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CUSTOM MOUTH GUARDS

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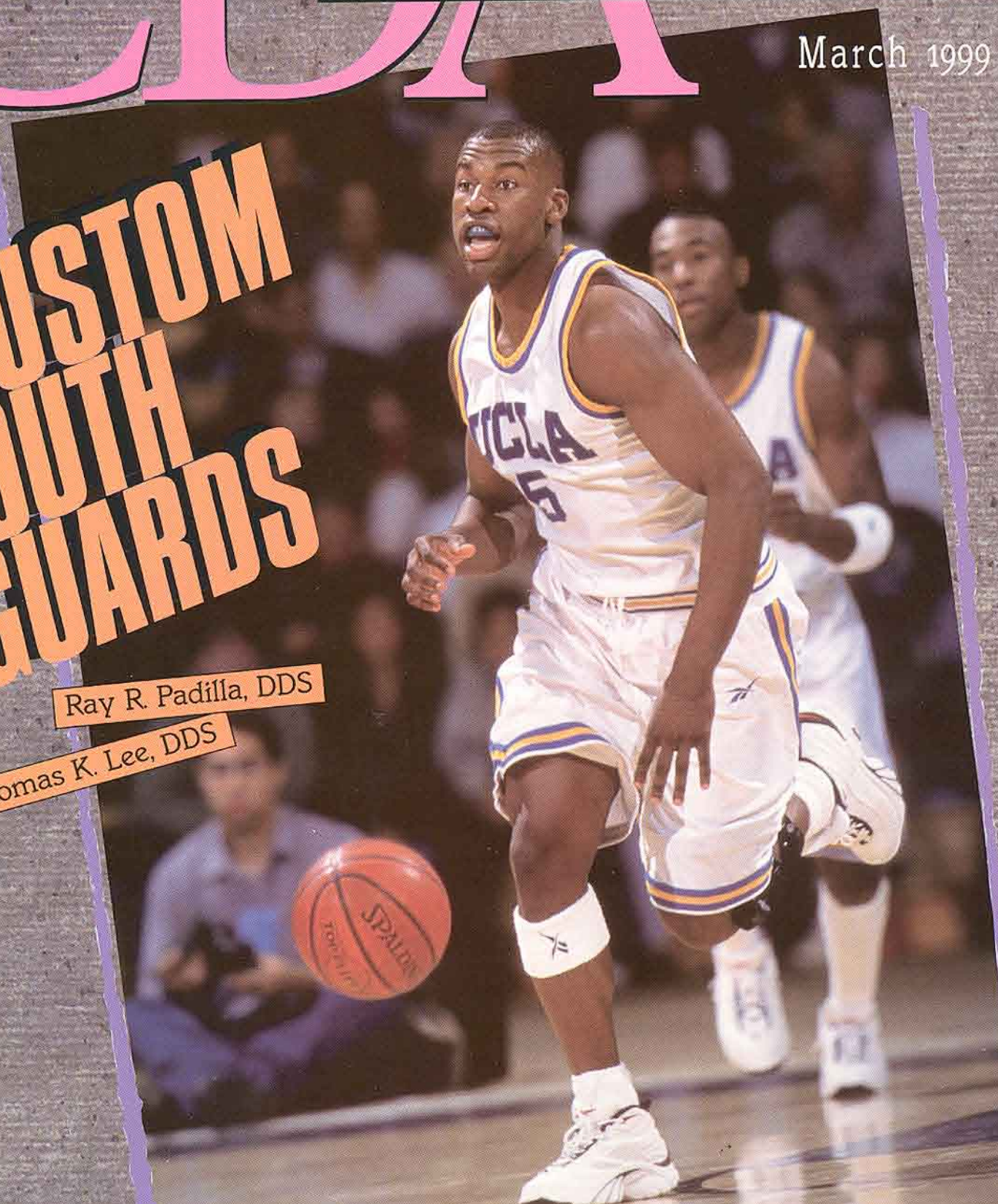

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DEPARTMENTS

FEATURES

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Troubling Matters

Jack F. Conley, DDS

In two of the past three years, the beginning of the new year has brought public focus to some nagging problems in the dental profession. In 1997, a Reader's Digest report brought to the attention of the public the matter of inconsistencies in treatment-planning and fee setting by dentists. This year, the TV newsmagazine "60 Minutes II" featured a story that highlighted the deaths of young children under sedation or general anesthesia procedures during treatment in the dental office.

It is too early to conclude what the impact of this most recent media report will be, although our initial belief is that the fears and concerns will be less far-reaching than the image problem faced by the profession in 1997. In our review, the report failed to establish that the lack of standards and safety precautions in the tragedies featured is an industry-wide problem. It also attempted to connect the lack of safety in the tragedies that were described to the lack of a specialty in dental anesthesia. However, interviews supported a general view that in at least a couple of the tragedies identified, there had been a lack of proper safety precautions employed as well as a lack of informed consent to the parents outlining the potential risks in the anesthesia/sedation procedures.

The thrust of such media reports encourages public support for stronger external regulation, which could ultimately result in removal of these procedures from the dental offices of competent, caring practitioners. It could also force unreasonably stringent educational requirements on well-qualified practitioners in the future.

The dilemma posed to the profession by these media reports is troubling. While a concerned profession cannot condone the actions of the negligence that contributed to the tragedies described, it is unfortunate that it must shoulder the negative public scrutiny that should more appropriately be borne by those who fail to fulfill their responsibilities of high public trust due to lack of judgment or skill. In contemporary society, it seems that the actions of a few will increasingly serve as the mechanism for public measurement of the profession's standards and image.

A frustrating aspect of these problems faced by the profession is that they are neither prevented nor resolved by regulations. The origin of so many of these problems is an ethical failure by the practitioner. Would a professional upholding the ethical principle of "doing no harm" ignore the necessity of employing appropriate safeguards and controls in a procedure involving risk to the patient? If it is argued that practitioner failures are matters of competence, does not the failure of the practitioner to undertake efforts to improve their skill and competence also violate the principle of doing no harm to patients entrusted to their care? The American Dental Association and California Dental Association have continually done a good job in establishing and supporting appropriate education and training requirements and safety measures in the best interests of the public. Yet there are those within the profession who ignore these standards by taking risks that are in violation of the public trust that the profession has been granted.

Another troubling matter that has been dogging the profession for some time has similar etiology. Recently, CDA

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leadership was challenged to consider a solution to the fraudulent claims filed by dentists with Denti-Cal and other indemnity programs in the state. Finding a solution to these abuses presents a considerable problem for two reasons. The organized profession is helpless to provide oversight without the data that identifies abusers, and second, it is likely that many in this group are not members of the organized profession and therefore are not bound to the principles of ethics or guidelines for professional conduct.

With certainty, there are also members of the organized profession in this category of risk-takers, who ignore the principles of ethics out of self-interest or ignorance. Even if the profession sets high standards and endeavors to monitor compliance, it is unable to oversee the compliance of these individuals because of the private nature of the business and patient treatment procedures employed inside individual dental practices. While peer review can assess the outcomes of many treatment procedures, it is not likely that either risk-taking practices that flaunt safety, or fraudulent business practices, will be subject to evaluation or scrutiny unless an adverse result comes to the attention of the public or profession.

That is why public opinion will eventually result in some form of continued competency assessment. That is troubling too, because the changes that will be required of the profession will come not only in response to competency issues, but primarily as a result of cumulative ethical shortcomings by dentists. That will be tragic in view of the importance that the dental profession has traditionally placed on professional principles of ethics.

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New Soldiers in the Digital Revolution

By David G. Jones

In an era where computers are the cool yet serious tool of choice for the masses to access and send electronic information, it is no wonder that more and more dental professionals are joining the party.

Not long ago, only analog X-ray film was available. The practice computer's usefulness was limited to patient scheduling, data entry, and accounting. With the use of new forms of digital dentistry tools that enable dentists and their staffs to be more productive, while providing even better patient care, all that is changing.

The cost of entry or upgrading to higher digital standards is not inexpensive. Prices range from the hundreds of dollars for software, to the thousands for many types of equipment. But the rewards are worth the price, according to those who have paid it.

"I find that my staff and I benefit as much from new technology as our patients do because of the increased efficiency it provides, and the higher quality of service it allows," says Mark P. Miller, DDS, of Tustin, Calif. "But, of course, the primary reason for acquiring technology is always for the betterment of our patients."

The foundation for going digital is a late-model personal computer configured specifically to handle the demands of a busy practice. Beyond that, the correct type of practice management software is the key to successfully creating a modern digital office.

"Most Microsoft Windows-compatible practice management software programs currently available will integrate the other elements of a digital office successfully," says Bob Seawell, vice president of operations for D&S Video Warehouse, a Sacramento County-based operation specializing in high-tech dental components. Seawell says component compatibility arguably is the most important part of putting together a digital practice.

Of the new wave, digital radiographs enjoy popularity, and many dentists who use them sing their praises.

"It's where technology is headed, and it will probably be the standard of care in the future," says Dr. Adam E. Cortese, a general practitioner from Rio Linda, Calif. "It's cost-efficient, and it uses from 40 percent to 90 percent less radiation than the film system uses, so patients like it better.

"The images are almost instantly displayed on a computer screen, and we're able to e-mail them to another dentist for consultation, or print them out for the patient."

Cortese says the system is easy to operate, requiring him about an hour to train his staff. It also saves him and his staff time and money.

"I also no longer have to buy film and chemicals, don't have to pay staff to process the film, don't have to deal with a hazardous waste generator permit from the county or pay a contractor to haul away the waste, and it's also better for patient education," Cortese says. "They can look at a computer screen and easily see what we're seeing, rather than looking at the small standard film."

Delta Dental of California, the state's largest dental insurer, doesn't yet allow digital radiographs to accompany claims. But that's about to change.

"We're getting closer to being able to do that, and within two years we hope to start a pilot program to accept digital radiographs and evaluate the most efficient manner to incorporate them with a claim," says Debbie Keatley, Delta's Electronic Data Interchange manager.

While Delta doesn't yet have the capability to receive digital radiographs, a recently released survey of Delta dentists shows that electronic claims submissions rose 67 percent last year. Even so, Keatley says she thinks mandatory electronic claims submissions are a ways off.

"But some companies are starting to charge fees for filing paper claims to help cover their costs and promote electronic filing to force dentists to use the technology, because it's the most cost effective for everyone involved," she says.

Miller has gone head-long into the brave new digital world.

"We have intraoral cameras in each operatory, and digital radiography images are captured on a laptop, and it downloads radiographs into the patient's chart on the office PC along with the intraoral pictures," Miller says. "We also order most of our supplies online, and that's really handy. We use electronic claims filing, and we can make appointments from each operatory, update patient files, and input patient notes."

In each of Miller's four operatories patients or staff can watch an educational video, examine intraoral camera images, or watch a patient education video on an interactive compact disk. Patients can profit from the increased productivity digital dentistry offers, Miller says, because dentists have more time to spend on each case, resulting in better patient care. He says staff training is a key to successful utilization.

"Typically, doctors get hooked on the latest technology," Miller says. "I get jazzed by it, but it will collect dust unless I get staff involvement. . . . And get the advice of people who know what they're doing and know how to make it all work together. They're worth their weight in gold."

Adding his perspective on technology's usefulness in dentistry is the former chair of CDA's Council on Dental Research and Developments, Michael J. Danford, DDS.

"I think down the line we're looking at increased use of digital technology in increasing patient care, developing electronic patient records, and teleden-

tistry to transmit images to someone else for consultation. By doing this, you can improve the overall care of the patient in a variety of ways. If I can do better dentistry with it, I'm interested."

UCSF Helps the Disadvantaged Become Dentists

The University of California at San Francisco School of Dentistry has launched a program to help students from disadvantaged backgrounds get into dental school -- and to increase the number of dentists providing help to underserved populations.

The UCSF pilot program, called the Dental Post-Bac Program, is the first in the country designed to help students from a range of circumstances become successful dentists. Similar programs for potential medical students exist at University of California campuses in Davis, Irvine and San Diego. The dental and medical programs are funded through a grant from The California Endowment.

UCSF officials say the program is meant to give additional training to students who have been identified as possessing the potential to become successful dentists but have been hindered by educational, cultural or social disadvantages.

Program organizers hope to achieve a secondary goal of increasing the underserved populations' access to dental care. They say that can be achieved by admitting to the program students who have demonstrated commitment to working in their communities and a desire to continue doing so as a dentist.

"We have a strong sense that the students in the program are going to make a different kind of provider," says Harvey Brody, DDS, UCSF clinical professor of dentistry and the program's associate director. "These are wonderful, hard-working young men and women who want to go back and serve their communities."

Students, who must have completed their undergraduate education and recently been denied admission to dental school, must prove their ability to succeed in dental school academically. They also must show that an overriding factor contributed to their inability to previously gain dental school admission, says Charles Alexander, PhD, UCSF School of Dentistry assistant dean and the program's director.

Alexander says factors could include an applicant's lack of access to primary or second schools that didn't have high-enough academic standards or adequate educational resources. Other factors may include family circumstances such as financial hardship that interfered with an applicant's ability to focus solely on school. Those situations are explored through written statements, personal interviews and references.

Once accepted into the Dental Post-Bac Program, students spend a year honing their academic and learning skills so they are better prepared when they reapply to dental school. They also receive help in applying to the dental schools of their choice and improving interviewing skills.

USC Researchers Are Hard on Enamel's Trail

Researchers at the University of Southern California School of Dentistry are closing in on making tooth enamel. They have identified tiny spheres that regulate the formation and organization of tooth enamel by controlling the substance's crystalline growth.

Called nanospheres because they are only 20 nanometers in diameter, these structures are formed by a naturally occurring family of tooth-specific proteins known as amelogenins. These spheres are also a component of the synthetic amelogenin first cloned at the USC School of Dentistry's Center for Craniofacial Molecular Biology four years ago.

"More than 98 percent of tooth enamel consists of carbonated calcium hydroxy-apatite," says research professor A.G. Fincham, PhD. "Essentially, teeth are made of rock."

For two decades, researchers have studied tooth enamel with the goal of replacing mercury-based gold and silver fillings with restorations of man-made material identical or similar to natural tooth enamel.

"Beyond that, the same principles that nature uses to make enamel might also be applied to create novel synthetic materials," Fincham says.

Researchers first saw the spheres in 1994. A powerful microscope recently revealed that the spheres are uniformly 18 to 20 nanometers in diameter. Chemically, the mineral crystals in tooth enamel are a calcium hydroxy-apatite formed from calcium and phosphate ions, which are transported into the nanosphere

Here are some suggested considerations for implementing new technologies:

- Define objectives. Envision how you want to practice with new technologies.
- Interview others. Talk to dentists who have implemented systems like the ones you're planning.
- Get it in writing. Ensure any guarantees of performance or system integration are in the contract.
- Go slowly. Integrate systems gradually to allow staff time to master new technologies.
- Have a back-up plan. Ensure that data is backed up daily. Secure the media in a separate location in case of fire or theft.

matrix by ameloblast cells.

Apatite crystals grown in the lab by traditional methods are about one-hundredth the size of the crystals nature makes. They grow haphazardly, and the resulting material is considerably weaker than natural enamel.

Four years ago, the USC researchers took the gene for an amelogenin protein from a mouse, placed it in a bacterial cell, and then used the bacterial reproductive process to produce an identical recombinant amelogenin protein. This recombinant amelogenin protein, which the researchers can now produce in quantity, has since been shown to self-assemble to make nanosphere structures identical to those seen in mice and other animals, including humans.

Infectious Disease Deaths Increase in Late 20th Century

After an 80-year plunge, deaths from infectious diseases rose steadily for the first time this century beginning in 1981 because of the AIDS epidemic.

The rise demonstrates the need for vigilance over the threats posed by infectious agents, according to an article in the Jan. 6 issue of the Journal of the American Medical Association.

Gregory L. Armstrong, MD, and colleagues from the Centers for Disease Control and Prevention in Atlanta, researched the mortality tables for death rates for nine categories of common infectious causes of death for the years 1900 to 1996. The nine categories were pneumonia and influenza (considered a single category), tuberculosis, diphtheria, pertussis, measles, typhoid fever, dysentery, syphilis and AIDS.

The researchers found that while deaths from infectious causes dropped dramatically during the first 80 years of this century, deaths from infectious agents have risen recently. The researchers found that in 1900 there were 797 deaths per 100,000 caused by the original eight infectious agents tracked, but by 1980 that number had dropped dramatically to 36 deaths per 100,000.

"The disease categories that contributed most to this decline were pneumonia and influenza, which fell sharply from 1938 to 1950 and subsequently leveled off for several years, and tuberculosis, which fell abruptly from 1945 to 1954 and continued to fall until the mid-1980s," the authors write. "These declines coincided with the first clinical use of sulfonamides (1935), antibiotics (penicillin in 1941 and streptomycin in 1943), and antimycobacterials (streptomycin, first used against tuberculosis in 1944, para-aminosalicylic acid in 1944, and isoniazid in 1952)."

From 1981 to 1995 in the United States, the rate of deaths from infectious agents increased to a peak of 63 deaths per 100,000 in 1995 and declined to 59 deaths per 100,000 in 1996. Death from infectious diseases increased by 58 percent from 1980 to 1992. Research attributes a significant part of the increase to the emergence of acquired immunodeficiency syndrome in 25- to 64-year-olds and, to a lesser degree, to increases in pneumonia and influenza deaths among people 65 and older.

The authors note that deaths caused by infectious disease may again begin to decline again as the century ends; a 7 percent drop was recorded in 1996, largely due to a substantial decline in AIDS deaths.

Medicine Has Come a Long Way, Baby

Merck's Manual turns 100 years old this year, and as part of the commemoration, Merck & Co Inc. has reissued the first one.

While it's not as much fun as looking at the old Sears & Roebuck Catalog reissues (love those chaise longues for $7), a few chuckles may be found upon leafing through the 1899 manual.

Among somewhat humorous entries are the many suggested uses for tobacco as a medical treatment. The maladies it was said to heal and the ways to use it include:

- Asthma: "smoking is sometimes beneficial";
- Constipation: "5 minims of the wine at bedtime, or cigarette after breakfast";
- Hay fever: (application not specified);
- Hemorrhoids: (application not specified);
- Hiccough: "smoking";
- Excessive lactation: "as poultice"; and
- Nymphomania: "so as to cause nausea: effectual but depressing."

Also included in the 1899 manual are remedies for melancholia. They include:

- Alcohol;
- Arsenic: "in aged persons along with opium";
- Cocaine; and
- Gold.

It's hard to argue with that last one.

Honors

Jeff Morley, DDS, of San Francisco, has been appointed as an associate editor of the Journal of the American Dental Association. He will oversee articles pertaining to esthetic and cosmetic dentistry.

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Pressure-Laminated Athletic Mouth Guards: a Step-by-Step Process

Ray Padilla, DDS, and Thomas Lee, DDS

ABSTRACT Of the variety of mouth guards available to the conscientious athlete for protection of oral structures, the pressure-laminated appliance provides the best fit and the most protection. The pressure-lamination technique, however, is not widely known among dentists. This article contains a step-by-step description of making pressure-laminated athletic mouth guards.

AUTHORS

Ray R. Padilla, DDS, is TK and chair of CDA's Council on Community Health.

Thomas Lee, DDS, is TK also.

The field of sports dentistry is gaining acceptance from all members of the sports medicine team, including physicians, physical therapists, and athletic trainers. It is increasingly important for these individuals to be able to come to the dentist for the latest advice on prevention and treatment of orofacial injuries and related topics, including knowledge of custom-made pressure-laminated mouth guards.

The American Society of Testing and Measurements suggests three classifications of athletic mouth guards:

- Type I: stock. These are store-bought over-the-counter mouth guards. They are simply taken out of the packaging and immediately placed in the mouth. No attempt at fit is made. These are regarded as the least protective of all types of mouth guards and are the least expensive.
- Type II: boil and bite. These are also store-bought over-the-counter mouth guards. Some attempt at fit is made by boiling the mouth guard and trying to mold it to the teeth. The instability and uneven distribution of material, however, do not lend themselves to proper fit and protection.
- Type III: custom made. These are made from a cast of the athlete's mouth by either vacuum or pressure lamination. These are the mouth guards of choice for the dental professional to recommend to their patients and athletes.[1]

Recently, the California Dental Association's Council on Community

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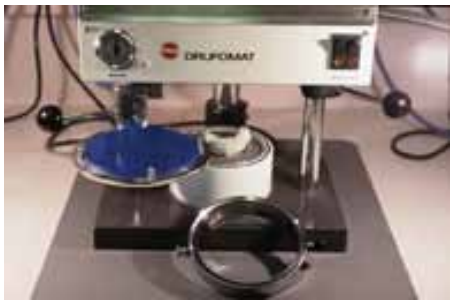

FIGURE 1

FIGURE 2

FIGURE 3

Health introduced an educational video underlying the need for dentist-diagnosed and -produced custom-made mouth guards. (California Dental Association and Tufty Productions, 1998). Dental professionals used to tell patients to wear a mouth guard without distinguishing between over-the-counter store-bought mouth guards and professionally made mouth guards. It is no longer suggested that patients seek the advice of sporting goods stores for their dentistry. The need to educate athletes, parents, and coaches about seeking the guidance of dental professionals is now even more important. The only options that should be suggested by dentists to their patients are custom-made mouth guards provided by health professionals. The comfort and fit of these mouth guards encourage higher compliance. The higher the compliance, the less the chance of injury because the custom fabrication of mouth guards ensures consistent thickness in critical areas of the appliance.

Dr. Ken Creighton, deputy chief medical officer for the 2000 Olympic Games in Sydney, Australia, and Dr. Brett Dorney, the games' dental director, have stated that the 2000 Olympics will be an opportunity to promote the best dental protection in "at risk" sports by using the latest pressure-laminated techniques. The Academy for Sports Dentistry is currently implementing a position statement that will promote the use of custom-made athletic mouth guards. In August of 1998, the Ontario Hockey League, the primary feeder league for the National Hockey League, mandated that all their players have dentist-fabricated mouth guards.

Most dentists familiar with custom-made mouth guards have made them using a vacuum machine. This machine – common to most dental offices – uses a heating element and up to one atmosphere of pressure to form a vacuum, thus adapting materials over casts of the mouth. This adaptation is poor when compared to results obtained with a pressure-lamination machine, which uses a heating element and up to 10 atmospheres of pressure (not vacuum) to better form a more intimate adaptation of the model using the material of choice. The machine demonstrated in this paper will be the Dreve Drufomat Machine (Distributed by Westone Laboratories, Colorado Springs, Colo.), although other machines may be utilized, such as the Biostar Machine (Great Lakes Orthodontics LTD, New York) and the Erkodent Erkopress Machine. (Glidewell Laboratory, of Newport Beach, Calif., fabricates the Playsafe Mouthguard with this machine, but it is not available for sale in the United States).

Comparison of Vacuum and Pressure Machines

It has been the authors' experience that the pressure-lamination machine is far superior in adaptation. Instead of the vacuum of less than 1 atmosphere used by the vacuum machine, positive pressure of up to 10 atmospheres is used. The key element, however, is the capability to laminate, which is only successful with high heat and pressure. The authors have been using pressure-lamination machines exclusively for several years. Besides athletic mouth guards, these machines can also be used for model duplication, custom trays, orthodontic retainers, implant stents, bleaching trays, bruxing appliances, snoring appliances, and denture repairs.

Not all American dentists and their patients are aware of the pressure-lamination technique. This paper will focus on the technique used for many years in Europe and Australia. There are qualified dental labs fabricating pressure-laminated mouth guards. However, dentists should be aware of the technique so they can make the mouth guards themselves or have the knowledge to fit, trim, and adjust these appliances once they arrive from the laboratory. Just as dentists fit, trim, and adjust dentures, partials, retainers, and other appliances, they need to do the same with custom-made pressure-laminated mouth guards. Knowledge of the fabrication procedure is imperative. Fit and compliance in wearing is essential to injury prevention.

Below is the step-by-step process for the fabrication of an athletic mouth guard for a high school or collegiate basketball player in stable occlusion. A trimmed cast of the athlete's maxillary arch was fabricated using die stone. During the impression process, care was taken to include all vestibular borders, and these borders are intact on the model. The goal

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FIGURE 4

FIGURE 5

FIGURE 6

FIGURE 7

FIGURE 8

FIGURE 9

FIGURE 10

FIGURE 11

FIGURE 12

FIGURE 13

FIGURE 14

FIGURE 15

FIGURE 16

FIGURE 17

FIGURE 18

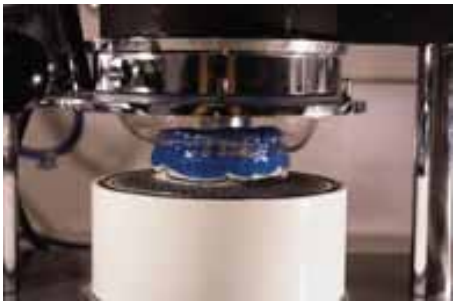

FIGURE 19

FIGURE 20

FIGURE 21

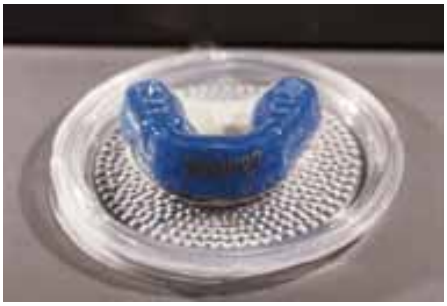

FIGURE 22

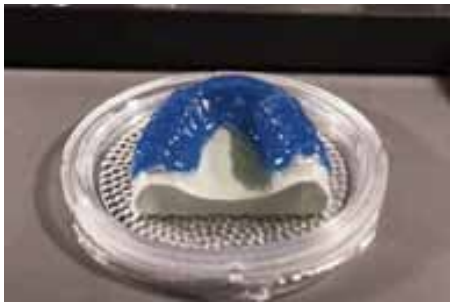

FIGURE 23

FIGURE 24

of using the mouth guard is to protect not only the teeth, but also the surrounding structures such as the alveolar bone and attached gingiva and mucosal tissues.[2]

FIGURE 1. The pressure-lamination machine being used is the Dreve Drufomat, which is used for the production of thermoformed dental appliances. The Drufomat is connected to an air compressor with operating pressure usually at 6 bar. The fabrication process is started by choosing the thickness and color of the ethyl vinyl acetate (EVA) laminate sheet. The thickness is determined by diagnosing the needs of the athlete with respect to age, level of competition, and history of past injury. For this example, the desired result is a 4 mm mouth guard, so two 3 mm sheets are laminated together. There is an approximate 30 percent shrinkage during the fabrication process, so by laminating two 3 mm sheets, the result will be a 4 mm mouth guard.

First, the Drufomat main and heater switches are turned on. Then a 3 mm blue sheet is selected for the first layer and placed in the disc positioning ring. The trimmed model is placed on the tray table slightly off center toward the lingual.

FIGURE 2. The clamping ring is placed over the EVA sheet to lock it into position.

FIGURE 3. The quartz heater and disc positioning ring are positioned over the

FIGURE 25

FIGURE 26

FIGURE 27

FIGURE 28

FIGURE 29

FIGURE 30

FIGURE 31

FIGURE 32

FIGURE 33

model, and the EVA material is allowed to heat to formable consistency.

FIGURE 4. The EVA material will begin to slump as it heats. When it begins to touch the model, it is ready for the pressure to be activated.

FIGURE 5. On the upper left side of the Drufomat is a white button that activates the pressure. This button must be pressed at the same time that the quartz heater is removed from over the EVA material. The pressure chamber will drop over the model and form and pressurize the EVA to the model. A light will come on, thus signaling that one's hands can be removed from the white button and quartz heater shifter.

FIGURE 6. The material is allowed to cool under pressure in this position for at least 15 minutes.

FIGURE 7. Once the time has elapsed, the white button is pressed to release the pressure until the indicator light shuts off.

FIGURE 8. The heater lever is slowly pushed toward the cylinder. The pressure cylinder will rise.

FIGURE 9. The first layer of the laminated mouth guard is now formed. The clamping ring and the formed appliance can then be removed. The appliance will need to cool to room temperature to prevent distortion.

FIGURES 10 AND 11. Once the mouth guard material is completely cooled, preliminary trimming may begin using a heated bard

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FIGURE 34

FIGURE 35

FIGURE 36

FIGURE 37

parker blade or scissors.

FIGURES 12 THROUGH 14. Care should be taken that the appliance is not trimmed excessively. Lingually, the palatal extensions should be removed. This allows for more comfort during speaking and breathing. Buccally, the mouth guard extensions should cover just like a denture, to full vestibular borders protecting the alveolar bone as well as the teeth from injury. The mouth guard should be trimmed back to the second molar.

FIGURES 15 THROUGH 17. The mouth guard is then ready for placement of stickers and identification. Any la bel machine can be used as long as it provides small (10 to 12 point) print. Black ink on clear tape should be used for light-colored mouth guards and white ink on clear tape should be used for dark-colored mouth guards. The dentist can ask the athlete what he or she would like on the mouth guard, perhaps a school name or logo across the front. The athlete's name should be placed on the side. The doctor's name and phone number should be placed on the other side.

FIGURE 18. The mouth guard is then ready for a second layer to be laminated in place. A clear sheet of EVA with the desired thickness, in this case 3 mm, should be used. The clear EVA sheet should be placed in the disc positioning ring. The model with the first trimmed blue layer is placed on the tray table slightly off center toward the lingual. At this point, the steps 1 through 4 (**FIGURES 1 THROUGH 4**) are repeated. Once the clear layer begins to melt to desired formable consistency, the fabrication is at a critical stage. The second layer must be hot enough to consistently and predictably laminate to the first blue layer. If this is not done, the two layers will not securely laminate and will separate in time.

FIGURE 19. The second clear layer must droop completely over the teeth on the model before the pressure chamber is activated.

FIGURE 20. The pressure chamber is activated as in step 5 (**FIGURE 5**) and the model allowed to cool under pressure. Steps 6 through 8 (Figures 6 through 8) are then repeated.

FIGURES 21 through **23**. The clamping ring is removed, and the laminated mouth guard allowed to cool to room temperature, preferably overnight. This eliminates any chance of distortion and ensures a perfect fit.

FIGURES 24 through **27**. Steps 10 through 14 (Figures 10 through 14) are repeated.

FIGURE 28. The internal lingual extensions should be marked with a pen to 1 to 2 mm from the teeth.

FIGURES 29 through **31**. With a stone acrylic bur, the excess material is trimmed lingually to the marked extensions. The mouth guard is then placed back on the model, and the margins are feather-finished for comfort lingually, buccally and labially. Any interference with muscle extensions should be removed.

FIGURES 32 and **33**. On a dental lathe, the mouth guard is further trimmed and smoothed to desired thickness with a scotch wheel.

FIGURES 34 AND 35. Final finish and polish is placed with a chloroform saturated gauze.

FIGURES 36 AND 37. The completed 4 mm custom-made pressure-laminated mouth guard. At this stage, it is critical to try in the mouth guard and check for fit and comfort. Slight trimming and adjusting may be necessary just as at any dental appliance insertion appointment. Special care should be taken to ensure a balanced occlusion. This may be done in the laboratory or directly at the chair with the patient, by slightly heating the occlusal surfaces of the mouth guard and biting down slightly and gently until all posterior teeth occlude. Special care should be taken not to bite down excessively and bite through the mouth guard. A minimal occlusal thickness of 3 mm is critical to ensure proper absorption of impact during competition.

Conclusion

In the authors' experience, the pressure-laminated mouth guard has been shown to be the most accepted mouth guard by athletes because of its precise fit,

comfort, and predictability of thickness in critical areas. This fabrication procedure gives the sports dentist the capability to diagnose, design, and customize these protective mouth guards for the specific needs and requirements of any athlete, regardless of age, level of competition, sport played, and past history of injury and concussion. They can be made as thick or thin as necessary according to the dentist's diagnosis. Dentists, as health professionals, have an obligation to present all treatment options to patients and explain the differences. Once patients have the knowledge of what is best for themselves and their children, they will not seek their dentistry from sporting goods retailers.

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Strategies for Management of Commonly Encountered Oral Mucosal Disorders

Michael A. Siegel, DDS, MS

ABSTRACT Oral mucosal disorders are frequently encountered by the practicing dentist. These lesions may represent oral manifestations of dermatologic or systemic disease, reactive lesions, or occult neoplasms. The diagnosis of these conditions is usually based on case-specific historical findings, clinical appearance, and the results of diagnostic procedures. This article will discuss the diagnosis and management of commonly occurring oral mucosal conditions such as candidosis, recurrent aphthous ulceration, herpes virus infection, and lichen planus. This manuscript represents a synthesis of the literature and the management approach utilized by the author in the treatment of his patients. This article is not intended as a comprehensive review of all the subjects discussed.

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Dentists are frequently called upon to evaluate oral mucosal conditions. This article will present the diagnosis of and management utilized by the author for four of the most frequently encountered oral lesions: candidosis, recurrent aphthous ulceration, herpetic infection and lichen planus.

Oral Candidosis

Candidosis, the most commonly occurring oral fungal infection in the non-immunocompromised patient, is caused by Candida albicans. Up to 60 percent of healthy individuals may harbor this fungal organism as host flora in the oral cavity.[1] For individuals who have Candida albicans as a normal component of their oral microflora, their own immune system and the competing bacteria keep the fungal organisms from overgrowing.[2] This opportunistic infection may occur due to a variety of systemic factors or as a result of local changes in the oral environment.

Systemic conditions associated with the development of candidosis include systemic steroid therapy and endocrine disturbances such as diabetes, pregnancy, and hypoparathyroidism. Other systemic factors that may favor the development of candidosis include malabsorption and malnutrition, Sjögren's syndrome, cancer chemotherapy, and immunosuppression such as seen in AIDS patients.[3] Local factors that predispose the patient to develop candidosis include changes in the oral flora resulting from decreased tissue resistance due to xerostomia or chronic local irritants (dentures, orthodontic appliances,

Figure 1A Pseudomembranous candidosis on the right side of the tongue in a 72-year-old male

Figure 1B Appearance of the tongue following two weeks of therapy with clotrimazole troches.

Figure 2A Erythematous candidosis of the palate in a 54-year-old female under an ill-fitting partial denture.

Figure 2B Appearance of the palate following temporary reline of the denture and two weeks of therapy with nystatin ointment.

smoking) and antibiotic therapy.

The clinical appearance of the oral lesions can vary greatly. Pindborg reported four clinical varieties of oral candidosis found in HIV-infected individuals: pseudomembranous, erythematous, hyperplastic and angular cheilosis.[4] These clinical fungal subtypes are also useful in diagnosing and managing these lesions in non-HIV-infected individuals. The two most common oral presentations are pseudomembranous candidosis (thrush) and erythematous candidosis (denture sore mouth).

Pseudomembranous candidosis is characterized by the presence of white curd-like lesions that can easily be removed with a tongue blade or gauze, leaving an erythematous, erosive surface underneath (**Figure 1**). The term thrush should be reserved for use in a pediatric patient population. The white curds consist of fungal organisms, bacteria, inflammatory cells, fibrin, and desquamated epithelial cells. The lesions occur most commonly on the buccal mucosa and mucobuccal folds, the oropharynx, and the dorsal surface of the tongue. If the white lesions have not been rubbed off, the patients are usually asymptomatic. Patients with extensive erosive areas may complain of tenderness, burning, or dysphagia.

Erythematous candidosis is frequently noted in patients who wear maxillary complete or partial dentures, especially among those who do not remove the prosthesis prior to bedtime (**Figure 2**). This form of candidosis seems to occur as a result of decreased tissue resistance from the prosthetic appliance. The lesions have a distinct predilection for the palatal mucosa but may also occur under mandibular dentures. Clinically, erythematous candidosis primarily appears as red, atrophic lesions. The erythema may be diffuse, involving the entire denture bearing area; or it may present as patchy areas of erythema that resemble petechiae.

Hyperplastic candidosis is unlike the pseudomembranous and erythematous forms in that it cannot be wiped off the mucosa. It is seen as elevated white plaques that resemble clinical leukoplakia. Hyperplastic candidosis most often involves the hard palate and the dorsal surface of the tongue. It must be distinguished from other keratoses by cytologic smear, culture, biopsy, or therapeutic trial with antifungal medication. Lesions that do not respond to a trial of antifungal medication must be biopsied to establish a diagnosis.

Angular cheilosis is due to candidal infection of the labial commissures. Angular cheilosis may occur with or without concurrent oral candidal lesions. It is characterized by redness and/or fissures radiating from one or both corners of the mouth and is often associated with small white plaques (**Figure 3**). Angular cheilosis has long been associated with vitamin B deficiency and decreased occluding vertical dimension. While these conditions may serve as predisposing factors for the development of angular cheilosis, the management of the lesions must be directed at their fungal etiology.

The diagnosis of candidosis can often be made from the patient history and the clinical appearance and distribution of the mucosal lesions. When necessary, especially in an immunocompromised individual, identification of the organisms is made in a culture of the lesion on a selective medium available from a commercial or hospital medical laboratory service, from a cytology smear stained with periodic-acid Schiff (PAS) reagent, or on a wet smear macerated with 10 percent potassium hydroxide.

Oral candidosis is most often treated with topical antifungal agents such as nystatin ointment, clotrimazole troches or amphotericin oral suspension (**Table 1**). Oral preparations in the form of troches

TABLE 1

Topical Medications Used to Treat Candidosis[35]

Medication	Forms	Dispense	Instructions	Advantages/ Disadvantages
Nystatin	ointment	30 gram tube	Apply thin coat to inner aspect of denture(s) after each meal. Do not eat or drink for 30 min. following application.	Safe, high compliance, inexpensive
Clotrimazole	troches	70	Dissolve slowly five times/day until gone. Do not chew.	Safe, high compliance, pleasant tasting, high sugar content, expensive
Amphotericin	oral suspension 100 mg/ml	48 ml	Swish with 1 ml for 3 min. four times daily and swallow until gone.	Topical and systemic effect, expensive, must remove dentures, potential for side effects
Nystatin-triamcinolone acetonide	ointment	15 gram tube	Apply to corners of mouth after meals and at bedtime for two weeks. DO NOT LICK.	Safe, inexpensive, high compliance

provide the advantage of prolonged contact of the medication with the lesions. They are safe to use because of their poor systemic absorption. Oral hygiene must be reinforced when prescribing oral antifungal troches because of their sugar content. The sugar content of these medications can also present a problem when prescribed for diabetic patients on a strict carbohydrate diet. While nystatin suspension is frequently prescribed, in general, rinses are less effective than other forms of topical antifungal therapy because the duration of tissue contact is insufficient.[5] When a rinse must be prescribed, such as for xerostomic patients who cannot dissolve the clotrimazole troches, amphotericin oral suspension is preferred to nystatin suspension. When swallowed, amphotericin suspension provides both a topical and systemic effect. However, it has reported side effects that include headache, nausea, vomiting, fever, and chills. Patients who wear dentures must remove them prior to using an antifungal rinse or troche.

When treating cases of erythematous candidosis that appear under a denture, the prosthetic appliance must be addressed as well as the oral lesions. After each meal, nystatin ointment or clotrimazole cream should be applied to the tissue side of the denture before replacement in the mouth. Patients should be reminded to remove their dentures at bedtime and soak them overnight in an antifungal solution. Most commercially available denture soaking tablets are fungicidal; it should not be necessary to prescribe nystatin suspension specifically for this purpose.

Angular cheilosis is a mixed infection of Candida albicans and salivary species of streptococci. These lesions respond very well to combination therapy containing an antifungal and a topical steroid in a cream or ointment vehicle. Nystatin with triamcinolone acetonide or clotrimazole with betamethasone dipropionate preparations are useful for this purpose. Patients should be discouraged from licking the lesions as this will continue to superinfect the cheilosis with salivary bacteria.

In cases of refractory candidosis, mucocutaneous candidosis, patients in whom compliance is a problem, or women who have a concurrent candida vaginitis, a systemic antifungal therapy with ketaconazole or fluconazole is recommended (**Table 2**). If either of these medications is used for longer than two weeks, liver function tests should be performed to ensure against hepatotoxicity.

Recurrent Aphthous Ulcers

Recurrent aphthous ulcers, or canker sores, are the most commonly occurring nontraumatic ulcerations of the oral cavity, with the incidence rate varying from 20 percent to 60 percent of the population.[6,7] Although the etiology of recurrent aphthous ulcers is still unknown, current investigations favor an immunologic reaction in which there is a focal immune dysfunction involving the lymphocytes.8

A number of factors play a modifying or triggering role in the development of these ulcers. These include hormonal changes, trauma, stress, and food allergies.[9,10] Foods associated as triggering agents of recurrent aphthous ulcers include bovine milk protein, glutens, chocolate, nuts, cinnamon, spices, and preservatives.[11] A number of medications are known to cause these ulcers. The most commonly used medications reported to cause intraoral aphthous-like lesions are the nonsteroidal anti-inflammatory drugs.[12] Deficiencies of ferritin and vitamin B12 have also been associated with recurrent aphthous ulcers.[13]

These ulcers have long been associated with inflammatory bowel diseases. Inflammatory bowel disease may have extra-abdominal intraoral signs such as aphthous-like ulcers that may appear one year prior to radiographic abdominal changes.[14] However, there is controversy as to whether recurrent aphthous ulcers represent a primary manifestation of granulomatous bowel diseases or a result of the medical management of these conditions.[15]

Recurrent aphthous ulcers have a

Figure 3A Severe bilateral angular cheilosis in a 76-year-old female patient.

Figure 3B Close-up of the right commisure prior to therapy.

Figure 3C Resolution of the right labial commissure following three weeks of therapy using nystatin with triamcinolone acetonide ointment.

Figure 4A Minor recurrent aphthous ulceration of the upper lip.

Figure 4B Major recurrent aphthous ulceration of the lower lip.

Figure 4C Herpetiform recurrent aphthous ulcerations of the floor of mouth and ventral surface of the tongue.

characteristic clinical appearance of a shallow round or ovoid ulceration with a whitish center and an erythematous border. Clinically, recurrent aphthous ulcers present as single or multiple shallow ulcerations that occur on freely movable mucous membranes such as the lips, buccal mucosa, tongue, soft palate, floor of the mouth, and tonsillar pillars. They are categorized as minor, major, or herpetiform, depending on their size and duration (**Figure 4**). Minor ulcers heal within two weeks and are less than or equal to 0.5 centimeters in diameter. Major ulcers are larger than 0.5 centimeters in diameter, take six weeks to three months to resolve, and may heal with residual scarring. Herpetiform recurrent aphthous ulcers are very small (0.1 to 0.2 centimeters) and occur in groups, giving the appearance of a viral infection. However, these lesions are not viral in etiology as their name inappropriately suggests. The distribution of herpetiform recurrent aphthous ulcers is on movable mucosa. The lesions do not begin as vesicles or blisters.

To date, the treatment of recurrent aphthous ulcers is primarily palliative and symptomatic. Every effort should be made to eliminate predisposing allergens from the patient's diet. It is often helpful to have the patient maintain a food diary for two weeks to identify dietary triggers of recurrent aphthous ulcers. Once identified, the recurrence rate will decrease commensurate with the allergen's role in predisposing the patient to these ulcers. Therapeutic agents such as topical steroids and amlexanox 5 percent oral paste have been effective in decreasing the symptoms and healing time, but nothing has been effective in decreasing the recurrence rate unless a trigger or serum deficiency can be identified and corrected.

Topical steroids are frequently used for the treatment of minor recurrent aphthous ulcers (**Table 3**). These drugs seem to be effective by decreasing the inflammatory response, which results in minimizing both the symptoms and the healing time. One of the most effective topical steroid preparations is 0.05 percent fluocinonide, which is available in a cream, ointment, or gel vehicle. Patients must be warned that chronic use of topical steroids may result in mucosal atrophy as well as systemic absorption of the steroid. Patients must be instructed not to use topical steroid medications on virally induced lesions. Topical steroid therapy should not exceed two weeks for any occurrence of aphthous ulcers. Patients should discontinue topical steroid use for at least two weeks before reinstituting therapy for a recurrence of lesions. Cases of disseminated recurrent aphthous ulcers can be treated with a steroid rinse such as dexamethasone elixir 0.5 mg/ 5 ml. The same information regarding steroid use should be given to the patient. The broad mucosal contact of steroid rinses may predispose the patient to secondary candidosis. In severe cases that are not responsive to topical steroids, systemic steroids such as prednisone may

Figure 5A Recurrent herpes labiallis in a healthy 40-year-old female. Eary vesicle.

Figure 5B Late veiscle

Figure 5C Crusted lesions

Figure 5D Healing without presence of scarring.

Figure 6A Asymptomatic reticular lichen planus in a 43-year-old male. Striae of Wickham of the right buccal mucosa.

Figure 6B Resolution of the striae following two weeks of topical therapy with 0.05 percent fluocinonide cream.

become necessary. When prescribing systemic steroids or steroid rinses for severe oral ulcerations, concurrent therapy with antifungal agents should be considered.

Amlexanox 5 percent oral paste is a new medication specifically indicated for the management of recurrent aphthous ulcers.[16,17] This medication has antihistamine properties and has been shown clinically to reduce both the symptoms and duration of the lesions.

Other types of treatment include topical anesthetics, caustic agents, and laser ablation. Topical anesthetics such as 2 percent viscous lidocaine hydrochloride will provide temporary relief of pain. Caustic agents such as silver nitrate have been used to cauterize the central portion of the ulcer, thus providing pain relief. Cautery may result in mucosal scarring, which limits the clinical indications of this technique to cases of severe, extremely painful ulcers. Laser ablation has been used to manage aphthous ulcers in some individuals but is limited by both the availability of the laser and the cost to the patient for repeated treatments.

Herpes Simplex Virus Infection

The most commonly occurring viral infections of the oral cavity and perioral tissues are caused by the herpes simplex virus (HSV). The herpes simplex virus has two distinct serotypes, HSV-I, which is primarily associated with oral and perioral lesions and HSV-II, which is primarily associated with genital lesions. Studies have shown that this type site predilection, however, is changing, possibly due to changing sexual practices. In a review of 336 cases of primary genital herpes, 10.7 percent were associated with HSV-I.[18] A similar study of 160 cases of primary herpetic gingivostomatitis indicated that 2.5 percent of these infections were associated with HSV-II.[18]

Exposure to HSV-I is widespread, since HSV-I serum antibodies can be found in up to 90 percent of the American population. Primary herpetic infections occur in individuals with no previous exposure to the virus. They are seen most often, therefore, in children and adolescents. Primary herpetic infections can and do occur in adults but are often misdiagnosed by both physicians and dentists. Most often, exposure to HSV in children results in a subclinical infection. Only a small percentage of patients will develop clinical manifestations of primary herpes, most often primary herpetic gingivostomatitis, pharyngitis or both.

The clinical manifestations of primary herpetic gingivostomatitis include

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TABLE 2

Topical Medications Used to Treat Recurrent Aphthous Ulcers[35]

Medication	Forms	Dispense	Instructions	Advantages/ Disadvantages
Ketaconazole	200 mg tabs	14	Take one tablet daily with a meal until gone.	Inexpensive, high compliance, poor absorption, must take with meal, potential for hepatotoxicity
Fluconazole	100 mg tabs	15	Take two tablets the first day and then one tablet daily until tone.	High compliance, good absorption, expensive, potential for hepatotoxicity

TABLE 3

Topical Medications Used to Treat Recurrent Aphthous Ulcers[35]

Medication	Forms	Dispense	Instructions	Advantages/ Disadvantages
Fluocinonide	0.05% cream ointment	30 gram tube	Apply thin coat to ulcer after meals and at bedtime. Do not eat or drink for 30 min. following application. DO NOT USE FOR MORE THAN TWO WEEKS.	Shortens the duration and severity of lesions, prompt relief of pain, patient must carefully follow directions, risk of mucosal atrophy absorption with prolonged use
Amlexanox	5% oral paste	5 gram tube	Apply thin coat to ulcer after meals and at bedtime. Do not eat or drink for 30 min. following application.	Primary indication for use is aphthous ulcers, very safe, minimal side effects, moderately expensive
Dexamethasone	elixir 0.5 mg/5 ml	100 ml	Rinse with one teaspoonful for: 3 minutes four times daily and expectorate, until lesions resolve. DO NOT SWALLOW.	Shortens the duration and severity of lesions, prompt relief of pain, patient must carefully follow directions, risk of mucosal atrophy and absorption with prolonged use, risk of secondary candidosis

systemic involvement as well as oral lesions. This disease is characterized by a rapid onset of generalized prodromal signs and symptoms, such as fever, malaise, headache, irritability and regional lymphadenopathy. The systemic symptoms are followed by the development of oral lesions. The first intraoral manifestation is a severe generalized gingival inflammation. Within several days, this is followed by the development of oral vesicles, which can occur on any of the oral mucous membranes. The vesicles rupture very rapidly, forming shallow, ragged, extremely painful ulcerations with a yellowish center and erythematous borders. The lesions begin as numerous punctate ulcerations that then coalesce, forming larger irregular ulcerations. Extraoral lesions occurring on the lips will often appear crusted. The oral lesions are usually accompanied by severe pain, foul odor, and increased salivation.

Acute primary herpetic infections may also present as pharyngitis without any other oral lesions. This occurs most often in adolescents and is characterized by a sore throat, dysphagia, cervical lymphadenopathy, fever, and headache.

The diagnosis of primary herpetic gingivostomatitis is most often based on the presence of prodromal systemic signs and symptoms in addition to the characteristic clinical appearance of generalized oral ulcerations. Diagnostic tests such as viral isolation in tissue culture and direct immunofluorescent antibody testing can be used to confirm the diagnosis, but they are not routinely used in an otherwise healthy patient.

Acute primary herpetic oral infections can vary considerably in severity and duration. In a healthy individual, the disease is self-limiting and lasts approximately 10-14 days, and the lesions heal without scarring. Since this is an acute viral infection, the usual supportive measures such as the maintenance of adequate fluid intake and nutrition should be undertaken to prevent dehydration and electrolyte imbalance. Patients often present with severe pain. Systemic analgesics such as acetaminophen with or without codeine are useful for the control of pain. Aspirin and nonsteroidal anti-inflammatory medications should be avoided in acute viral infections.

Systemic antiviral agents such as acyclovir are not routinely indicated for primary herpetic gingivostomatitis except in severely immunocompromised

Figure 7A Ulcerative lichen planus in a 74-year-old female. Ulceration along the left linea alba. Note the striae peripheral to the ulceration.

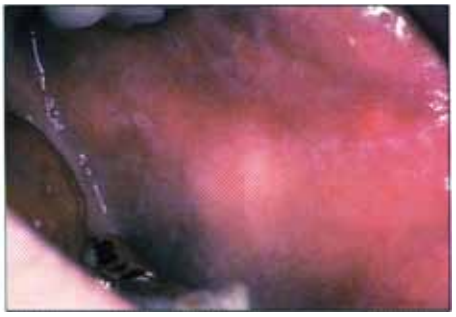

Figure 7B Appearance of the left buccal mucosa following two weeks of topical steroid therapy.

Figure 8A

Figure 8B

Figure 8C

patients or when there is ophthalmologic involvement. However, if the use of acyclovir is considered, it will be most effective if prescribed very early in the clinical course of the infection. The usual dosage of acyclovir is 200 mg, five times daily for seven to 10 days (**Table 4**).[19] The current Food and Drug Administration recommendation is that this regimen be used to treat oral herpes only in immunocompromised patients.

Recurrent Herpetic Infections

Approximately 30 percent to 40 percent of patients who have been exposed to HSV will develop recurrent infections that can present as either recurrent herpes labialis or recurrent intraoral herpes. These lesions represent reactivation and not reinfection of the HSV, which persists in a latent state in the trigeminal ganglion. The lesions are characterized by a mild clinical course and can be triggered by exposure to sunlight, fatigue, stress, hormonal changes such as menstruation, gastrointestinal disturbances, and oral trauma.

Recurrent herpes labialis (fever blister, cold sore) is preceded by prodromal signs or symptoms such as burning, tingling, tautness, soreness, or swelling in the site where the lesions will develop. Within a short time, small vesicles develop in clusters along the vermilion border of the lips (**Figure 5**). The vesicles rupture, resulting in ulcers that can coalesce to form larger irregular ulcerations with a crusted surface. In a healthy individual, the lesions heal in seven to 14 days without scarring.

The diagnosis of recurrent herpes labialis is based on its characteristic clinical appearance.

The treatment is still primarily symptomatic. Ice, ether, chloroform, and rubbing alcohol have been used as topical agents with mixed results. Historically, topical antiviral agents such as acyclovir ointment have also been used with limited success primarily because of poor cutaneous absorption. The Food and Drug Administration has recently approved penciclovir 1 percent topical cream for the treatment of recurrent herpes labialis (**Table 4**).[20] This cream may reduce the severity and duration of the viral outbreak. Lysine tablets have also been used with varying degrees of success. Some investigators reported that lysine resulted in milder episodes of herpes labialis if taken in high doses (2-3 gm) at the first prodromal signs.[21] In some individuals, it was also found to be effective in preventing recurrences if the patient continued to take 1,000 mg per day. Systemic antiviral agents, such as acyclovir, are primarily used in severe cases of mucocutaneous or ophthalmologic herpes simplex infections in immunocompromised patients. However, in patients known to have recurrent herpes labialis induced by exposure to sunlight, a prophylactic regimen of acyclovir 400 mg twice daily may be employed if prolonged actinic exposure is anticipated (**Table 4**).[22]

In healthy patients, recurrent intraoral herpes occurs less frequently than herpes labialis. Intraoral herpes may be triggered by dental therapy or trauma from mastication. The intraoral lesions begin as clusters of tiny vesicles that rupture very rapidly leaving small punctate ulcerations. These ulcers can coalesce as the lesion progresses, forming larger irregular ulcerations. The lesions occur primarily on oral tissues that are firmly bound to

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TABLE 4

Medications Used to Treat Herpetic Infections[35]

Medication	Forms	Dispense	Instructions	Advantages/ Disadvantages
Penciclovir	1% cream	2 gram tube	Apply every two hours during waking hours for four days. Treatment should be started during the prodromal symptoms, if possible.	High compliance, decreased duration and pain of episode, primary indication is RHL, safe, expensive
Acyclovir*	200 mg capsules	50	Take one capsule five times daily until gone.	Safe, inexpensive, must be initiated during prodrome to be effective
Acyclovir**	400 mg capsules	14	Take two capsules daily starting one day prior to anticipated sun exposure until gone.	Safe, inexpensive

* Recommended regimen for primary herpetic gingivostomatitis. The current Food and Drug Administration recommendation is that this regimen be used to treat oral herpes only in immunocompromised patients.

** Recommended prophylactic regiment for severe eipsodes of recurrent herpes labialis in a patient at risk for sun exposure. The current Food and Drug Administration recommendation is that this regimen be used to treat oral herpes only in immunocompromised patients.

the underlying bone, i.e., the hard palate, attached gingiva, and alveolar ridges.

The diagnosis of these lesions is based on the clinical appearance of the lesions and their location. The amount of discomfort associated with these lesions varies, and they heal without scarring in seven to 14 days. The management of pain in recurrent intraoral herpes would involve the same topical palliative agents as were recommended for the painful lesions of primary herpetic gingivostomatitis.

Patients must be informed of the infectious nature of both acute and recurrent oral herpetic conditions. The vesicles of oral herpetic infections are extremely contagious, so care must be exercised to avoid autoinoculation of other mucosal sites as well as transmission to others. All stages of these viral lesions are potentially infectious until complete re-epithelialization has occurred.

Lichen Planus

Lichen planus, a disorder of unknown etiology, represents the most common dermatologic disease with oral manifestations. The skin lesions occur as violaceous papules with a fine scale on the flexor surface of the arms and legs. The oral lesions vary greatly in appearance and frequently represent the only clinical sign of disease. Lichen planus is usually found in patients older than 40 and is frequently associated with stress and anxiety. Numerous medications have been reported to cause oral lichenoid drug reactions.[23,24] Commonly encountered medications may include thiazide diuretics and tetracyclines. Dental amalgam restorations with direct mucosal contact have also been implicated in lichenoid reactions.[25] The patient may be unaware of the intraoral form of the disease because it is often asymptomatic. Therefore, the oral soft tissues of patients with signs and symptoms of dermal lichen planus must be examined.

Oral lichen planus is often identified by the presence of fine, reticular white lines (striae of Wickham) on the lateral borders of the tongue, buccal mucosa, and gingiva (**Figure 6**). However, striae are not always present, especially in the ulcerative form of the disease, therefore, definitive diagnosis is made by biopsy. Although prospective studies have failed to demonstrate that lichen planus is a premalignant disorder, it is recommended that all patients exhibiting this condition intraorally, particularly those who have had the ulcerative form, receive long-term follow-up (**Figure 7**).[26-28]

Fluocinonide cream, ointment, or gel is effective in treating mucosal lesions and has not been shown to cause adrenal suppression (**Table 5**).[29] Ultrapotent topical steroids such as clobetasol propionate ointment may also be used intraorally and appear to be safe and effective.[30] However, because of potential systemic adverse reactions from long-term use of ultrapotency topical steroids on the skin, patients must be monitored regularly.[31]

Occlusive steroid therapy using custom-made flexible mouth guards to localize fluocinonide gel is extremely effective in controlling the gingival lesions of lichen planus.[32,33] Fluocinonide 0.5 percent gel is applied to the mouth guards, and patients are instructed to wear the mouth guards for 30 minutes per application. Therapy can be instituted with a regimen of four applications daily, preferably after meals and at bedtime. The frequency of daily use depends on the response of the lesions. Long-term control of persistent lesions can often be achieved with a 30-minute application every other evening.

Disseminated lesions can be controlled with dexamethasone rinses. Refractory, persistent, localized lesions respond very favorably to intralesional injection of triamcinalone (10 mg/ml) in lidocaine. Secondary candidosis should be considered when ulcerated lesions remain refractory to conventional therapy or when an unexplained relapse occurs in a

TABLE 5

Toipical Medications Used to Treat Lichen Planus[35]

Medication	Forms	Dispense	Instructions	Advantages/ Disadvantages
Fluocinonide	0.05% cream ointment gel	30 gram tube	Apply thin coat to ulcer after meals and at bedtime. Do not eat or drink for 30 min. following application. DO NOT USE FOR MORE THAN TWO WEEKS.	Shortens the duration and severity of lesions, relief of pain, patient must carefully follow directions, risk of mucosal atrophy and absorption with prolonged use, gel form should be used with custom carrier(s)
Clobetasol propionate	0.05% ointment	30 gram tube	Apply thin coat to ulcer after meals and at bedtime. Do not eat or drink for 30 min. following application. DO NOT USE FOR MORE THAN TWO WEEKS.	Shortens the duration and severity of lesions, relief of pain, patient must carefully follow directions, risk of mucosal atrophy and absorption with prolonged use, risk of systemic absorption
Dexamethasone	elixir 0.5 mg/5 ml	100 ml	Rinse with one teaspoonful for three minutes four times daily and expectorate, until lesions resolve. DO NOT SWALLOW.	Shortens the duration and severity of lesions, relief of pain, patient must carefully follow directions, risk of mucosal atrophy and absorption with prolonged use, risk of secondary candidosis

TABLE 6

Medications Used to Palliate Oral Mucosal Ulcerations

Medication	Forms	Dispense	Instructions	Advantages/ Disadvantages
Lidocaine HCl	2% viscous	100 ml bottle	Apply with cotton swab or rinse for two minutes prior to meals and expectorate. DO NOT GARGLE OR SWALLOW.	Safe, inexpensive, fast-acting pain relief, short duration, may compromise gag reflex
Dyclonine HCl	0.5% or 1.0%	1 ounce bottle	Apply with cotton swab or rinse for two minutes prior to meals and expectorate. DO NOT GARGLE OR SWALLOW.	Safe, inexpensive, fast-acting pain relief, long duration, may compromise gag reflex
Diphenhydramine HCl and magnesium hydroxide/ aluminum hydroxide	children's elixir suspension	OTC Mix equal parts (50% mixture of each)	Rinse with two teaspoonsful for two minutes as necessary for pain and expectorate.	Safe, inexpensive, fast-acting pain relief, provides coating over ulceration, short duration, children's elixir contains no alcohol
Sucralfate	suspension	14 ounce bottle	Rinse with two teaspoonsful two minutes prior to meals and at bedtime and expectorate.	Safe, fast-acting pain relief, provides coating over ulceration, moderate duration, expensive.

patient using topical steroids.[24] Systemic corticosteroids will resolve oral lesions that occur coincidently with skin lesions of lichen planus, but recurrence of oral lichen planus is likely. Use of systemic steroids for longer than two weeks at doses greater than 40 mg daily are likely to result in side effects that may not resolve once the steroids are discontinued. These side effects include oral candidosis, hypertension, fluid retention, gastrointestinal discomfort, insomnia, fat deposition, and skin rash.[31] Intraoral mucosal conditions that are refractory to therapeutic trial or remain present for longer than two to four weeks should be biopsied to establish a definitive diagnosis.

Discussion

Management of painful oral mucosal conditions may be either topical or systemic. Oral therapy should address patient nutrition and hydration, oral discomfort, oral hygiene, and management of secondary infection, as well as local control of the disease process. Depending on the extent, severity and location of oral lesions, consideration should be given to obtaining a consultation from a dentist who specializes in oral medicine, oral pathology, oral surgery, or periodontics. If the oral lesions are painful enough to limit normal dietary intake, nutritional supplementation and adequate hydration must be stressed to the patient. Commercially available weight-control beverages serve this purpose in a cost-

effective manner. Cold beverages or the use of ice chips may provide temporary relief of oral pain. Citrus fruits, carbonated beverages, and other acid-containing or spicy foods will exacerbate oral discomfort, so they should be avoided.

Symptomatic relief can be provided with topical preparations such as 2 percent viscous lidocaine hydrochloride, or 0.5 percent dyclonine hydrochloride applied prior to meals to facilitate eating (**Table 6**). Topical anesthetics can be used as a rinse in adults but should be applied with a cotton swab in a child so that the child does not swallow the medication. Swallowing these anesthetics is contraindicated, in part, because they may interfere with the patient's gag reflex. Symptomatic relief can also be obtained by mixing equal parts of diphenhydramine hydrochloride elixir and magnesium hydroxide/aluminum hydroxide. Children's formula diphenhydramine hydrochloride elixir does not contain alcohol. Sucralfate suspension may also be used prior to meals. The diphenhydramine mixture and the sucralfate coat the ulcerated lesions and allows the patient to eat more comfortably.

Mouthrinses containing a hydroalcoholic vehicle should be avoided because of the oral discomfort that will result from their use. The amount of oral discomfort experienced by patients with oral mucosal lesions varies and can often be controlled without the use of narcotic analgesics.

Meticulous oral hygiene is mandatory for these patients. Mucosal lesions contacting bacterial plaque present on the dentition are more likely to become secondarily infected. Patients should be seen by the dentist or hygienist for scaling and root planing, under local anesthesia when necessary, in all cases where oral hygiene is suboptimal. Patients must be encouraged to brush and floss their teeth after meals in a gentle, yet efficient manner. This may be enhanced by placing a soft toothbrush under hot water to further soften the bristles. Tartar-control toothpastes containing calcium pyrophosphate should be avoided because of their caustic nature and reported involvement in circumoral dermatitis.[34]

Secondary infection of ulcerative oral mucosal lesions is most commonly fungal in etiology. While long-standing oral ulceration alone may predispose some patients to secondary candidosis, therapeutic regimens of antibiotics or steroids will increase the frequency of mycotic infection in susceptible individuals.[24] Bacterial infection is less common. Unless the lesions become indurated or purulent or are associated with an acute tender lymphadenopathy, antibiotic coverage should not be necessary.

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Target Weighted Portfolio Approach to Investing

Darrell W. Cain

ABSTRACT A variety of investment strategies are used in the purchase of stocks and bonds. Because of changing market conditions, what has been successful in the past decade may not be in the next. In this paper, the author discusses theories of investing, explains his view of the dynamics that have affected recent market conditions, and outlines his target weighted portfolio approach to investing.

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The process of investing money is one of mystery and uncertainty for many people. In the past 10 years, the stock market – purchase of both stocks and bonds – has been the most prevalent method of investing money. During the past decade, the majority of all financial gains has been made in the stock market. This trend started after the retrenching of the U.S. economy in the mid to late 1980s, when the government declared $500 billion of real-estate loans as nonperforming and bailed out the savings and loan industry. This retrenchment caused a fundamental re-evaluation of investing within the United States. Many other areas of investing -- such as gold, real estate, farming, oil and gas drilling ventures, and the limited partnerships of the late 1970s and early 1980s – went by the wayside as the government changed its tax laws and policies. The purpose of this article is to discuss the various investment theories used in purchasing stocks and bonds, to review what works, and to discuss various concerns an investor should have about the stock market investment philosophy promulgated in the past 10 years. Some things that have worked in the past decade may not be appropriate in the future. It is important not only to discuss what works, but also to re-evaluate and consider what may not work.

Investing money is supposed to be a logical, numerically based process. The most common method of measuring one company against another is to look at their relative earnings compare them to

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the price multiple the companies sell for in the stock market. This multiple of price is usually based on the positioning of the company within its industry, the outlook for the company's growth, and predicted future earnings. The price/earnings ratio of companies has a relationship to the value of what can be purchased elsewhere outside the stock market.

The most common barometer people use to measure return is the price they are able to pay for a stock compared to the yield and safety of a bond. Usually, the lower the interest rates, the higher the multiple people will pay for stocks. This is an "opportunity cost of money" approach to investing. Why would someone purchase stock in a company that is only growing at 5 percent per year, costing a multiple of 20 times earnings, when he or she could purchase a very safe corporate bond yielding 9 percent? Many times stocks can become overvalued, so people consider purchasing bonds. Currently, interest rates are very low, and it is logical for people to pay higher multiples of earnings for stocks than they have in the past. However, investors should be aware that with the growth in the stock market during the past 10 years, some people have started to purchase stocks without realizing that they can, in fact, lose money. Many of these problems come from unreasonable expectations from the purchasers. Stocks purchases often have no basis in economic reality, particularly when a new company is having an initial public offering. Many times in the past 10 years, new stocks have been issued and the price has raced upward only to plummet when earnings do not meet expectations. This has created an attitude of gambling within the common investor.

The process of investing money should not be viewed as gambling. It is appropriate and important to develop a long-term attitude and a game plan to handle the ups and downs of the stock market. If an investor wants to be in the market to make the gain, the investor also has to be in the market when it goes down. Many investors are happy every year to make a 20 percent return on their money; but in any year where there is a zero or negative return, they want to know why their money was not moved into certificates of deposit or money market funds. An investor can anticipate broad trends in the stock market; however, he or she generally cannot truly "time the market." Timing the market is usually a very poor method of investing money. This is not to say, however, that there are not times when broad macroeconomic situations require an investor to reposition his or her assets.

This paper will discuss positive and negative strategies that are currently used in the investment field. The purpose is to discuss a methodology that the author has used over the past 10 years to produce outstanding results -- the target weighted portfolio approach. This approach is not based upon making the most money in the stock market. It is based on protecting the money that has already been saved. Dentists need a methodology to invest money that is appropriate for their circumstances. Being in the service profession, they have the ability to save and accumulate money, but everyone fights the fact that their wants and needs exceed the available cash flow. Saving money is unnatural because people have to forego current wants and needs to accumulate money in the hope that by investing it they will have money to live on in the future. Times of uncertainty exacerbate this problem and lead people to wonder whether their method of investing is appropriate. Therefore, an approach based upon targets and goals seems more appropriate than just throwing money into a diversified set of investments and holding on, hoping it works out. It is important to note, however, that investment advice is specific to each person's circumstance. Understanding what is appropriate for an individual investor begins with a basic knowledge of the investment process.

Basic Education

A large amount of money in the United States is currently being put into savings because the aging population is behind in its savings plans for retirement. Baby boomers are saving for the future, but they are behind. They are finishing paying for their children's educations so they are starting to move their money into the stock market and are expected to continue to do so for at least another 10 years. One of the first things that works when investing money is to do a good demographic analyses when choosing companies to invest in. It is important to identify broad trends within the marketplace and analyze how people plan to spend money. An investor must pick those industries that are going to realize benefits from the changing demographics. Then, he or she must pick the companies within those industries that have good management and are positioned to take advantage of the upcoming trend. This is the most appropriate way to invest because if an investor can identify demographic trends and buy the companies that will benefit from them, he or she has the most likelihood of seeing increased earnings and rising prices. One must also realize, however, that some things that were hot demographically in the stock market recently have already reached their peak. These companies' prices have already been bid up, and they cannot sustain the growth that drives the

high prices for their stock. All good things can come to an end. It is important that investors not get trapped in these stocks based on past performance.

Over the next 10 years, the stock market has a good outlook with high productivity taking place in technology within the United States. This will lead to many opportunities for increased growth and earnings within the stock market. However, when investing, one should not ignore basic business cycles that could affect the stock market. Although timing is not an appropriate way to invest money, one can certainly review the most recent downturns in the stock market and see that many of these events were tied to certain economic cycles. The great difference in interest rates between CDs and bonds yielding above 10 percent compared to the earnings of the companies and the multiples of prices that people were paying for those companies, caused the stock market to correct in 1987. Therefore, stocks went down. The government was able to compensate for this turn of events by dropping interest rates, which then effectively lowered the yields on alternative investments such as bonds and stabilized the stock market. That is an example of an interest rate cycle affecting the marketplace.

From 1990 to 1991, the market was down, which was tied to the Persian Gulf War and the speculation that was associated with the United States losing its ability to obtain oil from the Middle East. It is easy to predict that such an incident will affect the stock market. In 1994, there was a temporary downturn in the bond market due to exotic investments called derivatives and various bond failures such as that seen Orange County, Calif. That event also involved the purchase of assets in funds that were involved in very speculative activities. Speculative activities are usually a good way to lose money. Investors should try to stick with value-oriented investing, i.e., buying stock in companies that have good cash flow and a large market share within their industries.

There is a very different situation in the late 1990s for many of the basic business cycles that caused the stock market to decline in the past. In the current situation, people have been pouring money into the Far East and have created a significant overcapacity situation worldwide as it relates to the ability to produce goods and services. In one recent article, it was noted that the current world capacity to produce automobiles is in the neighborhood of 25 million more automobiles than people currently buy per year. This fact is causing automobile companies to sell for very low multiples of earnings because of the uncertainty of their business cycle. In addition to having significant overcapacity, there are many countries all over the world that have very low to no financial controls in place regarding the reporting of earnings. This has caused a situation in the Far East where most of the banks of Japan and other countries are insolvent. However, they have never realized these losses on their financial statements; and they continue to roll over their bad loans from year to year, endangering their depositor's monies. Once this overcapacity situation reached a crisis situation, the majority of people in the Far East, which accounts for more than half of the world's population, lost almost all their money. These countries are unable to sell their goods and services; and they have been dumping all of the basic commodities of gold, silver, oil, timber, etc. into the marketplace to raise cash to meet their debts. This has caused a crisis situation. Many people in the world are now unable to buy U.S. goods and services, which has created a significant trade deficit.

Every day there are reports of ships coming fully laden from the Far East, selling goods at very cheap prices and going home empty. This dumping of basic commodities into the U.S. marketplace means U.S. companies are unable to pass on price increases because their competition can undersell them. If they tried to increase prices, they would lose a significant market share. In addition, low interest rates and low inflation have created a situation of full employment. With full employment, people are seeking wage increases, and companies often have to pay those increases to keep good employees. These companies' profit margins are shrinking they have to pay higher salaries but have no ability to pass on a price increase. This has created low inflation, but it has also created a situation in which the earnings are starting to decline. This is important to note because as earnings decline, the value of the stocks and the multiples they are selling at as a percentage of their earnings are in danger of falling.

From 1982 to now, the average stock sold for nine times earnings; and now, in 1998, the average stock sells for 24 times earnings. This is called price/earning ratio expansion. Price/earnings expansion occurs when companies are still growing in their earnings at the same level they've always grown, but are selling for two to three times more than they have historically. This has to do with falling interest rates, but it also has to do with the amount of money flowing into the market. It's important to note, however, that with declining earnings, these multiples become unreasonable; and it is very possible that many stocks could fall significantly. Also contributing to a

possible stock price decrease is the fact that many companies in the United States have become dependent on selling goods and services overseas. As these earnings start to fall, there is a danger for stocks. Therefore, it is important to note that the formula used to invest money during the past 10 years -- buying companies that have good earnings growth, cash flow, and expanding sales -- may be changing.

This means, in particular, that the Blue Chip stocks (or what was known in the early '70s as the "nifty 50" stocks) may be at risk of declining. People do not realize that the indices they watch and measure stock market performance by are totally influenced by 50 or 70 stocks. The Dow Jones Industrial Average is made up of just 30 stocks and represents the financial fortunes of just those 30 companies. The S&P 500 index is a little harder to understand. Many people believe it represents the average return of the 500 largest companies in the stock market. This is not exactly true. The S&P 500 represents the 500 companies in the stock market based on their relative market capitalization or the size of the company in the stock market. This means that approximately 70 companies out of the 500 companies are so large that whatever they report as earnings and whatever price they are selling for in the stock market significantly affects this index.

In April 1998 through July 1998, the average stock market stock fell more than 30 percent, but the S&P 500 index remained positive. This sometimes causes problems because people start buying stocks based on brand name recognition. The problem is, an investor may be purchasing a stock that is selling for such a high multiple of earnings that with possible declines in earnings, the investor is at risk of losing a significant portion of money. This has been particularly true of technology stocks and certain companies that have had sales overseas in areas of broad positive demographic industries. This has led to significant speculation.

Most investors are not aware of a phenomenon known as price/earnings contraction. The last time this happened and had any significance was in 1973. The "nifty 50" stocks were selling for price/earning ratios that were close to 18 times earnings compared to the current price/earning ratios of the high 20s. These stocks lost more than 50 percent of their value in one year. Past does not dictate the future. Stocks that have done well in the past may not necessarily do well in the future. One cannot ignore situations in which stocks have been rising to levels that are not supported by underlying value.

People have bought some of the large stocks but do not realize that in 1973 and 1974, many of these stocks that were selling at high multiples declined in value by more than 50 percent and did not come back to the same price for at least 10 years. The investment strategy of "Well, it went down and all I have to do is hold it and it will come back," is a mistake. If one has $100,000 invested in these very large 50 stocks, and they go down by half in value (to $50,000), and one has to wait any period of time for those monies to come back to even, one has lost the impact of compounding the money, which is necessary to be able to build enough for retirement. Therefore, it is important for an investor to look at the earnings forecast and the multiples of the stocks he or she is buying. Over the next several years, these large company stocks will be vulnerable to significant price declines.This does not mean that the company won't be vibrant, growing, and employing people. It could grow in its earnings 10 percent to 15 percent per year. But, through what is called price/earnings contraction, the multiple that the stock sells for of 25 times earnings could decline to say 15 times earnings and even though the company continues to grow, the stock price could go down by half and stay down. Many people are not aware of this phenomenon, particularly when one considers the large mutual funds that have done well. Many times they have put most, if not all, of their investments into this small group of stocks with high price/earnings ratios.

Human nature is to find a good stock and hold onto it for a long time, riding it up, and then ignoring the circumstance when the stock declines, having regret, but continuing to hold the stock just hoping to get back to the high point of the stock price. Human nature is that no one likes to lose. Sometimes what one has to realize is that the stock has already gone up, and it is time to look for something else. The tobacco industry is an example. Many of those stocks have made a lot of money over the past 10 years; however, with the mounting state lawsuit settlements in tens of billions of dollars, an investor would have to ask "Do these companies have the ability to pay these judgments?" The risk of making an investment in this area is too great. It violates one of the first rules of investing, which is don't just worry about making a return on one's money, remember to keep the money.

Dollar-Cost Averaging

Another way of investing money is to consider dollar-cost averaging. Dollar-cost averaging is a methodology with a systematic savings program. A constant savings program is appropriate because to accumulate money, two things must happen: One, a person must spend less money than he or she earns, and two,

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once that money is saved, that person must deny its existence. Dollar-cost averaging is a system in which one saves money on a regular basis into his or her savings program. However, there are people who sometimes come into large sums of monies and hold it out of the stock market with some fear that it is the wrong time to buy. This is usually a bad strategy. It is generally better to put all the money into the market at once. However, it is important not to put all of the money in growth-oriented stocks, but to diversify and chose an appropriate asset allocation.

Another example of human nature is the tendency of people to withhold their money when the stock market is doing poorly. This is poor timing. When the stock market is doing poorly and stocks are down, good stocks also often go down. This is an opportunity to buy those stocks at a lower price. Therefore, even though it is human nature to withhold money during bad times, it is usually the best time to buy. This is an example of how people let their emotions contradict logic.

Asset-Allocation Theory

The next key item in the investment of money is the asset-allocation theory.

Some people think that the fund manager who makes the decisions about investing money is irrelevant. This was probably true in times of increasing price/earnings ratios, but the manager does have some influence on the market, particularly in a time when the market goes down. Individual selection of stocks in certain industries does matter. Some people have used fancy allocation theories based on looking at past performance of the stock market and coming up with a methodology where they put a specific percentage of the assets into certain industries or certain countries or certain types of stocks. With an asset-allocation theory, there is an appropriate time to buy some small companies and a time to buy large companies; but sometimes the purchase of individual stocks in foreign stock market exchanges is inappropriate and too risky.

One of the basic rules the author employs in investing overseas is never to invest in a company based on a foreign stock exchange. Always invest in a U.S. company that has a large market position in the overseas market. This is because the financial systems that ensure the accountability and performance of the earnings of the companies are better regulated through U.S. companies. Also, the average stock market capitalization in many foreign countries is so small that any single event can cause a significant fluctuation in the value of the stock market. This means that some of the high gains and large losses that take place overseas are really a matter of speculation. It is not appropriate to speculate with savings.

One of the problems with an asset-allocation theory based on past performance is that the allocation theory does not anticipate future trends in the marketplace and does not allow for logical reallocation of assets to meet changing situations. For example, when it became clear that the Far East was going to lose most of its financial assets, it was certainly a time to remove some exposure in those industries. Not only is demographic investing important in picking out the trends of what companies to buy, it is also important to look at where the company does business. This requires analysis and research, which has not been happening in the past 10 years. Instead, consumers buy brand-name identification from Madison Avenue, i.e., buy stocks that they have heard about or blindly invest in groups of assets based upon a formula.

People believe asset allocation is some form of magic. Asset allocation is a matter of prudently investing some money into the bond market and playing the cycle of interest rates; and putting certain assets in both big companies and small companies, particularly as these companies become undervalued. Even with an asset-allocation plan, an investor has to be flexible enough to move some money around as events change.

Mutual Funds

There are many well-managed mutual funds in the country, and they are probably the best way to buy stocks and have a diversified investment portfolio. Buying individual stocks requires a lot of research and constant attention. The problem is, with a lot of young investment managers in the country, many who have only been investing money for the past 10 years, there are unusually high allocations to "nifty 50" big stocks, which run up and down the indices of the stock market. Since most people compare the performance of their mutual funds to these indices, many of these young managers have just made decisions to buy the major components of the indices so that no matter what happens, they can point to the index and say "Well, I did as well as the index," or if the index goes down, they can say "Well, you know the index went down, and so did I. You can't always make money." This seems to be the defense of their decision-making. Particularly as the market turns down, many of the smaller companies in the stock market have corrected and gone down significantly. This represents a large buying opportunity. After this correction in the market, which may last until the year 2000, it will be important for investors to make sure that they diversify part of their money with money managers

who have experience in small-cap stocks.

Since the timing is unknown, but the stocks have been identified as undervalued, investors should put their money into these funds early and hold through any remaining downturn. This is because many of the small-cap stocks are already down in value more than 50 percent, thereby creating a significant buying opportunity.

Bond Funds

The problem with accumulating money is that ultimately, once an investor retires, he or she must start using that money. The investor needs to start receiving a yield. This is where bonds come in because they are the most prevalent way of receiving checks from investments after retirement. An investor must be wary of the average bond fund. In many cases, whether the market is going up or down, the investor is losing money. For example, when interest rates drop, people who have their money in CDs or other financial instruments are in a situation in which they don't have enough cash flow coming from their CDs or Treasury bonds. So they chase yield. What that means is that people pour money into bond funds, and then they drive up the price of the fund, decreasing its yield. Many times, this decreases the total return for the people who were already in the fund. This has a tendency to dilute the gain of the fund across the people in it and does not give the same gain that would be received if one held individual bonds.

Likewise, when interest rates rise, bond prices go down. As people see the erosion of their principal start to take place, they panic. This often causes a redemption problem in which people want to take their money out of the bond fund. This flight of capital out of the fund usually causes the manager, who has tried to be fully invested, to sell the best of the bonds to raise cash to meet redemptions. This has a tendency to cause the bond manager to sell the "good bonds" and hold the "dogs" of the fund. This is a problem because the people who are loyal to the fund end up with a portfolio of underperforming bonds. The bonds are not of the same quality that existed when the purchasers initially bought into the fund. One of the things needed for a good investment strategy is an outlet to invest in bonds that are diversified but send a steady check and reward the holder as the market goes up and down, without dilution from other people.

This is important because when it comes time to retire, one cannot own and take yield off of mutual funds as a form of receiving a check during retirement. When the stock market is going up and one keeps buying more mutual funds, the funds expand. Then it will work to sell shares of the fund if the market is rising. An investor can sell some of the shares fund and use that to live on during retirement. However, when the market declines and the value of the shares are declining and the investor is in a position where he or she must sell some of the shares of the funds to be able to live, the investor is losing principal. In that regard, it is important to have an investment strategy that allows one to hold an investment that sends a check. As the value of the investment fluctuates, one does not have to sell the principal to live.

Although a stock can be at $100 per share and fall to $80 per share and never go back up, as long as the investor picks the bond in the right company a bond can decline, but the investor will get his or her money back at maturity. That's important to note as a method of investing money.

Target Weighted Portfolio Approach

The author's method of investing money is to define a goal and emphasize it. Over the past 10 years, he has been using a goal of investment return of 10 percent to 13 percent. He has tried to obtain a 7 percent return above inflation. When setting a target, one of the principal methods is not to try to beat the stock market, but just to achieve a goal. An important part of the strategy is that once that goal has been obtained, the investor must not be afraid to sell his or her investments to realize the gains. This means one should not be afraid to sell at the top. A lot of investment strategy says that this means the investor will miss some of the top end of the market, but as many people have recently learned, the top end of the market is illusive and one can lose a good bit of gain. Since people are not smart enough to always sell at the top and buy at the bottom, the author uses a methodology where once the target has been hit, he starts to lessen the risk. The main tenet of the target weighted portfolio approach to investing money is always to protect the principal. As long as the principal remains, there is still an opportunity to invest. Since the market is volatile and goes up and down, keeping principal maintains the opportunity to make money.

The second tenet of the approach is having a reasonable asset allocation. The author allocates a significant portion of assets to bonds. At any given time, the author puts 40 percent to 50 percent of his clients' money in bonds, mostly high-yielding bonds. These high-yielding bonds require attention, however, because the investor must analyze the individual asset to make sure the company has the ability to pay back the bond.

The third tenet of the target weighted portfolio approach is that when an

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investor sells but cannot find anything of value to buy, he or she should not be afraid to build up cash. In many people's minds, this is inefficient because the money is not invested at all times; but holding cash is sometimes the best investment.

The fourth tenet is to anticipate that things will go down and not panic. The more the market changes, the more an opportunity arises for a good investor to take available cash and buy when things are down. This approach can make a lot of money if handled correctly.

The last tenet is that discipline is important. The investor much constantly save money and allow the money to have time to grow. One must not expect it to create returns on a quarterly basis and in equal installments, but one must realize that things that have value ultimately realize that value. The investor should not be afraid to realize that he or she must measure the risk and compare that to the value that can be received and, if possible, invest in things that stand in front of large economic trends that will lead to making more money.

Diversification is important. One should never put more than 2 percent to 5 percent into any given thing. In this way, any individual misallocations or bad events will not hurt the investor. Also, one should diversify in industries. It is good to buy value-oriented investments that can be measured in relative values as compared to other economic assets.

An investor should choose a fund manager who is not afraid to sell, someone who is not afraid to build cash and buy bonds and stocks, particularly when they are down.

Outlook for the Future

In the short term, the Y2K problem and the inability of U.S. companies to pass on price increases will lead to uncertainty in the stock market through the year 2000. With this scenario in place, investors should stay in the stocks that are in basic industries and invest regularly in small-cap stocks. Investors should be wary of the price/earning ratio contraction that could arise and therefore lessen their risk in companies with high price/earnings ratios, which have been purchased just based on brand recognition. For the next 10 years, the outlook is good. One must not be afraid to continue to invest and should not stand still out of fear. Instead, an investor should establish a plan and work the targets.

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One Important Way to Get the Best Performance From Staff

JEFFREY M. GOLDSTEIN

ABSTRACT Good communication on expectations is essential to encouraging the best performance from staff. An excellent tool for fostering this communication is the performance evaluation. Used correctly, it can open a dialogue that can lead to agreement between the supervisor and staff member on areas that need to be improved and ways to do so.

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Communication among staff members and between staff and supervisor (usually the dentist) is one of the most important ingredients for a successful practice. The more respect everyone has for one another and the better the communication, the better the growth and success of the practice and the happier everyone will be. Unfortunately, too often there is very poor communication within an office. The communication is not only poor with patients but also between each staff member and the dentist. Having pizza delivered to the office and "chatting" during lunch is not the basis for good communication.

It takes effort for an office to achieve good communication, and the way to continuously improve is by evaluating staff performance. The purpose of this article is to show dentists a specific way to evaluate performance. It is only through this quantitative process that one can truly measure a staff member's value.

Ingrid Kidd Goldfarb, president and owner of Trojan Professional Services, a company that provides support services for the dental profession, has said that "a structured, well-planned performance review provides clarity and direction for everyone. Part of each review includes setting goals to be achieved during the next year. It's difficult to have misunderstandings about what was expected or achieved by an employee when we refer back to the previous review."

The value of the review becomes apparent when all the parties involved

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have established a dialogue with good communication about areas of concern and a clear and concise discussion on the areas that need improvement for the practice to continue to move in a positive direction.

Staff members perform best if they not only know their job descriptions, but also know exactly how the supervisor feels about their performance, good or bad. Roger Levin, DDS, MBA, and president of the Levin Group agrees. He said, "Performance reviews are an essential part of managing the growth and achievement of any team member. These reviews can be made extremely positive to help people establish benchmarks from which to identify areas of potential improvement as well as strengths and weaknesses. Strengths should be complimented whereas weaknesses should result in a plan for continual improvement. This will strengthen both the individual and the overall practice."

Performance includes many areas, such as punctuality; work ethic; neatness/appearance; creativity; and, certainly, specific job skill. It is important and helpful for employees to know and understand what they are doing well, where they are average, and which areas may need improvement. For example, unless a specific script is used by an appointment coordinator, he or she may not be using the verbal skills that are best for the practice. The coordinator is responsible for the way the dentist wants the office represented on the telephone.

Another example might be a staff member who often allows his or her desk area to be messy. Neatness is especially important at the front desk. This mess may include food or drink, stacks of paper, and general untidiness. If nothing is ever communicated to that individual, how would he or she know that the dentist considers the work area unkempt and unacceptable? The answer is simply that he or she wouldn't. In such a situation, the performance evaluation can come into play.

Because employees like to know where they stand with their supervisor, it is time for the dental office to address that issue in writing. Included with this article is a performance evaluation for the reader's use. Unlike most personnel performance evaluations, this one is specifically designed for the dental practice and is appropriate for administrative as well as clinical staff (including hygiene). What is exceptional about using this evaluation is that each staff member should complete a self-evaluation. The supervisor also completes one. In a private meeting, the employee and supervisor compare the completed evaluations. This is the opening of dialogue (communication) between the two parties. Although there is an objective way to score the evaluation, it is just as important that the two parties communicate to each other what they agree and disagree with. It is here that improvement begins. It can be surprising what issues this evaluation brings to the surface. Once the supervisor has decided on a score for each heading and subheading, there is a specific formula to reach an objective "performance score." This meeting does not have to be, nor should it be, uncomfortable or negative. This is a time to discuss and evaluate specific performance. Again, the supervisor will find that staff performance will increase when every employee knows the dentist is interested in their performance and in listening to their concerns. Simply, that's called good communication. There is never a substitute for it. Dr. Joseph C. Abe, general practitioner and past president of the San Gabriel Valley Dental Society said his "experience with periodic performance evaluations has been absolutely positive. Good staff members want to be effective and do care about delivering the best services possible."

Performance evaluations help:

- To focus on strengths and weaknesses (When the dentist and staff person's separate evaluations are compared, it is often found that the employee grades him- or herself lower.);
- To focus on practice objectives and team coordination;
- To improve communication between the doctor and the staff; and
- To facilitate discussion between the doctor and staff about mutually beneficial goals.

It is important to establish some ground rules before beginning the performance evaluation procedure. It is supposed to be an objective evaluation of how employees perform in their jobs. The results of the evaluation are to be placed in the employees' personnel files so that accurate records can be kept with regard to their improvement. In some instances, this may be the documentation necessary to dismiss an employee. This process is not intended to be used for destructive criticism or vengeance but instead as a vehicle that allows the staff member to identify strengths and limitations. Once limitations are identified, a self-improvement program can be implemented by the staff member. Though this evaluation procedure is not meant to be used as a tool for "separation from employment" issues, it can help establish a case for termination (if this separation is inevitable) and help defend against wrongful discharge claims.

Some of the ground rules that will help make this process painless and productive are:

- The performance evaluation meeting should not be held during lunchtime. It should be done during office work time -- not the staff member's own time. It simply isn't fair otherwise.
- The end of the day is not the best time to have this meeting. Everyone is a little tired, and the last thing anyone is interested in is sitting down and communicating about job performance.
- The time should be established well in advance so that both parties have an appropriate amount of time to complete the evaluation form.
- Enought time should be allowed for comfortable discussion or the best results will not be obtained.
- This evaluation process should be

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done on the anniversary of the staff member's employment.

Following is the rating system that will give the final results so the supervisor can objectively grade staff members.

- RE: rarely equaled -- 1 point
- ER: exceeds requirements -- 2 points
- MR: meets requirements -- 3 points
- MM: meets minimum requirements -- 4 points
- FM: fails to meet minimum requirements -- 5 points

The best score will be the lowest number. The personnel performance evaluation is separated into two main headings: personal factors and skill factors. Personal factors are worth 33 percent of the total score, and skill factors are worth 66 percent. The reason for this is that a dentists hires staff for their skills in certain areas, e.g., RDA or insurance knowledge, not because they come to work on time or are congenial.

There are 14 subheadings under personal factors. Within each subheading there are one or more factors.

First, the dentists rates each factor in each subheading on the "score legend" (RE, MM, MR, etc.). The he or she totals the scores of the factors in each subheading and takes the average, which gives the score for that individual subheading. For an example, see **Figure 1**.

The same instructions are followd for skill areas. It is important to note that the skill areas are broken down, and each auxiliary will not be rated for each subheading. One of the skill area subheadings is treatment room auxiliary. Obviously, the front desk person would not be rated under that subheading (unless he or she is a combination assistant). The financial secretary subheading would not be completed for a hygienist.

At this point, the supervisor will determine an overall grade for personal factors and another for skill areas. Each of those grades is found by adding the score for each subheading and dividing by the number of subheadings. For example, there are 14 subheadings of personal factors. Therefore, the 14 subhead totals are added together and divided by 14 for an average. The result will be the grade for personal factors. The same is done for skill areas. Because personal factors are worth 33 percent and skill factors are worth 66 percent, the formula is as follows: (personal factor grade x 1) + (skill area grade x 2) = employee's score.

If the performance evaluation score is:

- 1 to 2.5 -- The individual probably deserves a merit raise.
- 2.5 to 4 -- The individual should receive a cost of living increase at best.
- 4 or above -- The dentist may consider separating this employee from employment or dramatically improve his or her training.

Once the supervisor has successfully accomplished the performance evaluation process and identified areas of concern, it is appropriate for him or her to investigate how this process will help the employees' performance. It has already been noted that most importantly, the communication between the supervisor and each individual is the first step to performance improvement. But, there is more.

On the last page of the evaluation form is an area titled, "areas needing improvement." Once the areas have been addressed, the issue of improving the performance in these areas comes into question. One way to tackle this issue is for the supervisor to simply ask the employee, "How do you plan on addressing the area that needs improvement?" A specific answer to this question is important. For example, "I'm going to try harder, Doctor" is an unacceptable answer. An objective must be measurable, achievable, specific and time-able. Therefore, if punctuality is a problem and the staff member is often late, the answer might be:

"Starting tomorrow (time-able), I'm going to get up 30 minutes earlier (specific) than I do at this time so that I can be sure to be here on time." (This can be "measured" by simply noting the timeliness, and it is clearly "achievable".)

So it will continue with each area that needs improving. It is presumed that the supervisor and employee have already discussed areas that have been merely average in score (MR), so headings graded MM or FM are the key areas to note.

In conclusion, if the staff is to be treated with the same respect the dentist uses for his patients -- the same way the dentist would like to be treated -- this evaluation will be most helpful. Once the supervisor and employees know and understand what is being done well and what needs improvement, the practice will reap the benefits through the improved interpersonal communication and move forward. As Dr. Joseph Abe points out, personnel want to know if they are performing well or poorly. They want to know that the dentist cares about how they perform on the job, and that he or she is interested in listening to them and discussing their performance. If a dentist wants to get the best performance from his or her staff, he or she must communicate with them through a well-designed performance evaluation process. This process is designed to be a dialogue, not a monologue. It is the time to share opinions and experiences: the good and the not so good.

PERSONAL FACTORS

Ability to Deal With People:

_____ Remains calm under stressful situations

_____ Conversations with patients are "you" oriented rather than "I" oriented

_____ Courteous with patients, doctor(s) and peers

_____ Tactful and diplomatic

Team-Oriented -- has "work together" attitude

_____ Cooperates with co-workers

_____ Supports goals of doctor(s)

Professionalism

_____ Maintains air of responsibility and confidentiality

_____ Respects confidential information

_____ Job knowledge

Adaptability – Accepts change without aggravation

_____ Flexibility in daily routine

Neatness/Appearance

_____ Maintains non-cluttered work area

_____ Legible record-keeping

_____ Maintains well-groomed status throughout day (uniform, hair, nails, oral hygiene)

Time Effectiveness -- makes productive use of time

_____ Organizes work time and space

_____ Recognizes priorities of duties

Punctuality – ability to be prompt

_____ With assigned tasks (reports, projects)

_____ Gets to work on time

_____ Assists doctor in managing his or her time so as to stay on schedule

Speech – exhibits control of English language

_____ Vocabulary/grammar -- effective word choice and usage

_____ Thought clarity -- speaks without confusing self and others

_____ Voice tone

Disposition

_____ Avoids moodiness

_____ Presents cheerful image

_____ Keeps personal problems out of office

_____ Consistently positive attitude

Accuracy -- is detail oriented

_____ Is exact and precise

_____ Avoids repetitive errors

Creativity -- Imagination

_____ Comes up with new ideas

_____ Formulates workability of ideas

_____ Unafraid to voice ideas

Ability to Take Directions

_____ Does not require repetitive prompting

_____ Listens as well as hears

_____ Follows instructions as given

Health

_____ Preventive health oriented

_____ Believes in and practices preventive oral hygiene

_____ Minimal utilization of sick days

Strives for Self-Improvement

_____ Seeks out continuing education and pursues advanced certification

_____ Sets personal and practice goals

_____ Accepts constructive criticism with positive attitude

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SKILL AREAS

Appointment Secretary

_____ Efficient scheduling

_____ Appointment confirmation

_____ Recall patient contact

_____ Patient screening

_____ Phone call mastery (controls conversation)

_____ Handling patient inquiries and grievances

_____ Reception and dismissal of patients

_____ Handling of emergency patients

Hygienist

_____ Patient motivation to finer treatment

_____ Supportive of doctor's philosophy of dentistry

_____ Maintains a humble profile

_____ Clinical skills

_____ Communicative skills with patient, staff, or doctor

_____ Handling of recall system (if delegated)

_____ Treatment room inventory maintenance

_____ X-ray skills

_____ Diagnostic models

_____ Capable of individual prevention instructions

_____ Patient seat and dismissal manners

Financial Secretary

_____ Firm Financial Arrangements

_____ Follow-up on delinquent accounts

_____ Maintenance of accounts/receivables at minimum delinquency

_____ Bookkeeping data current, accurate, legible, and balanced

_____ Understanding of local insurance plans

_____ Prompt processing of insurance claim forms

_____ Confidentiality of all records

_____ Comparative shopping and supply ordering

_____ Office statistical data maintenance

_____ Computer input data processing

Treatment Room Auxiliary

_____ Anticipates doctor's needs

_____ Assists doctor during treatment

_____ Crown and bridges

_____ Perio

_____ Operative

_____ Exam

_____ Emergency

_____ Pedo

_____ Ortho

_____ Oral surgery

_____ Endo

_____ Removable appliances

_____ X-ray skills (if delegated)

_____ Diagnostic models (if delegated)

_____ Patient seat and dismissal manner

_____ Patient motivation to finer treatment

_____ Patient communication and conversation

_____ Supportive of doctor's philosophy of treatment

_____ Maintains inventory control for areas of responsibility

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Accomplishments Since Last Evaluation Date

_____

_____

_____

_____

Areas Needing Improvement

_____

_____

_____

_____

Future goals/projects and completion dates:

_____

_____

_____

_____

Manager's/Supervisor's comments:

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Staff member's comments:

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EVALUATED BY _____

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Brush With Greatness

Robert E. Horseman, DDS

I used to have a plan for what I would do if I ever came face-to-face with a real celebrity. Cool, I decided, would be the way to go. Never let them see that you're impressed, no obsequious toadying. No fawning, just detached coolness. So much for planning. When I came across the first and only celebrity I've ever met, I saluted, called him "Sir" and nearly became incontinent.

It's early morning, summer of 1944, Livermore Naval Air Station, California. I'm sitting in the rear cockpit of an N-2S Stearman primary trainer, commonly called "The Yellow Peril." Yellow, because that's the color of it; Peril, because there are thousands of them here at NAS Livermore, and they're all trying to either take off or land on the mile square mat fronting the control tower.

As an AvCad-V-5, my job is to sit here, strapped in, helmeted and goggled, on a concrete parachute. There are 100 Stearmans on the flight line this morning, engines warming up, ticking over noisily. Along with the other cadets, I am awaiting the arrival of The Man. The Man is my flight instructor. He is God and I am an Idiot; it's a relationship all cadets accept as normal.

Threading his way carefully between the whirling props, supporting his chute behind him with both hands, God approacheth. Navy protocol requires that, upon his recognition that I am alive, I pop him a smart salute and yell out, "Cadet Horseman, SIR!" Preparing to mount the front cockpit, he looks up, expressionless, returning the salute and that's when it happens!

My God! My instructor today is Spangler Arlington Brugh! That's right, Spangler Arlington Brugh, a.k.a. Robert Taylor, movie star, matinee idol, billed as "The Man With the Perfect Profile" and husband of Barbara Stanwyck. Only the fact that I'm securely pinioned in my seat prevents me from making a perfect fool of myself by leaping out to kiss the hem of his garment. We are going flying, me and a movie star. Alone, in an airplane, Bob and Bob.

Taylor doesn't seem to notice my absence of cool. He tells me via the gosport tube that connects his mouthpiece to my earphones to taxi out, take off and climb to 2,000 feet south of the field. That voice! The same plummy baritone that knocked 'em dead in the 1935 version of "Magnificent Obsession," caused Vivien Leigh to swoon in "Waterloo Bridge," broke the heart of Deborah Kerr in "Quo Vadis," and inflamed both Elizabeth Taylor and Joan Fontaine in "Ivanhoe." That same voice is telling me to turn right 30 degrees. I could die!

Lt. Taylor doesn't seem to be in the mood for routine instruction today. He demonstrates an "8 point slow roll." It's perfect. Thank heaven he doesn't ask me to do one. We then go to an outlying field used to practice "S turns to a circle" and

"slips to a circle." He demonstrates one of each. I have done this a hundred times, but again, he doesn't ask me to show my stuff. I'm beginning to wonder -- is he trying to impress me? Me? Does he think that because he's a movie star everybody thinks he can't really hack it in the Navy? That it's just a cushy assignment until the war's over?

He suddenly elects to land on the grassy field, gets out and motions me to do likewise. We stand there for a moment, side by side. I'm acutely aware that he is short -- five-seven, maybe eight with lifts. I feel like scrunching down to his level from my six-one. He offers me a cigarette; I decline, embarrassed. Then I think, you moron! That cigarette would have made a priceless souvenir. He's 33 years old; I'm 24 and feel like 6. While he's lighting up, I study him, looking for flaws that I can report back to show how unimpressed I was, how cool. There aren't any. Hair, complexion, voice -- he's got it all. OK, so he's a little short. Maybe he has to stand on a box like Alan Ladd when he busses these women. If Barbara Stanwyck can live with that, it's no skin off my nose.

I'll say this: He's not much of a conversationalist. I have to say something. He's finished one cigarette and is lighting up another.

"It's a strange war, isn't it, Sir?" I offer.

"Hmmm," he says in his Taylor voice.

"I mean, here I am, a dentist from Laguna Beach and you a movie star from Hollywood flying primary trainers in Livermore."

"Hmmm," he says. I was hoping for more, like "How come you're not doing dentistry?" or "Would you mind taking a look at this molar? It's been bothering me." Maybe without a script, he hasn't a clue. I can't even get a good look at his teeth to see if they're capped.

We fly back to the base, stick our Yellow Peril in with the others and manage to land safely. Once out of the plane, he offers his hand, we shake, salute and he's gone. That's the last I ever see of him, walking away, supporting his chute with one hand and trying to get at his cigarettes with the other.

Later I learn that I am his last student at Livermore before he departs to narrate a documentary about the USS Enterprise, called "The Fighting Lady." Twenty-five years later in 1969 he is dead at 57 of lung cancer. I blame myself for not pointing out to him on that grassy field that all Perils weren't necessarily Yellow, that he should quit smoking right then, cold turkey. Then maybe he and I and Barbara could go out for some Chinese and a movie. But I guess that wouldn't have been cool.