.

Alternative diagnostic techniques include computerized tomography (CT) scans⁶ or magnetic resonance imaging (MRI), which show a well-defined concavity of the lingual

mandibular cortex. Once the diagnosis of a Stafne defect is made, no further treatment is necessary. ■

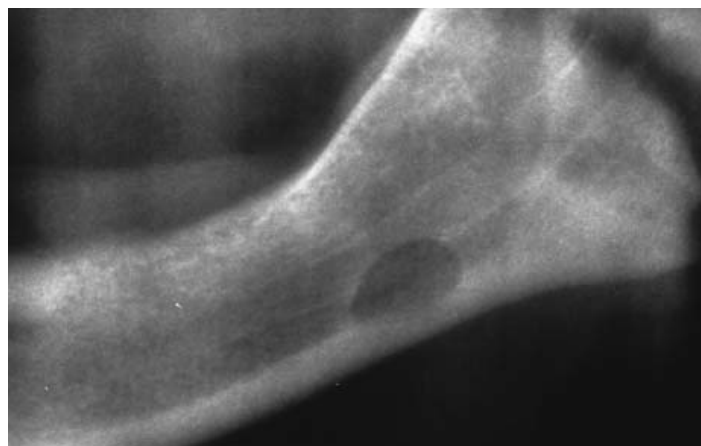


Figure 2. Stafne defect presenting classically as a radiolucency of the posterior mandible below the mandibular canal.

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BOOK REVIEWS



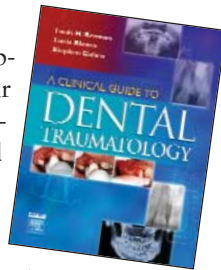
NORMAN BECKER, DDS, EDITOR EMERITUS

A CLINICAL GUIDE TO DENTAL TRAUMATOLOGY

LOUIS H. BERMAN, LUCIA BIANCO, STEPHEN COHEN

Mosby Elsevier

For this book, the editors selected contributors who have dedicated much of their careers to understanding and treating traumatic injuries to the face and dentition, and who use their vast experience to describe the treatment of these injuries with this first edition devoted to evidence-based care.



The text not only covers classification, etiology, and prevention suggestions, but also includes chapters on assessment, crown fractures, root fractures, luxation, avulsions, and soft-tissue injuries, as well as alveolar fractures. In addition, the authors discuss the laws involved and the psychological impact of injuries.

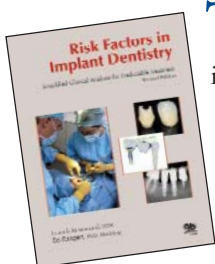
Each chapter is well organized, starting with a box outlining the content and the important aspects to be covered. The text is supported by the use of photographs to illustrate and explain treatment. A strong example that indicates the value of this edition can be found in Chapter Three: "Crown Fractures: A Practical Approach for the Clinician." The contents of this important chapter include Classification; Etiological Factors; Diagnosis and Clinical Finding; Radiographic Findings; Biological Consideration and Treatment Principles; Enamel Infractures and Enamel Fractures; Enamel-Dentin Fracture without Pulp Involvement; Enamel-Dentin Fractures with Pulp Involvement; Treatment Techniques for Non-Vital Teeth; Restoration of Immature Roots; and Crown Fractures in Primary Teeth. Case studies help the authors present the care and treatment of these traumatic injuries.

Each chapter could almost stand by itself as a teaching tool. I would suggest that this text become a reference volume in every clinician's library.

RISK FACTORS IN IMPLANT DENTISTRY: SIMPLIFIED CLINICAL ANALYSIS FOR PREDICTABLE TREATMENT—SECOND EDITION

FRANK RENOARD, DDS, AND BO RANGERT, PHD

Quintessence Publishing



The number of books, as well as the courses being offered, about oral implantology has increased considerably in recent years. It is not always easy to determine the value of materials devoted to this subject. Often the clinician is dependent on the success or failure of completed cases and discussions with colleagues, as well as education and training. This text attempts to be a clinical guide for the clinician implantologist.

Through the use of charts, photographs, and case histories, the authors provide a step-by-step description of clinical procedures, resulting in techniques that are easy to understand. The text covers general risk factors; esthetic risk factors; biomechanical risk factors; treatment of the edentulous maxilla; treatment of the edentulous mandible; treatment sequence and planning protocol; and complications.

The many practical suggestions and clinical hints make this edition a valuable teaching tool.

TISSUE ENGINEERING—SECOND EDITION

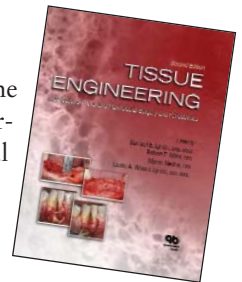
**SAMUEL E. LYNCH, ROBERT E. MARX, MYRON NEVINS,
LESLIE A. WISNER-LYNCH**

Quintessence Publishing

This textbook is not an "easy read" for the general practitioner, but the content certainly has valuable information for clinical practice.

In the preface, lead editor Samuel E. Lynch, DMD, DMsC, president and CEO of BioMimetic Therapeutics, sums up the purpose of this second edition: "Great progress has been made in the clinical applications of tissue engineering since the first edition of this book was published in 1999. Two pure, recombinant (synthetic) growth factors have received FDA approval for use in orofacial indications and are now available for widespread clinical use. The availability of rhPDGF and rhBMP for widespread use ushers in a new era in patient care in periodontics and oral and maxillofacial surgery, allowing us to move from primarily passive, often highly invasive therapies to active ones that significantly stimulate the healing and regenerative processes."

To the clinician who refers patients for periodontal care, this progress allows treatment to become less traumatic and painful with less healing time required. The editors call upon many well-known contributors who use case histories and surgical techniques, along with helpful photographs, to demonstrate the use of the recombinant protein therapeutics. Principles of tissue engineering, periodontal regeneration and localized implant site development, and craniofacial reconstruction, as well as orthopedic indications, are discussed and demonstrated by the contributors. ■



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ART OF DENTISTRY

ERIC K. CURTIS, DDS, MAGD, ELS

Dr. Curtis is past president of the American Association of Dental Editors. In 2006, he received the American Dental Association's Distinguished Editor Award.

EXPERT ADVICE

NOW THAT SCIENTISTS HAVE ANNOUNCED THE MAPPING OF THE human genetic code, I can come clean. I am a national expert on genetic engineering in dentistry. I'm not kidding. Just ask the producer at the network television news affiliate who called me for advice a couple of summers ago for a story he was airing on growing test-tube teeth. Or the national radio news service reporter who wanted to interview me about advances in genetic manipulation of human adult teeth. Or the major university that tried to book me for a keynote lecture detailing my "research."

Tempting as the offers were, I declined both the TV stand-up and the lecture because of one small detail: I don't actually know anything about the human genome. I've got 100,000 or so genes of my own, like everyone else, and about 3 billion DNA units, but I wouldn't recognize a nucleotide if it smacked me in the face. All I am is a country dentist with a twinkle in my eye and a serviceable modem.

My far-flung reputation sprang from a story I wrote a while back about the future of dentistry, into which I tucked a tidbit about the possibility of growing new adult teeth. I had read an article about a British study whose researchers speculated they could develop a gel containing genetic information that would stimulate a particular type of tooth to grow. "Think of it!" the article exulted. Just remove that wrecked molar and stimulate another one in a few weeks to sprout right out of the bone. Although, to date, actual teeth have been grown only in mouse kidneys (how about that for ectopic eruption?), I mentioned the researchers' findings.

My story about a story made its way to people who knew people, and suddenly those people were calling me. I explained that I couldn't offer any particular insights into the life-ordering chemical configurations spiraling down the double helix. The university politely withdrew its lecture request, but none of the other folks seemed to mind my empty head. The radio news reporter still wanted me to lend my dental degree to a sound bite.

It seems the nature of authority has changed. An expert used to be someone very knowledgeable on a given subject. John Steinbeck once described a skillful cook this way: "She was so expert with the rolling pin that the dough seemed alive." These days an expert has become more of a spokesperson. You just pick up the rolling pin—along with an audience—and you're on your way. The dough goes in your checking account.

If experts were once associated with wisdom, now they are about market share. In spite of more and more of our population being college-educated, our culture increasingly cries out for experts, people who stand out from the crowd and can guide us with sage advice and prognostications. In this age of entertainment, a little showmanship enhances the expert's impact. Witness Dr. Laura Schlessinger, the radio talk show psychologist whose astounding success helped transform experts into celebrities, and Dr. Phil McGraw, the made-by-Oprah television psychologist who has a nationally syndicated talk show.

This tale has two morals. The first is a memo to our consumer selves: Temper enthusiasm for expert advice with healthy skepticism.

The truth is that being an expert takes more confidence than knowledge. That fact was lampooned a few years back in the TV ad campaign for Holiday Inn Express, one sequence of which showed a plane full of skydivers about to jump.

"Have you ever done this before?" a nervous neophyte asked the instructor as he clipped her into the static line. "No," he smiled, "but last night I stayed at a Holiday Inn Express!" Dr. Laura's PhD, it turns out, is not in psychology, but physiology.

That's not to suggest that we abandon expert advice. As professionals, accustomed to being authority figures ourselves, we may fear that consulting an expert uncomfortably exposes our greenness in other fields. "You know what an expert is, don't you?" my uncle, a college president, used to growl. "An 'ex' is a has-been and a 'spurt' is a drip under pressure." Yet our shifting financial, emotional, health, or career situations may be greatly improved by entrusting them to someone else's able ministrations.

Which brings me to the second moral of my story: Be the expert your patients crave. Take time to answer questions. Experts dispense not only information, but also reassurance. While magazines and pharmacies give away dental advice, dentists who are perceived as inaccessible may give away pieces of their authority. We make repairs with handpieces and scalpels, but we heal with caring and concern.

Make your expertise available to the local medical community, as well. As a dentist on staff at our local community hospital, I field consultation requests from a variety of other doctors. Just the other day, for example, I was called bedside to confer over the possibility that an in-patient's leg infection might be causing him to brux.

I admit, I left a little disappointed that no one asked me about test-tube teeth. ■

