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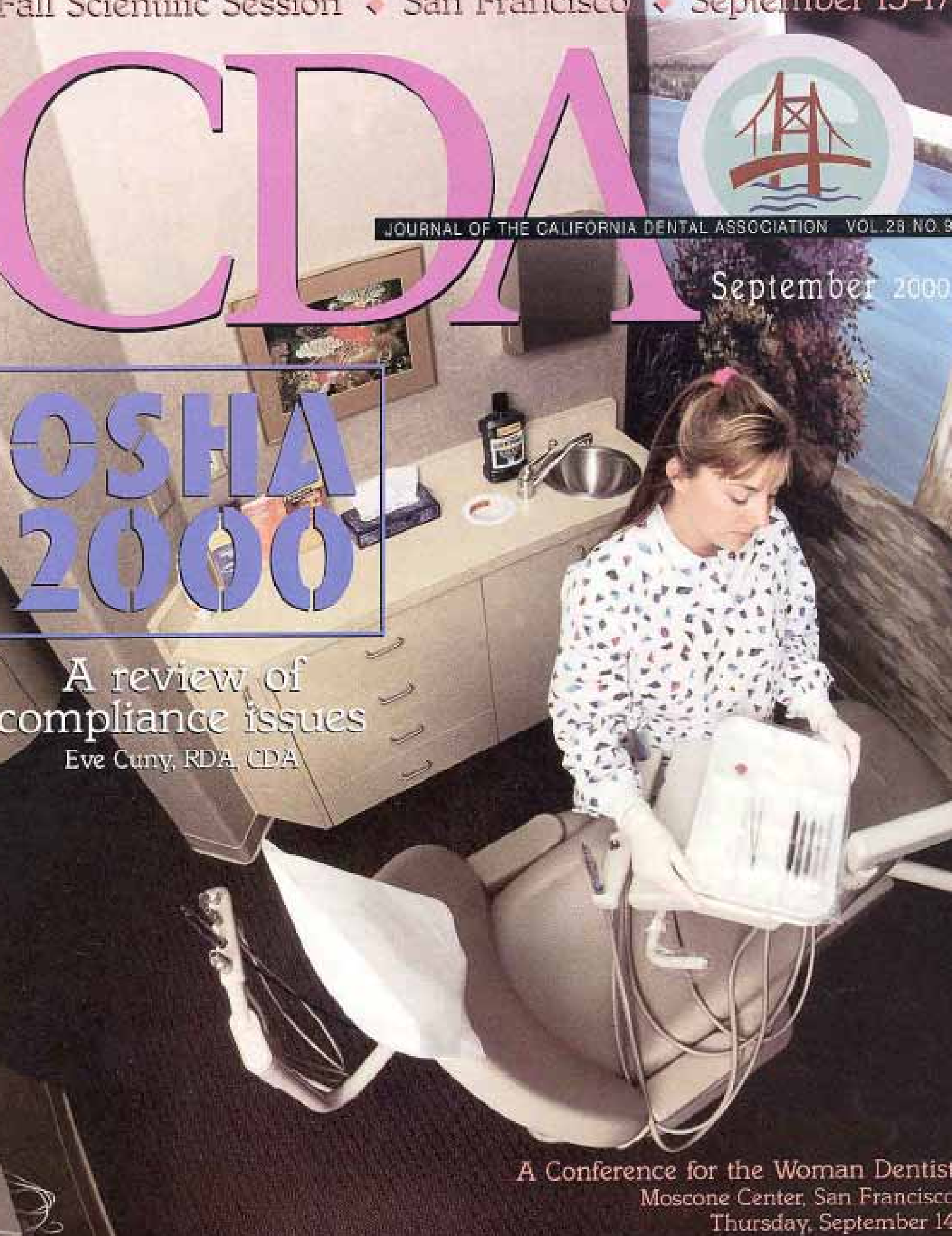

# OSHA 2000

## A review of compliance issues

Eve Cuny, RDA, CDA

A Conference for the Woman Dentist

Moscone Center, San Francisco

Thursday, September 14

OF THE CALIFORNIA DENTAL ASSOCIATION
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## DEPARTMENTS



## FEATURES

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# Communicating Organizational Effectiveness

Jack F. Conley, DDS

As most regular readers of California Dental Association publications know, this year the association has been engaged in many worthy efforts that will contribute to improving the image that it projects to the audience that it serves: the members and potential members of the dental profession in California. Despite its strength and successes over many years, the association has continued to be dogged by criticism from some members and nonmembers suggesting that the services provided do not justify the level of membership dues support. We hasten to emphasize that such criticism has prevailed for as long as we can remember, and even in the hoped-for future times of positive achievement, there will probably be detractors. That is the nature of the beast. Those who question the effectiveness of the organization provide checks and balances that motivate leadership to continue the endeavor toward achieving the highest standards.

If the many current administrative and leadership initiatives, from strategic planning to new management systems, are not as successful in achieving the desired goals as the proponents and the target audience would like, it will not be because of a lack of effort on the part of those who have sacrificed many long hours to the cause. From our vantage point, that has never been the problem or even a part of the continuing problem we discuss this month.

In our view, the question of organizational effectiveness arises out of a major handicap imposed by the very structure of tripartite. We are together, but we are still apart. When it comes to understanding programs and decisions, the discussion often takes on a "We vs. They" mentality. Do not misinterpret our intent -- we are not speaking against tripartite, merely identifying seeming obstacles to its successful application. Each constituent or component within the structure carries out what they believe to be their responsibility to their membership, but the relationships between leadership at each level and their members at large, as well the relationships with colleagues at other levels of the tripartite, often become detached. Attitudes are stretched to the breaking point, and the feeling of being a part of something shared is lost.

It would seem that communication is at center stage of the problem. Some years ago, ADA and then CDA determined that communication with members would be improved with newsletters designed to keep often isolated dental practitioners informed with professional news, including reports on the efforts by the organization on behalf of the individual. ADA News and CDA Update were born and continue to provide high quality information on a regular basis. We have found it disappointing from past reports of dentist focus groups queried about membership and membership benefits, that many dentists fail to recognize (or remember) events or achievements of their organizations that have been reported in these publications. Our expectation, although probably too idealistic, has always been that if they become familiar with organizational efforts and achievements, the value of being part of the process is realized and the association benefits from a member who is supportive.

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Since quality publications do not offer the complete answer to improved communication, what about the Internet? According to a recent survey by Dental Practice Report, nine out of 10 dentists have computers at the office, and 53.6 percent have Internet access. Also, the survey reports that dentists who use the Internet more than 10 times per month for purposes other than e-mail are more likely to do so at home (63.5 percent) rather than the office (37 percent). Further, the top three dental-related uses of the Internet are to obtain information about dental research, dental products, and continuing education courses.

All CDA council, committee, Board, and House minutes are now posted to CDA Online. This leads us to wonder whether association business, from goals to achievements, can become important to the Web-surfing dentist. In a very serious sense, we doubt that this information will break into the top three list. But, it is another avenue that might help to create greater understanding for some who find this venue more attractive than the printed page.

One part of electronic communication that can more effectively contribute to eradicating the boundaries between the levels of the tripartite is e-mail communication. We were pleased to note that of the current 64 presidents and president-elects in the 32 CDA component societies, only 10 do not have e-mail accounts. What a tremendous improvement in opportunity for good communication between CDA and the components if we all can learn to use the medium efficiently and effectively. The only potential negative is, can the component leadership establish an e-mail network with a significant number of the membership at large that would further facilitate the communication process, so that constituent-component communication is fully integrated.

There is one final piece to the communication puzzle that would probably contribute a great deal to a feeling of organizational effectiveness. In his recent monthly communication to leadership, Tim Comstock pointed to an activity that has been dormant at CDA. That activity -- marketing!

Some still remember the phrase "We're the Dentists Who Set the Standards." We are not suggesting a return to that particular motto as we know there are reasons this particular statement is not acceptable in the contemporary environment of competition. But as Mr. Comstock pointed out, "We need to show new and potential members a clear value for affiliation with CDA." A good marketing approach should appeal to old and new members alike, providing a feel-good attitude about their inclusion and participation in organized dentistry.

After many years of watching the association process in action, we are convinced that the perception of organizational effectiveness by CDA is dependent upon that elusive entity called communication. We expect positive and progressive improvements from the year 2000 initiatives under development that will contribute to the future effectiveness of the organization. That should fix philosophies and processes that are "broken."

However, we believe that future organizational successes will also be dependent upon CDA's ability to bring a diverse group of professionals together based upon the full knowledge that that their organization is continually at work on their behalf. Only when the communication gap is closed will the real effectiveness of the organization be realized and appreciated.

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## Conference Explores Challenges for Women Dentists

By David G. Jones

Women no longer practice solely in the traditional roles in dentistry they principally occupied over the past decades. They have joined the ranks of dentists in record numbers and in doing so have found that they confront the same challenges that all dentists face, and a few more that are uniquely theirs. The result is a complex web of business and personal interrelationships that present women dentists with many challenges to overcome.

To provide them with some answers, CDA has developed a full day of powerful information and professional tips to help women dentists overcome their unique professional and personal challenges. Developed with the guidance of a diverse team of women dentists, "Reaching For Excellence! -- A Conference for the Woman Dentist," is a program full of information to help them negotiate the maze of dentistry from the perspective of a woman.

The day-long event on Sept. 14, immediately preceding CDA's Fall Scientific Session at the Moscone Convention Center in San Francisco, will include a C.E. class on women's oral health issues and a panel discussion on issues facing women dentists. Workshops are scheduled on topics ranging from managing the dental team to balancing career and lifestyle.

CDA President Kent Farnsworth, DDS, says that the conference is a project the association has been looking to do for some time.

"There was some initial concern that we were singling women out, but it's evident from the subject matter that we are meeting the needs of all our members," he says. "It's particularly important that we make sure we address the specialized needs of our female members. The conference will certainly go a long way toward doing that."

Suze Orman, a nationally known certified financial planner, will provide the day's keynote address. The national best-selling author of The Courage to Be Rich and The Nine Steps to Financial Freedom is a financial contributor to NBC's "Today" show. Last year Smart Money magazine recognized Orman as one of its 30 "Power Brokers" in a report profiling individuals who most influenced the mutual fund industry. Her presentation will combine practical advice, personal exercises, compelling case studies, and provocative insights as she addresses the financial issues and milestones women face.

Bette Robin, DDS, JD, will make another specialized presentation called "Woman, Employer and Dentist: Making it Work." The hour-long presentation will focus on the employment issues women dentists face in the dental practice, especially in light of the fact that most dental staff members are also women.

"Many female dentists bond with their female staffs in a more personal way than male dentists, often making employment-related decisions difficult for many women dentists," Robin says. "In this seminar, I'll show attendees ways to avoid these pitfalls and maintain a friendly, satisfying, and professional relationship with their staffs."

Robin, who obtained her law degree after being sued by an employee in her practice, says she hopes to provide a general awareness of employment law that is severely lacking.

"I'll go through ways women can cope with some of the issues that can be harsh from an employee standpoint," Robin says. "And we'll explore ways to make employee issues into business decisions rather than emotional decisions so they won't result in lawsuits from showing favoritism. I'll also provide content on actual employment laws and how to deal with them."

An issue transcending all areas of a woman dentist's career is related to the unique personal challenges of marriage and child rearing, and balancing family and work. Part of the conference will focus on that important issue in a panel discussion called "Professional Options/

## Dental Problems Change Lions' Diet to Humans

In 1898, a pair of male lions stalked and devoured more than 130 railroad workers as they built a bridge over the Tsavo River in southeastern Kenya. Construction was halted until the lions were hunted down and killed.

What made the lions go berserk? In a paper presented at the annual meeting of the American Society of Mammalogists, zoologists Bruce Patterson and dentist Ellis Neiburger say dental problems may be to blame.

They report that tooth problems may have forced at least one of the lions to look for a new source of food. Their findings support the theory that some habitual man-eaters (usually lions, tigers, and leopards) turn to humans for food when a chronic injury or infirmity prevents them from pursuing fast-moving prey like zebras or gazelles.

"Humans are easy prey," Patterson said. "We're very slow, we don't hear very well, and we don't see very well in the dark."

Patterson and Neiburger examined the teeth and jaws of three man-eating lions in the collection of the Field Museum in Chicago: the two males from Tsavo and the Man-Eater of Mfuwe that killed six people in 1991 near Zambia's Luangwa Valley.

All three lions exhibited noteworthy dental and jaw problems. Worst off was one of the Tsavo lions, who was missing three teeth in a row and had a broken lower canine with a large root-tip abscess. The upper canine had rotated into an awkward, dysfunctional position.

Personal Choices: The Juggling Act." A team of five woman dentists will act as panelists exploring a variety of issues with the audience.

Panel member Debra S. Finney, DDS, CDA's treasurer, says women dentists wear many hats as moms, dentists, and employers.

"It seems I always have about 10 balls in the air at a time," Finney says. "It's not specific to dentistry, but women with demanding careers who are also raising families have a difficult time of it."

Finney says that the best way she's found to balance her busy life will also be a topic of discussion at the panel.

"I've found that the networking, being able to talk with other women, helps me best," she says. "Being able to have a support system can give women dentists the knowledge that they're not alone."

Farnsworth said that the conference promises to be helpful for women dentists and organized dentistry in general.

"It will be helpful to women dentists to help them address the problems unique to their approach to dentistry," he says, "and for CDA it will show we are trying to reach out to a diverse population as part of our stated goals for the new century."

Finney likened the full day of events to a women dentist's busy life.

"I don't know how I'll juggle the conference trying to go to all the seminars," she says. "Attendees can't go to everything, but we've tried to look at the whole ball of wax offering educational courses that will grant C.E. units, practice management issues, financial planning, and also looking at how we are different as employers and how we interact differently in the workplace."

## Ancient Medical Texts Available on the Web

Medieval medicine went high-tech recently when the National Library of Medicine unveiled its illustrated catalog of Islamic medical manuscripts on the Web.

"The National Library of Medicine has one of the three greatest collection of Islamic medical manuscripts in the world," said Emilie Savage-Smith, an American scholar from Oxford University and one of the world's foremost authorities on Islamic medicine.

A treatise written by the famous physician and clinician al-Razi (known to Europeans as Rhases) is the crown jewel of the library's collection.

"It is believed to be the third oldest Arabic medical manuscript in the world," said Dr. Elizabeth Fee, chief of the History of Medicine Division. Beautifully scripted, the manuscript's pages are still in superb condition.

The library acquired its collection from various sources, including purchases made from a bequest of Dr. William F. Edgar, a physician who in 1849 took a wagon train over the Oregon Trail and settled in California.

Dr. Philip M. Teigen, who has coordinated the library's 10-year project, which included an earlier exhibit and a symposium on Islamic medical manuscripts, said, "We wanted to take the treasures of our Islamic Medicine collection and make them more widely available to the general public. Publishing them on the World Wide Web seemed to be the best way to reach the largest number of people."

The manuscripts can be accessed at http://www.nlm.nih.gov/hmd/arabic/arabichome.html.

## CDC Dispels Medical Hoaxes

The Centers for Disease Control and Prevention has launched a new section of its Web site devoted to dispelling current health-related rumors and hoaxes.

Some of these rumors falsely claim that the CDC has verified the information. Much of the misinformation is being spread via the Internet and e-mail.

"So many of the hoaxes used the CDC as a supporting voice of authority in their messages, so we decided to make a formal response," said CDC spokesman Tom Skinner.

The CDC's "Current Health Related Hoaxes and Rumors" page gives the correct information on a variety of recent stories, including:

- Does HIV Cause AIDS?
- False E-mail Report: Hantavirus Spread by Contact With Soda Cans or Grocery Packages.
- False E-mail Report: Klingerman Virus.
- False Internet Report: Bananas.
- Needle Stick Hoaxes.

The page can be accessed at http://www.cdc.gov/hoax_rumors.htm.

## NIH Funds UCSF Study

The National Institutes of Health has awarded $900,000 to the University of California at San Francisco to study how best to prevent childhood caries.

The UCSF School of Dentistry's Comprehensive Oral Health Research Center of Discovery will use the funds to study how various social, behavioral and biological factors affect the dental health of San Francisco's children in Chinatown and the Mission District.

A previous study found that up to 30 percent of children under age 6 at San Francisco health centers already

## ICD Honors CDA Journal

The Journal of the California Dental Association has received two awards in the year 2000 USA Section of the International College of Dentists Journalism Awards Competition.

The May 1999 issue, "Infectious Disease at the Millennium" received the Platinum Pen First Place Award for writing that is of current importance to the dental professional. The contributing editor for the issue was Thomas J. Pallasch, DDS, MS.

In addition, the June 1999 issue on Dr. Bob Horseman was honored with a Special Citation for recognizing "a face of dentistry not usually seen in a publication." Steven D. Chan, DDS, was contributing editor.

"Beyond its central mission to provide dental scientific information and news, the CDA Journal is in a unique position to be able to devote an occasional issue to a human-interest topic," said Jack F. Conley, DDS, editor. "We are pleased to be recognized by the International College because their awards program for dental publications has consistently set the standards for dental journalism."

had early childhood caries and that it was particularly prevalent among Latino and Asian children.

UCSF hopes to recruit 400 families for the study. For more information on enrollment, please call (415) 476-5692.

### OSAP Releases New Waterline Statement

The Organization for Safety & Asepsis Procedures has released its new position paper on dental unit waterlines that updates and expands its original 1997 document.

The new paper includes comprehensive background information on the issue and addresses the use of coolant and irrigating solutions in dentistry, methods to improve and maintain the quality of water used in dental treatment, the responsibilities of manufacturers in improving the quality of dental treatment water, and clinician responsibilities. A complete glossary of dental unit waterline terminology is also included in the fully referenced position paper, as is a list of Internet resources.

Although there is no documented epidemiological evidence of a widespread public health problem, the presence in dental waterlines of potential human pathogens (including Pseudomonas aeruginosa, Legionella species, and non-tuberculous Mycobacterium) species suggests reason for concern. In fact, the Occupational Safety and Health Administration has recently alerted its compliance officers of the potential for occupational exposure to bacteria from contaminated dental waterlines.

Utilizing an easy-to-understand format that couples position statements with their rationale, the OSAP Position Paper on Dental Unit Waterlines can be incorporated into annual staff training as required by OSHA. It also provides information that can be used to address patient questions and concerns about the safety of dental treatment and dental unit water.

The position paper is free to OSAP members and available to nonmembers for $10. For more information, contact the OSAP Central Office, P.O. Box 6297, Annapolis, MD 21401, call (800) 298-OSAP, or visit www.osap.org.

### Web Watch

- **http://www.4woman.gov/owh/**
  The Office of Women's Health. The site has information on government programs and initiatives regarding women's health.
- **http://www.ama-assn.org/special/womh/womh.htm**
  Journal of the American Medical Association Women's Health Information Center. The page contains news and in-depth special reports on women's health.
- **http://www.nytimes.com/specials/women/whome/index.html**
  New York Times Women's Health. The page has news information on women's health issues.
- **http://www.womensoralhealth.org/**
  Melissa J. Wages won the CDA 1999 Table Clinic Competition in Anaheim by creating this Web site, which includes a variety of information on oral health.

### Honors

**John Featherstone, PhD,** chair of the Department of Preventive and Restorative Dental Sciences at the University of California at San Francisco School of Dentistry has been appointed to the Leland and Gladys Barber Distinguished Professorship.

**Karin Vargervick, DDS,** chair of the UCSF Department of Growth and Development and director of its Center for Craniofacial Anomalies has been appointed to the Larry L. Hillblom Distinguished Professorship in Craniofacial Anomalies.

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# OSHA 2000: A Review of Compliance Issues

Eve Cuny, RDA, BA

**ABSTRACT** The California Occupational Safety and Health Administration is responsible for enforcing worker safety regulations in the state of California. The infection control regulation, while the best known to dentists, is only one of many that affect every dental practice. The past two years have brought significant changes to Cal/OSHA rules. This paper reviews some of the current regulations that apply to dental offices.

AUTHOR

**Eve Cuny, RDA, BA,** is the director of environmental health and safety at the University of Pacific School of Dentistry.

The California Occupational Safety and Health Administration is responsible for enforcing worker safety regulations in the state of California. Often, dentists and other health care employers misinterpret the scope of Cal/OSHA's authority. Infection control, while the best known of these regulations to dentists, is only one of many that affect every dental practice. Cal/OSHA regulates chemical exposures, general safety, fire and emergency, employee exposure to medical waste, ergonomics, exits, fire extinguishers, pressure vessels (compressors), and numerous other areas of potential workplace hazard.

Cal/OSHA has authority for only those hazards that affect workers and is not charged with authority for patient safety. Other regulatory agencies – such as the Dental Board of California, the California Department of Health Services, and local regulatory agencies – have authority over the practice of infection control in dentistry as it may affect patients and the public.

As a whole, dentistry is not a high priority for Cal/OSHA since employees of dental practices rarely become injured, become ill, or die from workplace exposures. From June 1998 through May 1999, Cal/OSHA inspected 56 dental offices in California (**Table 1**). Nearly all of those inspections were based on an employee complaint. The number of OSHA inspections in California for all industries during the same period was 11,458.

The past two years have brought the most significant changes to the Cal/OSHA regulations since the introduction of the bloodborne pathogens rule in 1992.[1] The bloodborne pathogens rule received major revisions in 1999, affecting virtually all dental offices. The controversial Ergonomics Standard also completed a lengthy series of court challenges with a final ruling handed down in March 2000.

## Ergonomics

The California Occupational Safety and Health Standards Board added Title 8, Section 5110, to the California Code of Regulations in July of 1997. The new requirement that addresses repetitive

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motion injuries was almost immediately met with challenges to the exemption provided for employers with nine or fewer employees. In March 2000, after several judgments and reversals, the Superior Court issued instruction to the Standards Board to revise the regulation and remove any small-employer exemption. The final judgment requires all California employers -- regardless of business size -- to comply with the ergonomics rule.

The ergonomics rule requires employers to implement its provisions if more than one employee suffers a repetitive motion injury under the following circumstances:

- The repetitive motion injuries were predominantly (50 percent or more) caused by a repetitive job, process, or operation.
- The employees incurring the repetitive motion injuries were performing a job process or operation of identical work activity. Identical work activity means that the employees were performing the same repetitive motion task such as, but not limited to, word processing, assembly, or loading.
- The repetitive motion injuries were musculoskeletal injuries that a licensed physician objectively identified and diagnosed.
- The repetitive motion injuries were reported by the employees to the employer in the past 12 months but not before July 3, 1997.

If these four circumstances occur in the dental practice, then the employer is required to implement an ergonomics program. The program must include worksite evaluations of the job type associated with the injuries, control of further exposure, and training. The elements of the training program must include an explanation of the employer's program, exposures associated with repetitive motion injuries, symptoms and consequences of such injuries, reporting of symptoms and injuries to the employer, and methods used to minimize such injuries.

The regulation does not require a written program if the two repetitive motion injuries are not reported in the one-year period. However, it would appear prudent for a dentist/employer to include a copy of the one-page ergonomics rule2 in his or her safety manual with a policy statement indicating that the employer's intent is to be aware of the regulation and address ergonomic concerns as they become apparent.

It will be important for employers to follow the development of the ergonomics standard currently under review by federal OSHA. This proposed regulation is broader in scope and would require additional action by employers. Federal OSHA has ultimate jurisdiction over the states. Although 23 states operate their own plans, including California, federal OSHA must approve and monitor the state-run programs. The state programs must have regulations that are at least as strict as federal rules.

## Bloodborne Pathogens Rule

Major revisions to the Cal/OSHA bloodborne pathogens rule became effective on July 1, 1999. These revisions were a result of legislation intended to reduce the risk of exposure to blood and other body fluids that may result in the transmission of infectious diseases from patients to health care workers. A number of new requirements went into effect, including development of a sharps injury log, use of engineered safety devices, and employee participation in the annual review of the written exposure control plan.

## Sharps Injury Log

A sharps injury log is required to record each exposure incident involving sharp instruments or devices. This is in addition to existing paperwork requirements such as the OSHA 200 log. The information must be recorded within 14 working days of the incident being reported to the employer. The bloodborne pathogens rule specifies the information that must be included on the log. A sample injury log containing the required fields for information is provided as **Figure 1**.

## Use of Engineered Safety Devices

According to Cal/OSHA, engineered sharps injury protection means either:

"A physical attribute built into a needle device used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, which effectively reduces the risk of an exposure incident by a mechanism such as a barrier creation, blunting, encapsulating, withdrawal, or other effective means; or a physical attribute built into any other type of needle device, or into a non-needle sharp, which effectively reduces the risk of an exposure incident."

Therefore, needles, scalpels, and other sharp instruments that are available with built-in protection must be provided by the employer. Devices do not have to be provided under specific circumstances that are contained in the revised regulation.[3] Exceptions include circumstances in which there is no device available, the available device will jeopardize patient safety or the success of the procedure, the engineering control is not more effective than the alternative in use, and reasonably specific and reliable information is not available on safety performance of the device. If devices are available but employers choose not to use them, they must demonstrate that they have made the determination only after evaluation of the devices. It is important for dentists to remain informed of developments in sharps protection devices and carefully determine whether the devices are appropriate for use in their practices.

## Postexposure Management

An exposure incident is defined by Cal/OSHA as "a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties."[1] Previously,

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the employer was required to provide confidential postexposure evaluation and follow-up by a licensed health care provider.[4] The employer was also required to request that the patient submit to testing for human immunodeficiency virus and hepatitis B virus. Included in the regulation was a statement that, "additional collection and testing shall be made available as recommended by the U.S. Public Health Service."[1]

Since the date of original promulgation of the bloodborne pathogens rule, a test for hepatitis C virus has become available. In the revised regulation, it is stated that the employer must also provide follow-up for HCV. This would include testing of both the health care worker and the patient, if consent were obtained. It is important to remember that the employer must make a good-faith effort to identify the source patient and request that the patient submit to testing for HIV, HBV, and HCV. Only if the patient declines to be tested is the employer released from this responsibility.

## Review of the Exposure Control Plan

Every dental office is required to have a written exposure control plan that is accessible to employees in the workplace. The exposure control plan must be reviewed and updated at least annually. Modifications should reflect new or modified tasks and procedures that affect occupational exposure, reflect progress in implementing the use of needleless systems and sharps with engineered injury protection, acknowledge new or revised employee positions, evaluate exposure incidents, and respond to any deficiencies in the exposure control plan.

It is expected that employees with occupational exposure will be involved in the review and update and provided the opportunity to contribute to the content of the written plan. An individual office may develop its own program or may use a "fill in the blanks" type of program, as long as the specific requirements for the exposure control plan are included.

**Table 1**

**Cal/OSHA Dental Office Citations June 1, 1998, through May 31, 1999**

| Violation type | Number of citations | Fines |
|---|---|---|
| Bloodborne pathogens | 48 | |
| Hazard communication | 32 | |
| Injury and illness prevention | 19 | |
| Fire extinguisher | 7 | |
| Other | 24 | |
| Total | 130 | $18,095.00 |

Fifty-six dental offices were inspected during this 12-month period with the number of violations per office ranging from zero to 10. In 15 of the dental offices, inspections were conducted and no violations were cited. In eight of these dental offices, the cases are still open, and there is possibility that the final number of total violation and fines will vary slightly. The fine per office ranged from $0 to $3,355.

## Prospective Changes to the Cal/OSHA Regulations

A number of potential changes in OSHA regulations that may affect dentistry loom on the horizon and should be followed by practitioners. Additional changes to the bloodborne pathogens rule and ergonomics rule and the addition of a tuberculosis standard all have a potential to affect California dentists.

Federal OSHA is considering an ergonomics standard that, if implemented, may necessitate the revision of the California rule. A bill is under consideration in the federal legislature requiring sharps injury protection (similar to existing California law) that would also require the state to modify its rule if the federal requirements are more strict than existing California regulations.

In 1997, federal OSHA proposed standards for protection of workers against occupational exposure to tuberculosis.5 This regulations remains under consideration; and there is no existing requirement in California, in spite of several companies advertising "OSHA-required TB Exposure Control Plans." If the proposed rule is adopted as currently written, most dental offices would be unaffected by the regulation. Only those practices in high-risk facilities such as correctional facilities, long-term care facilities, homeless shelters, and hospital areas treating active TB patients would be included.

Infection control and other regulatory requirements are likely to continue to change as new pathogens and hazards emerge and new control measures are developed or identified. Dentists should stay involved in professional associations, continuously review the literature, and seek out sources of reliable information to ensure all available protections for personnel are in place and that the office is protected from charges of regulatory violation.

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# Women's Oral Health Issues

Barbara J. Steinberg, DDS

**ABSTRACT** Hormonal fluctuations affect more than a woman's reproductive system. They have a surprisingly strong influence on the oral cavity. Puberty, menses, pregnancy, and menopause all influence women's oral health and the way in which a dentist should approach their treatment. This paper will review aspects of a woman's life when hormonal fluctuations may affect oral tissues.

AUTHOR

**Barbara J. Steinberg, DDS,** is a professor of medicine and surgery at the MCP Hahnemann School of Medicine and a clinical associate professor of oral medicine at the University of Pennsylvania School of Dental Medicine.

Because oral health is an integral part of general health, oral problems indigenous to the female population have to be addressed. Women have special oral health needs and considerations that men do not have.

Hormonal fluctuations affect more than a woman's reproductive system. They have a surprisingly strong influence on the oral cavity. These changes are not necessarily the result of direct hormonal action on the tissue but are, perhaps, best explained as the effects of the local factors (e.g., plaque on tissues exacerbated by hormonal activity). Puberty, menses, pregnancy, and menopause all influence women's oral health and the way in which a dentist should approach their treatment. Similar influences may also be seen in women taking oral contraceptives. This paper will review each of those parts of a woman's life when hormonal fluctuations may affect oral tissues. It will also discuss the effects of eating disorders on the oral cavity.

## Puberty

Gingival tissues and the subgingival microflora respond with a variety of changes to the increasing hormone level at the onset of puberty. Microbial changes have been reported during puberty and can be attributed to changes in the microenvironment seen in the gingival tissue response to the sex hormones as well as the ability of some species of bacteria to capitalize on the higher concentration of hormones present.1

Clinically, during puberty there may be a nodular hyperplastic reaction of the gingiva in areas where food debris, materia alba, plaque, and calculus are deposited, The inflamed tissues are deep red and may be lobulated, with ballooning distortion of the interdental papillae. Bleeding may occur when patients masticate or brush their teeth. Histologically, the appearance is consistent with inflammatory hyperplasia.

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## Menses

Oral changes that may accompany menses include swollen erythematous gingival tissues, activation of herpes labialis, apthous ulcers, prolonged hemorrhage following oral surgery, and swollen salivary glands.[2,3]

Some females are not aware of any gingival changes at all, while others complain of bleeding and swollen gums in the days preceding the onset of menstrual flow. These changes usually resolve once menses begin. In addition, an increase in gingival exudate caused by inflamed gingiva has been observed during the menstrual period and is sometimes associated with a minor increase in tooth mobility.[4,5]

Intraoral recurrent apthous ulcers and herpes labialis lesions occur in some women as a pattern that seems related to their menstrual cycle. The lesions appear during the luteal phase of the cycle and heal following menstruation.

In some women, postoperative hemorrhage occurs more frequently during menses than at other times. No significant hematologic laboratory findings accompany this other than a slightly reduced platelet count and a slight increase in clotting time.

Swelling of the salivary glands, particularly the parotid, occurs occasionally during menses. There may be an associated increase in gynecologic complaints, though the cause is unclear.[2]

## Pregnancy

The popular notions that pregnancy causes tooth loss ("a tooth for every pregnancy") and that calcium is withdrawn in significant amounts from the maternal dentition to supply fetal requirements have no histologic, chemical, or roentgenographic evidence to support them. Calcium is present in the teeth in a stable crystalline form and, as such, is not available to the systemic circulation to supply a calcium demand. However, calcium is readily mobilized from bone to supply these demands.

Gingivitis is the most prevalent oral manifestation associated with pregnancy. It has been reported to occur in from 30 percent to 100 percent[6,7] of all pregnant women, although it most frequently ranges from 60 percent to 75 percent. Gingival changes usually occur in association with poor oral hygiene and local irritants, especially bacterial flora of plaque. However, the hormonal and vascular changes that accompany pregnancy often exaggerate the inflammatory response to these local irritants.

Clinically, the appearance of inflamed gingiva during pregnancy is characterized by a fiery red color of the marginal gingiva and interdental papillae. The tissue is edematous, with a smooth, shiny surface; loss of resiliency; and a tendency to bleed easily There may also be increased pocket depth and minimal loss of attachment apparatus.[8,9] Gingival changes are most noticeable from the second month of gestation, reaching a maximum in the eighth month. These changes occur earlier and more frequently in anterior than posterior areas. The severity of gingival disease is reduced after childbirth, but the gingiva does not necessarily return to a state of health.[10] Patients with untreated gingival disease during pregnancy will most likely have gingival disease after pregnancy, although it may decrease in severity.[11]

A recent study[12] suggests that maternal periodontal disease may be a risk factor for preterm low-birthweight babies. A preterm low-birthweight baby is one born before the 37th week of gestation who weighs less than five pounds, eight ounces. More studies are needed to substantiate these results as well as to determine whether intercepting maternal periodontal disease will reduce the risk of preterm delivery.

In addition to generalized gingival changes, pregnancy may also cause single, tumor-like growths, usually on the interdental papillae or other areas of frequent irritation. This localized area of gingival enlargement is referred to as a "pregnancy tumor," "epulis gravidarum," or "pregnancy granuloma." The histologic appearance is similar to the pyogenic granuloma. Its reported frequency ranges from 0 percent to 9.6 percent.[1,13] The lesion occurs most frequently on the labial aspect of the maxillary anterior region during the second trimester. It often grows rapidly, although it seldom becomes larger then 2 cm in diameter. A pregnancy tumor classically starts to develop in an area of inflammatory gingivitis. Poor oral hygiene invariably is present, and often there are deposits of plaque or calculus on the teeth adjacent to the lesion. The gingiva becomes hyperplastic and enlarges in a nodular fashion to give rise to the clinical mass. The fully developed pregnancy granuloma is a sessile or pedunculated lesion that is usually painless. The color varies from purplish red to deep blue, depending on the vascularity of the lesion and the degree of venous stasis. The surface of the lesion may be ulcerated and covered by a yellowish exudate, and gentle manipulation of the mass easily induces hemorrhage. Bone destruction is rarely observed around pregnancy granulomas.

Generally, the lesion will regress somewhat postpartum; however, surgical excision is often required for complete resolution. It may be prudent to delay surgery until after the pregnancy. Before parturition, scaling and root planing, as well as intensive oral hygiene instruction, may need to be initiated to

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reduce the plaque retention.

There are situations, however, when the pregnancy granuloma will have to be excised during pregnancy, such as when it is uncomfortable for the patient, disturbs the alignment of the teeth, or bleeds easily on mastication. Pregnancy granulomas excised before term may recur; therefore, the patient should be advised that revision of the surgical procedure may have to be performed postpartum.[10]

An additional oral finding that may be seen in the pregnant patient is generalized tooth mobility.[14] This change is probably related to the degree of gingival diseases disturbing the attachment apparatus, as well as to mineral changes in the lamina dura. This condition usually reverses after delivery.

Finally, some pregnant women complain of xerostomia; and, indeed, one study found this persistent dryness in 44 percent of the pregnant participants.[15,16] Hormonal alterations associated with pregnancy are a possible explanation. More frequent consumption of water and sugarless candy and gum may help this problem.

## Oral Contraceptives

One of the most common effects on the oral mucous membranes in individuals taking oral contraceptives is gingival inflammation. Many people have an exaggerated gingival inflammatory response to local irritants, characterized by fiery red, enlarged, and hemorrhagic gingival tissues.

Women taking oral contraceptives demonstrate a significant increase in the number of Prevotella species in the gingival microflora. Increased female sex hormones substituting for the naphthoquinones required by certain Prevotella species most likely are responsible for this rise.[7]

Measurable changes have also been observed in the salivary components of women taking sex hormones, including a decrease in concentrations of protein, sialic acid, hexosamine fucose, hydrogen, and total electrolytes. In some studies, changes in salivary flow have been reported. For example, both parotid and submandibular salivary secretion rates increased in women using oral contraceptives in one report,[17] while another noted a persistent dryness of the mouth in 30 percent of subjects on oral contraceptives.[16]

The dental literature reports that women taking oral contraceptives experience a twofold to threefold increase in the incidence of localized osteitis following extraction of mandibular third molars.[18] The higher incidence of osteitis in these patients may be attributed to the effects of oral contraceptives (estrogens) on blood-clotting factors. It may be advisable to perform extraction of teeth (especially of third molars) on non-estrogenic days (days 23 to 28) of the pill cycle, to reduce the risk of a postoperative localized osteitis.[2]

## Menopause

Menopause, the cessation of menses, is a normal developmental event experienced by women around the age of 50. It has been said that the average women can expect to live one-third of her life after her last menstrual period.[19] Menopause is accompanied by a number of physical changes, some which occur in the oral cavity. The most common oral problems of menopause are discussed below. Though menopause has long been associated with certain physical changes, the exact etiology and the mechanisms involved in the onset of these symptoms remain unknown.[19]

### *Oral Discomfort*

Oral discomfort is a common complaint among menopausal and postmenopausal women. Occurrences of pain, burning sensations, altered taste perception (salty, peppery, or sour), and dryness of the mouth have been reported in approximately 20 percent to 90 percent of menopausal women.[20-22] Most menopausal women who complained of oral discomfort were relieved after the administration of estrogens either systemically or topically.[20,22,23]

### *Oral Mucosal Changes*

Changes in the oral mucosa occurring in menopausal women may vary from an atrophic and pale appearance to a condition known as menopausal gingivostomatitis. This condition is marked by gingiva that is dry and shiny, bleeds easily, and ranges from an abnormally pale color to tissue that is very erythematous.[24] Other studies report menopausal women with oral discomfort had a clinically normal oral mucosal appearance,[23,25] suggesting that oral discomfort may be due to other causes, such as psychological disturbances. It appears that hormonal replacement therapy is of benefit in reducing oral discomfort in those who have both abnormal and normal mucosal appearance. Woman on hormonal replacement therapy (i.e., estrogen and progestin) may experience gingival problems similar to those of oral contraceptive users.

### *Salivation*

It has long been assumed that salivary flow decreases with age, but it is now generally accepted that major salivary gland output does not diminish with advancing age if the individual is otherwise healthy.[26]

### *Osteoporosis*

Generalized bone loss from systemic osteoporosis may render the jaws susceptible to accelerated alveolar bone resorption.[27] The compromised mass and density of the maxilla or mandible in a patient with systemic osteoporosis may also be associated with an increased rate of bone loss around the teeth or the edentulous ridge.[28-30] Recent studies support the hypothesis that systemic bone loss may contribute to tooth loss in healthy individuals31 and women with low bone mineral density tend to have fewer teeth compared to controls.[32] In fact, one study reports that women with severe postmenopausal symptoms were three times as likely as controls to be edentulous.[33]

Although it has been thought that residual ridge resorption was a local problem caused or promoted by disuse, inflammation, or mechanical factors, there now appears to be ample evidence to support the idea that it is principally a systemic problem.19 There have been numerous reports that show a relationship between residual ridge reduction and osteoporosis.[34,35]

When considering the relationship between osteoporosis and periodontitis, it is believed that osteoporosis is not an etiologic factor in periodontitis but may affect the severity of the disease in pre-existing periodontitis.1 A recent study suggests that severe osteoporosis that significantly reduces the bone mineral content of the jaws may be associated with less favorable attachment level in the case of periodontal disease.[36] Some recent studies have suggested that estrogen replacement therapy protects against tooth loss and reduces the risk of edentulism.[37-39]

## Eating Disorders

The most dramatic oral problems seen in eating-disordered individuals stem from self-induced vomiting. While this symptom is more characteristic of the syndrome of bulimia nervosa, a subgroup of anorectic individuals also engage in self-induced vomiting with or without prior binge eating.

The most common and dramatic effect of chronic regurgitation of gastric contents is smooth erosion of enamel or perimylolysis. This manifests as a loss of enamel and dentin on the lingual surfaces of the teeth as a result of chemical and mechanical effects caused mainly by regurgitation of gastric contents and activated by movements of the tongue. This erosion typically is seen on the palatal surfaces of the maxillary anterior teeth and has a smooth, glassy appearance. There are few, if any, stains or lines in the teeth; and when the posterior teeth are affected, there is often a loss of occlusal anatomy. Perimylolysis is usually clinically observable after the patient has been binge eating and purging for at least two years.[40]

There appears to be a relationship, albeit not a perfect correlation, between the extent of tooth erosion and the frequency and degree of regurgitation, as well as with oral hygiene habits.[40] For example, some patients do not regurgitate all of the low pH stomach contents and thereby avoid severe enamel erosion. Destruction of tooth structure can also be avoided by adhering to scrupulous oral hygiene practices (with the exception of immediate toothbrushing) after vomiting.

Enlargement of the parotid glands and occasionally the sublinguals are frequent oral manifestations of the binge-purge cycle in eating disorder individuals.[41] The incidence of unilateral or bilateral parotid swelling in patients who frequently binge eat and purge has been estimated at between 10 percent and 50 percent. The occurrence and extent of parotid swelling is proportional to the duration and severity of the bulimic behavior.[40]

The etiology of this salivary gland swelling is still not identified, but most investigators have associated it with recurrent vomiting. The mechanisms, in this case, may be cholinergic stimulation of the glands during vomiting, or autonomic stimulation of the glands by activation of the taste buds.[41]

The oral mucosa membranes and the pharynx may also be traumatized in patients who binge eat and purge, both by the rapid ingestion of large amounts of food and by the force of regurgitation.[42] The soft palate may be injured by objects used to induce vomiting, such as fingers, combs, and pens. Dehydration, erythema, and angular cheilitis have also been observed.[42]

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# Soft Tissue Surgery in the Oral and Maxillofacial Region

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**ABSTRACT** The practice of dentistry is most often perceived as the treatment of the hard tissues of the oral region, specifically the teeth and jaws. However, there are many disorders and conditions involving surgical treatment of the soft tissues that extend to the adjacent and associated structures of the oral and maxillofacial surgery region.

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Dentistry is defined as the evaluation, diagnosis, prevention, and/or treatment (nonsurgical, surgical, or related procedures) of diseases, disorders and/or conditions of the oral cavity, maxillofacial area and/or the adjacent and associated structures and their impact on the human body; provided by a dentist, within the scope of his or her education, training and experience, in accordance with the ethics of the profession and applicable law.

Oral and maxillofacial surgery is the specialty of dentistry that deals with the diagnosis, and surgical and adjunctive treatment of diseases, injuries, and defects involving both the functional and esthetic aspects of the hard and soft tissue of the oral and maxillofacial region.

This definition of dentistry reflects the scope of practice of soft tissue surgery in the oral and maxillofacial region and includes a wide and diverse group of surgical procedures, including temporomandibular joint surgery, nerve repair, repair of oral and facial lacerations, closure of oroantral and oronasal defects, excision of soft tissue lesions, pre-prosthetic surgery (split thickness for esthetic implant reconstruction skin graft vestibuloplasty), soft tissue surgery for esthetic implant reconstruction, and sleep apnea surgery (including laser surgery).

These soft tissue procedures in the oral and maxillofacial region are frequently combined with hard tissue (dental and osseous) surgery, which enables the profession to provide comprehensive care to restore function and esthetics. The general practitioner should be familiar with the variety of soft tissue procedures that can be performed so that these services may be considered and appropriate referral made.

## Surgery for Snoring and Sleep Apnea

Snoring is usually more of an inconvenience to a snorer's sleeping partner than to the snorer him- or herself. It is generally caused by an excess floppiness in the uvula or posterior border of the soft palate, which vibrates on breathing and causes the typical noise of snoring. Alone, it is rarely of medical significance.[1] Sleep apnea, on the other hand, is a condition in which the sufferers stop breathing for periods while asleep. They may unknowingly wake themselves up because of cessation of breathing and may have several hundred such episodes each night. This restlessness results in excessive daytime tiredness and has been shown to be associated with a higher incidence of motor vehicle and industrial accidents.[2] Additionally, it can lead to hypertension and cardiac problems.[3,4] Sleep apnea can be in the form of central sleep apnea, in which it is thought that the respiratory center fails to respond to high carbon dioxide levels during sleep so that there is no central drive to breathing, and obstructive sleep apnea, in which excessive narrowing of the upper airway during sleep causes the apnea. The narrowing can be at various levels from the nasopharynx to the base of the tongue and the hypopharynx. Many cases are mixed, with an element of both central apnea and obstructive apnea. Sufferers from sleep apnea are likely to be obese males who often have mandibular retrognathia.[5] It is necessary to differentiate between simple snoring and sleep apnea, which may have snoring as one of its components, since the treatment is different; and, in fact, treatment of a sleep apnea patient as merely a snoring patient can potentially be dangerous, converting a snoring sleep apneic to a silent sleep apneic. All patients with snoring and tiredness or other symptom of sleep apnea who require treatment should be monitored in a sleep laboratory to assess their exact problem and identify the appropriate treatment.[6]

Snoring often responds to simple measures varying from devices that stop the snorer from lying on his or her back while sleeping,[7] to a variety of dental devices to reposition the mandible or soft palate.[8,9] Some patients prefer a surgical treatment for snoring since it tends to be more permanent and allows one to lead a normal lifestyle afterward. Traditionally, treatment has involved a formal surgical palato-uvuloplasty,[10] which has required hospitalization and is normally not covered by medical insurance. More recently, laser-assisted uvulopalatoplasty11 has become popular since it can be performed on an outpatient basis, thus considerably lowering the costs (Figures 1,2, and 3). Under local anesthesia, utilizing the surgical carbon dioxide laser with a special attachment to protect the posterior pharyngeal wall, the uvula is shortened and the posterior margins of the soft palate tightened. Patients complain of a very sore throat for one to two weeks; but the results are good, and most patients report either complete cessation of snoring or great improvement.

When obstructive sleep apnea is diagnosed, simple measures such as weight loss, avoidance of alcohol, and the use of dental appliances can be successful.[9] In more severe cases, traditional treatment has been to use continuous positive airway pressure to breathe air under pressure while asleep.[12] This treatment can be quite successful, but many patients are unable to tolerate trying to sleep while breathing through a mask. In patients who are retrognathic, and where the base of tongue is believed to be the obstructing factor, sleeping with a dental device that protrudes the mandible and provides an airway can be successful although, again, some patients find it difficult to tolerate these devices.[9] If the patient is retrognathic, a mandibular advancement procedure that will physiologically reposition the mandible and bring the base of tongue away from the posterior pharyngeal wall may be successful.[13] The addition of a genioplasty, which also includes the genial tubercles, may increase the success rate since this will preferentially

**Figure 1.** A long floppy soft palate and long uvula causing snoring.

**Figure 2.** So ft palate and uvula immediately after laser-assisted palatouvoloplasty.

**Figure 3.** Final result in same case, six weeks postoperatively.

advance the hyoid bone and further open up the airway[14] (**Figure 4**). A formal hyoid suspension operation utilizing fascial lata or a similar suspensory sling can also be performed.[15] In patients who are not retrognathic, the same result can be obtained by carrying out both mandibular and maxillary advancement procedures to keep the jaws in harmony and get the same results.[16] The esthetic results may not be as satisfactory in all cases, however. In some cases, if these measures are unsuccessful and sleep apnea is severe and symptomatic, a permanent tracheostomy is necessary for the patient to be able to breathe at night; it is closed off during the day.[17]

Since in many cases the breathing obstruction occurs at several levels, it has been suggested that only bimaxillary advancement surgery will address obstruction at all levels from the nasopharynx down to the hyoid region. An arbitrary maxillary advancement of 10 mm coupled with appropriate mandibular advancement plus a possible genioplasty has been advocated as the logical next step after continuous positive air pressure has been tried and before permanent tracheostomy, which is the final treatment for this condition.[18]

Sleep apnea remains a fairly newly diagnosed condition that may be suffered by as many as 9 percent of women and 24 percent of men in the United States;[19] and the dental profession can play a considerable role in its management with operations such as a laser-assisted uvulopalatoplasty, mandibular advancement, genioplasty, hyoid suspension, and bimaxillary orthognathic surgery, in addition to the provision of a variety of dental appliances and advice on weight loss and other measures.

## A Soft Tissue Flap in TMJ Surgery

Soft tissue transfer from the temporalis muscle to line the glenoid fossa is a technique that has enjoyed success in a variety of temporomandibular joint surgeries and diagnoses.[20] It has application as a natural interpositional material to prevent bony or fibrous re-ankylosis following surgical correction of the condition. It has also been used as a replacement for the native disc in the event that it must be excised for disease or perforation. The temporalis muscle flap is also indicated after the removal of a failed alloplastic implant and whenever a resilient soft tissue interposition is needed. Such circumstances include the use of the temporalis flap in combination with complete joint replacement for advanced degenerative joint disease, tumor resection, and congenital defects.

The use of the patient's own soft tissue for lining the glenoid fossa is desirable because of the lack of antigenicity. The fact that the flap is pedicled to a blood supply (the deep temporal arteries that branch off the internal maxillary artery) promotes an excellent chance of healing. Its accessibility to the surgical site makes this technique a logical choice.

The surgical technique for procuring the temporalis soft tissue flap allows the associated fascia to be harvested along with the muscle just deep to it. This is significant because the nondistensible fascia can add body and shape to the flap. When the flap is then rotated into the glenoid fossa, it has integrity and a stable form.

The temporalis flap, which may be considered a composite flap since it includes the fascia, was first reported by Verneuil in 1860 when he used it as interpositional soft tissue in the treatment of TMJ ankylosis. Clinical research has shown that using the temporalis flap as passive interpositional soft tissue results frequently results in reduction of pain, increased mandibular mobility, improved function, and patient satisfaction. In addition, a biopsy will show that the muscle remains viable within the glenoid fossa, although it may demonstrate evidence of partial denervation.


**Figure 4.** A modified genioplasty to include the genial muscles in order to advance the hyoid bone and open the hypopharyngeal airway.

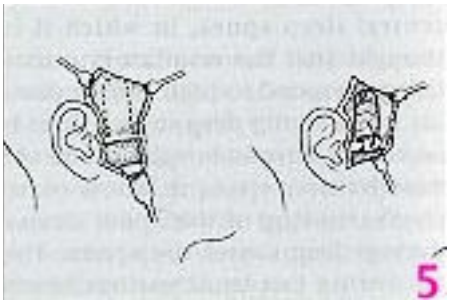


**Figure 5.** The finger-like flap is outlined and the inferiorly based flap is turned outward and downward over the zygomatic arch and placed in the temporomandibular joint.

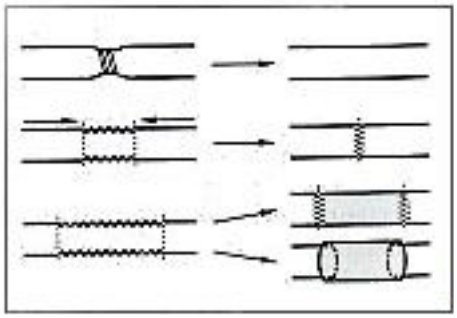

**Figure 6.** The microneurosurgical procedures currently available: Top -- decompression of fibrosis or scar tissue around nerve allowing normal neuroanatomy. Middle -- excision of an area of localized nerve damage followed by direct anastomosis. Bottom -- excision of a larger area of nerve damage followed by either a nerve graft or the use of an alloplastic conduit placed over the ends of the nerve to allow spontaneous nerve growth and repair.

Electromyographic studies demonstrate that the remaining temporalis muscle functions normally postoperatively.

### *Technique*

The TMJ may be accessed through different incisions: usually either a straightforward preauricular incision placed in a crease just anterior to the ear or an endaural incision that dives into the ear canal behind the tragus. The surgeon selects the approach based on his or her experience. There must also be a superior extension to the incision that allows the surgeon to visualize the deep temporalis fascia overlying the temporalis muscle. The incisions are designed to preserve branches of the facial nerve that cross the zygomatic arch 0.8 to 3.5 cm anterior to the anterior margin of the bony external auditory canal.

The surgeon begins by incising through the scalp and the superficial temporalis fascia, until the white layer that marks the deep temporalis fascia is exposed. From there, one follows the distinctive plane inferiorly as it leads directly to the zygomatic arch. The temporalis muscle dives deep to the arch. The insertion of the muscle is the coronoid process where the temporalis flap is based. Once the zygomatic arch is reached from the superior portion of the incision, the surgery continues by development of the dissection just anterior to the tragal cartilage. While following the cartilage and using it as a guide, the posterior aspect of the condylar head and neck is reached. The upper and lower halves of the dissection can then be united over the root of the zygomatic arch.

The zygomatic arch, which contains the glenoid fossa, is exposed subperiosoteally by creating an incision through the lower aspect of the deep temporalis fascia. The superior joint space of the TMJ is entered into through a T-shaped incision through the capsule. The development of the temporalis flap may then begin whether the TMJ meniscus is to be removed at this juncture or is already absent.

The muscle flap, which is approximately 2 to 3 cm wide and 5 to 6 cm in length, may be of either partial or full thickness. Either way, the deep temporalis fascia overlies the muscle and may be sutured to it. If it is full thickness, the pericranium is included and the muscle is sandwiched between the pericranium and the fascia. The orientation of the flap complex may be aligned posteriorly so that it is roughly parallel to the arch. The flap is then rotated into the glenoid fossa by bringing it over or under the zygomatic arch (**Figure 5**). Remnants of the disc deep within the fossa or remnants of the retrodiscal tissue may be used to suture the flap so that it drapes well over the condylar head. The result is a vascularized soft tissue bed that serves to cushion the joint.

Finally, as with any TMJ surgery, postoperative physical therapy is of utmost importance for a successful result. Passive mouth-opening exercises are recommended for the first week followed by more vigorous physical therapy. A goal of increasing maximum incisive opening and lateral excursions must be emphasized to the patient.

## Nerve Repair Surgery

Involvement of the inferior alveolar nerve, the lingual nerve, or the mental nerve can occur with many forms of dental treatment, including major surgical procedures, dentoalveolar surgery, periodontal surgery, endodontic treatment, implant-related procedures, and, very occasionally, local anesthetic injections.[21] Although in most cases nerve involvement is only temporary, it is sometimes permanent. For example, it is estimated that inferior alveolar nerve involvement occurs from 0.5 to 5 percent of the time with wisdom tooth removal[22-27]and lingual nerve involvement from 0.6 to 2 percent of the time.[28-31] Of these cases, 97 percent of inferior alveolar nerve involvement recovers spontaneously, as does 83 percent of lingual nerve involvement.22 Inferior alveolar nerve probably recovers more predictably since it is enclosed in a bony canal that guides regeneration.

It is estimated that if total recovery is going to occur, it will have begun by two months. If there has been no recovery at all by four months, then total recovery is unlikely and even partial recovery becomes less likely.[32] Conversely, if surgery is going to be performed to try to repair a damaged nerve, there is general agreement that the sooner it is done, the better the final result will be.[33] Herein lies the dilemma because there is no point in operating early on a nerve that will get better on its own; but if surgery if delayed too long, the results are poor. This has led to the development of current protocols that suggest that if the area supplied by the nerve is still totally anesthetic two to three months after the causative incident, then surgical exploration may be indicated. Similarly, if dysesthesia or painful sensation is the main problem, then surgical exploration after two to three months may be indicated. In other cases, surgical exploration is normally delayed for from four to six months to allow any spontaneous recovery to occur. Present protocol suggests surgical exploration only if there is less than about 30 percent of normal sensation remaining at this time and spontaneous recovery has ceased. This is because surgical exploration and repair rarely results in full return of sensation; and, although results do vary,[34,35] it is possible that nerve repair surgery only provides return of

some sensation in about 50 percent to 60 percent of cases.

Current protocols advise regularly monitoring patients with nerve involvement for the first few months. Testing is carried out by semi-objective techniques such as Von Frey's hairs for light touch and direction, two-point discrimination for quality of sensation, and Minnesota thermal discs for temperature sensation.[36]

If the patient's nerve involvement fulfills the criteria for surgical exploration, it is normally performed under general anesthesia with magnification by surgical loupes or, more often, an operating microscope. Exploration of the lingual nerve is done intraorally and exploration of the inferior alveolar nerve can be done intraorally or extraorally. When done extraorally with decortication of the mandible, a better surgical result can usually be obtained; but this does not always translate into better nerve recovery. Surgical exploration can have three outcomes (**Figure 6**):

- A finding of nerve compression or impingement such that removal of the cause of the compression or impingement is all that is required for a good result.
- A nerve transection or localized area of nerve damage. This will require the removal of the damaged segment and freshening of the ends with direct anastomosis with 8/0 or 9/0 nylon sutures under magnification (**Figure 7**). This carries a reasonable prognosis for some recovery in 50 percent to 70 percent of cases.
- Where there is a larger area of nerve damage or a segment of nerve missing, once the ends are identified and freshened up, it may not be possible to obtain enough mobilization for an end-to-end anastomosis. In this case, some kind of graft or conduit must be used. Initially, a donor nerve was used, such as the great auricular nerve in the neck[37,38] or the sural nerve on the lateral side of the foot.[39,40] These are reasonably effective (30 percent to 40 percent recovery of some sensation) but do result in a sensory deficit in the donor area and the second surgical site. The authors have done a number of grafts utilizing Gore-Tex tubes[41] as a conduit for nerve repair, but the results were poor and the authors no longer use this technique.[36] Autogenous veins have been shown to form a physiological conduit for nerve

**Figure 7.** A direct anastomoses (arrow) to repair a several lingual nerve carried out via an intraoral incision on the lingual side of the mandibular molar teeth. 9/0 nylon sutures are used for the repair.

**Figure 8.** A vein graft (arrowed) from the posterior facial vein used to reconstruct the inferior alveolar nerve from an extraoral approach.


**Figure 9a.** A young woman struck her forehead on a steering wheel with laceration of the upper eyelid and eyebrow.


**Figure 9b.** Exact realignment of the brow helps to hide the scar.


**Figure 9c.** Final result three months postoperative. The eyebrow and contiguous tissues have been aligned. There is some residual erythema in the area of repair which will fade over the next six months to one year.

recovery since the vein wall contains nerve growth factors.[43-45] Interposed muscle has also been suggested as an autogenous donor repair.[46-48] The authors have now performed a series of cases using autogenous veins (**Figure 8**), utilizing either a branch of the facial vein or the external jugular vein if an external incision has been made in the neck, or the long saphenous vein in the leg if an intraoral approach is being used. The provisional results are comparable to autogenous nerve grafting. The success rate is lower than for a direct anastomosis since there are two anastomoses for the regenerating nerve to negotiate.

Most active research in this area is in the areas of prevention of nerve involvement, early detection and monitoring, and the use of nerve growth factors to encourage spontaneous regeneration of nerves.

## Maxillofacial Soft Tissue Injuries

Soft tissue injuries in the face require particular attention for esthetic reasons and because of the proximity to vital structures. Cranial nerves, eyes, ears, and drainage ducts can be injured with serious functional and cosmetic consequences.

Lacerations are often simple to repair. (Figures 9a through c). However, they can sometimes be complex injuries involving important structures such as the eyelids, tear ducts, bone, and nerves.

The principle steps of laceration repair include a thorough exam to identify the extent of the injury followed by adequate anesthesia, debridement of nonviable or irreversibly injured tissue, and irrigation with large amounts of normal saline. Finally, repair is performed to reapproximate tissues anatomically. If the skeleton is fractured, it should be repaired first. This is followed by repair of critical anatomic structures such as tendons, muscle, ducts, and nerves. Finally, the skin is repaired with fine suture. Exact reapproximation of the dermal layer will prevent contour abnormalities that make scars noticeable. The epidermis can then heal with minimal scar formation. Sutures are removed in three to five days to prevent suture tract marks.

If tissue has been lost, it must be replaced with like tissue to restore form and function. This may involve undermining, local flaps, or even composite grafts or free tissue transfer.


**Figure 10a.** Ovoid oroantral fistula in the left premolar region and a smaller oronasal fistula in the nasopalatine region.


**Figure 10b.** CT scan showing the oral antral defect. There is evidence of a previous nasal antrostomy not related to the current treatment.


**Figure 10c.** Immediate postoperative view of the soft tissue closures of the oroantral and oronasal defects.

## Closure of Oral Antral and Oral Nasal Defects

Oroantral communication after the removal of maxillary molars occurs in approximately 0.3 percent of cases.[49] However, implant placement and maxillary antroplasty (sinus lift) can also cause oronasoantral defects. Fortunately, most surgically created communications are small and tend to close spontaneously. However, larger defects or communications, usually associated with infection, may cause persistent opening and fistulization requiring soft tissue surgery for closure.

Various techniques are currently available for closure including a sliding advancement buccal flap, a rotational pedicled palatal flap,[50] a buccal fat pad flap, a tongue flap, and the Fickling inkwell technique.[51]

## Case Report

A 53-year-old male patient presented with complaints of communications between his mouth and sinus and nasal cavities subsequent to endosseous implant failure, maxillary antroplasty, and autogenous onlay bone grafting (iliac crest and tibial) (**Figure 10a**). Oral fluids would exit through the nose during meals. The patient had the procedures performed simultaneously as well as excision of a nasopalatine cyst. All six of the maxillary implants were subsequently lost, leaving the patient with a 1 cm oroantral fistula in the left maxillary premolar region and a 0.5cm oronasal fistula in the maxillary midline. There was no evidence of acute infection, drainage, or nasal obstruction. A CT scan was ordered to identify the magnitude of the defects (**Figure 10b**). The patient elected to have the fistulae closed surgically rather than treated with

a prosthetic obturator.

Under general anesthesia, the fistulae were closed in a double-layer fashion using the Fickling inkwell technique. Brilliant green dye was used to outline the incision, which extended circumferentially around the fistula with two arms of the incision extending broadly into the buccal vestibule, anteriorly and posteriorly. A No. 15 scalpel blade and a No. 66 beaver tip blade were used to incise around the fistula. A split-thickness mucoperiosteal flap was reflected approximately 1.5cm anteriorly and posteriorly. After the fistulous tract was incised from its bony margins but left deeply attached, resorbable sutures were inserted with the knots on the antral side of the fistula, which, when tied, caused the fistula to evert in the form of an unspillable inkwell. This created the antral closure and allowed the ultimate suture line of the buccal advancement flap to be placed over supporting bone, rather than over the original defect. The buccal flap was trimmed for maximum adaptation and advanced for a tension-free closure of the oral side of the defect. A similar procedure was used to close the oronasal fistula (**Figure 10c**). The patient healed without complication with the oral and nasal communications remaining closed. The patient subsequently had a complete maxillary denture constructed.

Awareness of the following principles will improve successful closure of oral antral and oral nasal fistulae:

There should be careful treatment planning of flap design with measurements taken of the donor and recipient sites.

The flap should be designed to maximize the blood supply and augment the vascularity.

- Treat infection prior to closure.
- Appropriate imaging of the maxillary sinus and region of the defect should be obtained.
- Fistulae may close spontaneously or diminish in size.
- The bony defect is usually larger than the soft tissue opening.
- A tension-free two-layer closure (nasal and oral) provides adequate coverage, added strength, and improved vascularity.
- The labial vestibule may become compromised subsequent to flap mobilization, and a secondary vestibuloplasty may be required if prosthetically necessary.
- Nasal antrostomy or Caldwell Luc operations are usually not required but should be considered if chronic sinus disease persists or there is associated poor nasal drainage
- If an acrylic splint is used postoperatively, compression of the blood supply must be avoided.

Benign and Malignant Lesions

The dentist has the opportunity and the obligation to identify both benign and malignant lesions of the oral and maxillofacial regions. Observation, examination, and investigation of lesions of the face are crucial to the well-being of the patient, particularly when the pathology identified is malignant. Basal cell carcinoma is one of the most common lesions that the dentist may help diagnose, with approximately 500,000 new cases diagnosed every year in the United States. This figure represents 80 percent of all skin cancers, with the number of new cases increasing by 3 percent to 7 percent each year.[52]

Basal cell carcinoma is characterized as a locally invasive primary epithelial malignancy that grows slowly and arises from the basal cell layer of the skin and its appendages and results from chronic exposure to ultraviolet radiation, especially in fair-skinned individuals. A typical presentation of this lesion is one of a slowly growing lesion that begins as a painless, firm papule that, if untreated, grows into a lesion with a central depression with telangiectatic blood vessels coursing over the rolled border. For relatively small lesions, less than 1 cm, surgical incision with adequate margins usually suffices, with cure rates of 95 percent to 98 percent. When larger lesions are identified, Mohs micrographic surgery can be utilized in which frozen-section assessment of mapped and marked surgical specimens are made to determine if the lesion has been removed in its entirety. Metastasis is extremely rare, but there is a 30 percent chance of the patient developing a second lesion within three years of initial treatment.

## Case Report

A 59-year-old patient presented with a 6 to 7 mm by 4 mm dark pigmented lesion inferior to the nasolabial fold. (**Figure 11a**) and had a slight central ulceration. Under local anesthesia, a wide excision of the lesions was done (**Figure 11b**). The wound margins were undermined and a tension-free primary closure obtained (**Figure 11c**).

Microscopic description revealed a lobular proliferation of basal cells in the reticular dermis. The neoplasm was pigmented, had mucoid changes, and exhibited squamoid differentiation. All margins were free of neoplasm. The surgical site healed without complication, and the scar was barely visible three months postoperatively (**Figure 11d**).

## Vestibuloplasty With Split-Thickness Skin Grafting

Loss of the natural dentition leads to physiologic and anatomic changes that complicate the restoration of normal function. These changes include loss of

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alveolar bone followed by resorption and remodeling. Changes in bony anatomy in turn lead to changes in soft tissue contours, in some cases eventually limiting or prohibiting the successful use of dental prostheses. In selected cases, vestibuloplasty and split-thickness skin grafting may provide a restorable platform by addressing the following three pre-prosthetic surgical goals: provision of a broad and convex ridge form, provision of fixed tissues over the primary denture support area, and provision of facial and lingual vestibules for denture flange extension. Although it is possible to perform a vestibuloplasty alone, allowing the soft tissues to heal by secondary epithelialization, the combination of split-thickness skin grafting with the vestibuloplasty procedure provides greater patient comfort and better stability.[53]

The history of skin grafting begins in 1869 with the use of "pinch grafts" to cover open wounds. Investigation and trial and error led slowly but steadily to the current knowledge of the biology of skin grafting.

Vascularization and healing of skin grafts occurs in a two-phase process. The first phase is plasmatic imbibition. During the initial 48 hours, capillary action draws a plasma-like fluid from the underlying recipient bed. A fibrin network forms between the graft and the recipient bed, which helps to secure the graft in place. After this period, blood flow begins in the graft and excess fluid is carried away to the systemic circulation. The second phase is termed inosculation of blood vessels. Vascular buds that proliferated during the first 48 hours provide a mechanism for entry of blood to the graft. By day four to seven, true circulation is established. At the same time, lymphatic channels are re-established.

Thus, survival of the graft depends upon the presence of a vascular recipient bed and fixed contact of the graft with the tissues of the recipient bed. Poor adaptation of the graft to the bed, fluid collections (such as hematoma) underneath the graft, movement, pressure or infection will prevent proper contact and jeopardize the survivability of the graft.

Split-thickness skin grafts consist of epidermis and a variable thickness of dermis. Full-thickness skin grafts include the entire dermis and adnexal structures such as hair follicles, sweat and sebaceous glands. Partial-thickness grafts are further classified into thin, intermediate and thick grafts depending upon the amount of dermis that is included. The choice of which type of skin graft to use depends upon the clinical situation. For intraoral split-thickness skin grafting with vestibuloplasty, a thin split-thickness skin graft (0.015 inches) is found to be most usable. For reference, the #15 scalpel blade is approximately 0.015


**Figure 11a.** Basal cell carcinoma inferior to nasolabial fold.


**Figure 11b.** Wide excision basal cell carcinoma.


**Figure 11c.** Tension free primary closure of skin.


**Figure 11d.** Healed surgical site six months after excision with barely visible scar.

inches in thickness. When contrasting and comparing thick and thin grafts, the following observations may be made.

- The thinner the skin graft, the more the graft will contract in the first few months after transplantation. Conversely, thicker grafts contract more immediately upon harvest but less over time.
- The thinner the skin graft, the more likely it is to survive because it does well during the plasmatic imbibition phase of healing and because it is more rapidly vascularized.
- The thinner the skin graft, the less likely it is that adnexal structures will be transplanted with the graft.
- The thinner the skin graft, the more rapidly the donor site is likely to heal.

Thus, a thin skin graft that has been atraumatically removed and placed in a well-prepared donor site and which is well-stabilized during the initial healing phases is best-suited to the purpose of attempting to reconstruct the denture-bearing platform.

*Case Report*

A 60-year-old patient presented with a chronically infected and mobile subperiosteal implant (**Figure 12a**), which had initially been placed because of poor mandibular denture stability and retention. Removal of such a device was complicated by inflamed tissue at the level of the transmucosal posts and scarring and tissue intertwining in the metal grid of the subperiosteal implant substructure. Subsequent to the removal of the implant, the patient was left in a clinical situation worse than prior to placement of the subperiosteal implant due to obliteration of the labial and buccal vestibules and crestal attachment of the Mentalis and Buccinator musculature.

A split-thickness skin graft vestibuloplasty was performed. It significantly enhanced the prosthodontist's ability to construct a well-extended lower complete denture to maximize support, stability, and retention. Under general anesthesia, a standard mandibular vestibuloplasty was performed to lower the depth of the vestibule and provide a keratinized, nonmobile tissue base. The skin graft was harvested from the lateral aspect of the patient's thigh (**Figure 12b**). The donor site was covered with an adhesive dressing for patient comfort and infection prophylaxis. The skin graft was then placed and secured with a dermal glue (**Figure 12c and Figure 12d**), in a relined, previously constructed acrylic splint. The splint was secured with circummandibular ligatures and removed after 10 days. The skin graft healed uneventfully and provided the prosthodontist with an increased anterior labial vestibular depth composed of immobile, keratinized tissue. Since elements of the dermis were included in the graft, some hair follicles were transplanted (**Figure 12e**). The complete dentures were constructed approximately 10 weeks postoperatively (**Figure 12f and Figure 12g**). The patient was satisfied with the function and esthetics of the prostheses. Although placement of endosseous implants could further stabilize the lower denture, no further treatment was required.

Esthetic Implant Reconstruction

Soft tissue surgery around endosseous implants is indicated in certain clinical situations and can significantly enhance esthetics.[54,55] Procedures utilizing pedicle flaps, onlay and interpositional connective tissue grafts, and sculpting techniques can reconstruct deficient soft tissue components creating a natural peri-implant appearance. When these procedures are combined with tissue-preservation techniques and properly designed restorations, the normal appearing regional morphology is more likely to be simulated.

*Case Report*

A 19-year-old female patient presented with a congenitally missing maxillary left lateral incisor and retained deciduous maxillary left lateral incisor that had been recently extracted (**Figure 13a**). The patient had a high smile line and high esthetic requirements. The treatment plan called for combining tissue preservation techniques, gingival sculpting, and prosthetically guided tissue regeneration. Two slightly beveled and curvilinear vertical incisions were placed in the interdental grooves avoiding the gingival sulci of the adjacent teeth and avoiding interdental reflection (**Figure 13b**). This approach camouflages the incisions and preserves the interdental papilla while providing adequate surgical access to place the implant.

At Stage I surgery, a fixture level impression was made (**Figure 13c**), and a custom provisional crown fabricated to be placed at Stage II surgery in order to obtain guided tissue regeneration. At Stage II surgery, the gingival tissue was sculpted around the provisional restoration. After approximately 10 weeks, the final restoration was constructed (**Figure 13d**).

To create an esthetic and inconspicuous implant restoration, it is imperative to establish an adequate and closely adherent zone of attached soft tissue to the transmucosal portion of the implant. This creates a healthy soft tissue interface, barrier and biological seal.

*Case Report*

On Oct. 2, 1998, an essentially healthy 21-year-old Caucasian female presented

**Figure 12a.** Chronically infected subperiosteal implant.

**Figure 12b.** Dermatome harvesting split thickness skin graft from lateral aspect of the thigh.


**Figure 12c.** Application of dermal glue to secure skin graft in stent.


**Figure 12d.** Festooned skin graft placed in relined mandibular stent.


**Figure 12e.** Healed skin graft extending the anterior mandibular vestibular depth, providing non-mobile and keratinized tissue; hair is present in the skin due to inclusion of hair follicles during skin graft harvesting.


**Figure 12f.** View of complete dentures with enhanced mandibular extensions of the denture flanges.

**Figure 12g.** Clinical view of complete dentures in place.


**Figure 13a.** Edentulous site after extraction of over-retained carious deciduous left maxillary lateral incisor.


**Figure 13b.** Tissue-preserving, aesthetically placed incision.


**Figure 13c.** Acrylic splint for fixture level, Stage I impression using a light-cured material.


**Figure 13d.** Final single-tooth restoration in maxillary left lateral incisor position.

**Figure 14a.** Severel resolbed partially edentulous alveolar ridge.

**Figure 14b.** Another view.

for consultation regarding placing an implant in the tooth No. 9 position. In 1992, she sustained injury to tooth No. 9 during a bicycle accident but eventually had the tooth removed several years prior subsequent to endodontic failure.

Clinically, there was a severely resorbed residual alveolar ridge with only an estimated 2 to 3 mm of buccal-lingual width at the ridgecrest in the tooth No. 9 region with a very significant labial concavity (**Figures 14a and b**). The patient had a relatively short midface and according to the dental history had orthodontic maxillary expansion as a child.

There was some retroinclination to the mandibular lower incisors, probably compensatory in nature, which created a significant amount of incisal contact, a factor considered of importance relative to implant loading. There was also evidence of nocturnal tooth grinding, and use of a nightguard was recommended. Dynamic lip function was assessed, which revealed that on a broad smile, the entire crown of the maxillary incisor teeth could be seen.

The patient brought with her a CT scan ordered by another consulting surgeon. Axial sections had been obtained through the maxilla at 1 mm intervals using 1.5 mm collimation (**Figure 15**). Radial reconstructions were then obtained using the data. Panoramic and periapical radiographs were then taken to supplement the CT scan.

Limiting factors were identified and discussed with the patient and her parents. They included extensive bony defects (horizontal and vertical) in the missing central incisor region, a high smile line that would reveal the interface of the implant and gingiva, short vertical height of bone between the ridgecrest of the anterior maxilla and the floor of the nose (limiting the length of the implant that could be placed), compromised bony support of the adjacent central and lateral incisors, potential for gingival recession after grafting and implant placement, the potential for a vertical soft tissue defect requiring a connective tissue graft, loss of the interdental papilla, a prominent maxillary midline frenum, and a short mandibular height below the apices of the mandibular anterior teeth (limiting bone harvesting and predisposing the patient to neurosensory alteration in the lower incisors).

A proposed treatment sequence and timetable was developed that included options and contingencies. In January 1999, under intravenous sedation, an 8 mm by 13 mm autogenous corticocancellous graft was harvested from the mandibular symphysis (**Figure 16a**), contoured, mortised, and fixated in place with a 1.2 mm by 12 mm titanium screw (**Figure 16b**). The graft was positioned so that there would be coronal repositioning of the labial mucoperiosteal soft tissue complex, restoring some of the vertical architecture of the resorbed alveolar ridge.

On June 2, 1999, the graft site was re-entered using a slightly palatal soft tissue incision, and a titanium 13 mm by 3.25 mm implant was placed in the reconstructed alveolar ridge. On Jan. 19, 2000, under local anesthesia, the implant was uncovered using a papillary sparing incision and a 4 mm in height abutment was placed. The soft tissue horizontal incision in the edentulous area was placed slightly palatally to allow transposition of a bulk of tissue to the labial position to fill out the soft tissue contours. After a five-month period to allow for osseointegration, the implant was uncovered using minimal soft tissue reflection, and a temporary abutment was placed. A screw-retained direct-to-fixture restoration was constructed (**Figure 17a, b**).

## *Discussion*

The above case illustrates some of the principles of hard and soft tissue reconstructive surgery to restore deficient dentoalveolar segments. Ridge preservation is also an essential element for successful implant reconstruction. This includes atraumatic tooth removal with immediate grafting of compromised extraction sites with deproteinized cancellous bone mineral (Bio-Oss) or other suitable grafting materials, and an overlying absorbable collagen membrane. Thus, prolapse of the overlying soft tissue into the alveolar defect is prevented, allowing for guided bone regeneration. This approach allowed bony and partial soft tissue reconstruction of the site and subsequent implant placement.

## Conclusion

Soft tissue procedures in the oral and maxillofacial regions can enhance total facial esthetics and balance, while creating a functional, and frequently rejuvenating improvements. These procedures also help correct functional impairments, traumatic injuries, and defects and should be considered by the general practitioner during treatment planning.

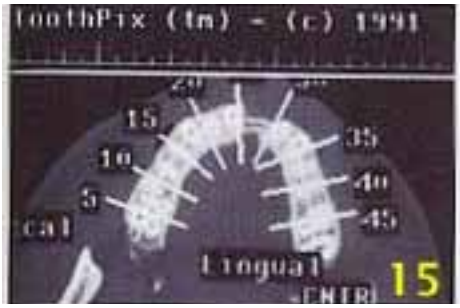


**Figure 15.** Axial CT scan demonstrating severe alveolar resorption in edentulous site.


**Figure 16a.** Donor site from mandibular symphysis.


**Figure 16b.** Corticocancellous autogenous bone graft fixated to atrophic site.


**Figure 17a.** Restoration placed on implant in tooth #9 position.


**Figure 17b.** Periapical radiograph of implant and restoration.

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# Oral Health in America: A Report of the Surgeon General

**ABSTRACT** The U.S. surgeon general released this year the nation's first official report on oral health. This document elaborates on the meaning of oral health and explains why oral health is essential to general health and well-being. We have reprinted here an abridged version of the report's Executive Summary. The full report can be accessed at http://www.nidcr.nih.gov/sgr/sgr.htm.

Publication of this first Surgeon General's Report on Oral Health marks a milestone in the history of oral health in America.

The report elaborates on the meaning of oral health and explains why oral health is essential to general health and well-being. In the course of the past 50 years, great progress has been made in understanding the common oral diseases – dental caries and periodontal diseases – resulting in marked improvements in the nation's oral health. Most middle-aged and younger Americans expect to retain their natural teeth over their lifetime and do not expect to have any serious oral health problems.

The major message of this surgeon general's report is that oral health is essential to the general health and well-being of all Americans and can be achieved by all Americans. However, not all Americans are achieving the same degree of oral health. In spite of the safe and effective means of maintaining oral health that have benefited the majority of Americans over the past half century, many among us still experience needless pain and suffering, complications that devastate overall health and well-being, and financial and social costs that diminish the quality of life and burden American society. What amounts to "a silent epidemic" of oral diseases is affecting our most vulnerable citizens – poor children, the elderly, and many members of racial and ethnic minority groups (U.S. General Accounting Office 2000) (Table).

A major theme of this report is that oral health means much more than healthy teeth. It means being free of chronic oral-facial pain conditions, oral and pharyngeal cancers, oral soft tissue

lesions, birth defects such as cleft lip and palate, and scores of other diseases and disorders that affect the oral, dental, and craniofacial tissues, collectively known as the craniofacial complex.

New research is pointing to associations between chronic oral infections and heart and lung diseases, stroke, and low-birth-weight, premature births. Associations between periodontal disease and diabetes have long been noted. This report assesses these associations and explores mechanisms that might explain the oral-systemic disease connections.

The broadened meaning of oral health parallels the broadened meaning of health. In 1948 the World Health Organization expanded the definition of health to mean "a complete state of physical, mental, and social well-being, and not just the absence of infirmity." It follows that oral health must also include well-being. Just as we now understand that nature and nurture are inextricably linked, and mind and body are both expressions of our human biology, so, too, we must recognize that oral health and general health are inseparable. We ignore signs and symptoms of oral disease and dysfunction to our detriment. Consequently, a second theme of the report is that oral health is integral to general health. You cannot be healthy without oral health. Oral health and general health should not be interpreted as separate entities. Oral health is a critical component of health and must be included in the provision of health care and the design of community programs.

The wider meanings of oral and health in no way diminish the relevance and importance of the two leading dental diseases, caries and the periodontal diseases. They remain common and widespread, affecting nearly everyone

**Table**

## The Burden of Oral Diseases and Disorders

Oral diseases are progressive and cumulative and become more complex over time. They can affect our ability to eat, the foods we choose, how we look, and the way we communicate. These diseases can affect economic productivity and compromise our ability to work at home, at school, or on the job. Health disparities exist across population groups at all ages. Over one third of the U.S. population (100 million people) has no access to community water fluoridation. Over 108 million children and adults lack dental insurance, which is more than 2.5 times the number who lack medical insurance. The following are highlights of oral health data for children, adults, and the elderly. (Refer to the full report for details of these data and their sources.)

**Children**

- Cleft lip/palate, one of the most common birth defects, is estimated to affect 1 out of 600 live births for whites and 1 out of 1,850 live births for African Americans.
- Other birth defects such as hereditary ectodermal dysplasias, where all or most teeth are missing or misshapen, cause lifetime problems that can be devastating to children and adults.
- Dental caries is the single most common chronic childhood disease – five times more common than asthma and seven times more common than hay fever.
- More than 50 percent of 5- to 9-year-old children have at least one cavity or filling, and that proportion increases to 78 percent among 17-year-olds. Nevertheless, these figures represent improvements in the oral health of children compared to a generation ago.
- There are striking disparities in dental disease by income. Poor children suffer twice as much dental caries as their more affluent peers, and their disease is more likely to be untreated. These poor-nonpoor differences continue into adolescence. One out of four children in America is born into poverty, and children living below the poverty line (annual income of $17,000 for a family of four) have more severe and untreated decay.
- Unintentional injuries – many of which include head, mouth, and neck injuries -- are common in children.
- Intentional injuries commonly affect the craniofacial tissues.
- Tobacco-related oral lesions are prevalent in adolescents who currently use smokeless tobacco.
- Professional care is necessary for maintaining oral health, yet 25 percent of poor children have not seen a dentist before entering kindergarten.
- Medical insurance is a strong predictor of access to dental care. Uninsured children are 2.5 times less likely than insured children to receive dental care. Children from families without dental insurance are three times more likely to have dental needs than children with either public or private insurance. For each child without medical insurance, there are at least 2.6 children without dental insurance.
- Medicaid has not been able to fill the gap in providing dental care to poor children. Fewer than one in five Medicaid-covered children received a single dental visit in a recent year-long study period. Although new programs such as the State Children's Health Insurance Program may increase the number of insured children, many will still be left without effective dental coverage.
- The social impact of oral diseases in children is substantial. More than 51 million school hours are lost each year to dental-related illness. Poor children suffer nearly 12 times more restricted-activity days than children from higher-income families. Pain and suffering due to untreated diseases can lead to problems in eating, speaking, and attending to learning.

**Adults**

- Most adults show signs of periodontal or gingival diseases. Severe periodontal disease (measured as 6 mm of periodontal attachment loss) affects about 14 percent of adults aged 45 to 54.
- Clinical symptoms of viral infections, such as herpes labialis and oral ulcers are common in adulthood, affecting about 19 percent of adults 25 to 44 years of age.
- Chronic disabling diseases such as temporomandibular disorders, Sjögren's syndrome, diabetes, and osteoporosis affect millions of Americans and compromise oral health and functioning.
- Pain is a common symptom of craniofacial disorders and is accompanied by interference with vital functions such as eating, swallowing, and speech. Twenty-two percent of adults reported some form of oral-facial pain in the past six months. Pain is a major component of trigeminal neuralgia, facial shingles (post-herpetic neuralgia), temporomandibular disorders, fibromyalgia, and Bell's palsy.
- Population growth and diagnostics that are enabling earlier detection of cancer mean that more patients are undergoing cancer treatments. More than 400,000 of these patients will develop oral complications every year.
- Immunocompromised patients, such as those with HIV infection and those undergoing organ transplantation, are at higher risk for oral problems such as candidiasis.
- Employed adults lose more than 164 million hours of work each year due to dental disease or dental visits.
- For every adult 19 years or older without medical insurance, there are three without dental insurance.
- A little less than two thirds of adults report having visited a dentist in the past 12 months. Those with incomes at or above the poverty level are twice as likely to report a dental visit in the past 12 months as those who are below the poverty level.

**Older Adults**

- Twenty-three percent of 65- to 74-year-olds have severe periodontal disease (measured as 6 mm of periodontal attachment loss). (Also, at all ages, men are more likely than women to have more severe disease; and, at all ages, people at the lowest socioeconomic levels have more severe periodontal disease.)
- About 30 percent of adults 65 years and older are edentulous, compared to 46 percent 20 years ago. These figures are higher for those living in poverty.
- Oral and pharyngeal cancers are diagnosed in about 30,000 Americans annually; 8,000 die from these diseases each year. These cancers are primarily diagnosed in the elderly. Prognosis is poor. The five-year survival rate for white patients is 56 percent; for blacks, it is only 34 percent.
- Most older Americans take both prescription and over-the-counter drugs. In all probability, at least one of the medications used will have an oral side effect -- usually dry mouth. The inhibition of salivary flow increases the risk for oral disease because saliva contains antimicrobial components as well as minerals that can help rebuild tooth enamel after attack by acid-producing, decay-causing bacteria. Individuals in long-term care facilities are prescribed an average of eight drugs.
- At any given time, 5 percent of Americans aged 65 and older (currently some 1.65 million people) are living in a long-term care facility where dental care is problematic. Many elderly individuals lose their dental insurance when they retire. The situation may be worse for older women, who generally have lower incomes and may never have had dental insurance. Medicaid funds dental care for the low-income and disabled elderly in some states, but reimbursements are low. Medicare is not designed to reimburse for routine dental care.

at some point in the life span. What has changed is what we can do about them.

Researchers in the 1930s discovered that people living in communities with naturally fluoridated water supplies had less dental caries than people drinking unfluoridated water. But not until the end of World War II were the investigators able to design and implement the community clinical trials that confirmed their observations and launched a better approach to the problem of dental caries: prevention. Soon after, adjusting the fluoride content of community water supplies was pursued as an important public health measure to prevent dental caries.

Although this measure has not been fully implemented, the results have been dramatic. Dental caries began to decline in the 1950s among children who grew up in fluoridated cities, and by the late 1970s, decline in decay was evident for many Americans. The application of science to improve diagnostic, treatment, and prevention strategies has saved billions of dollars per year in the nation's annual health bill. Even more significant, the result is that far fewer people are edentulous today than a generation ago.

The significant role that scientists, dentists, dental hygienists, and other health professionals have played in the prevention of oral disease and disability leads to a third theme of this report: Safe and effective disease prevention measures exist that everyone can adopt to improve oral health and prevent disease. These measures include daily oral hygiene procedures and other lifestyle behaviors, community programs such as community water fluoridation and tobacco cessation programs, and provider-based interventions such as the placement of dental sealants and examinations for common oral and pharyngeal cancers. It is hoped that this surgeon general's report

will facilitate the maturing of the broad field of craniofacial research so that gains in the prevention of craniofacial diseases and disorders can be realized that are as impressive as those achieved for common dental diseases.

At the same time, more needs to be done to ensure that messages of health promotion and disease prevention are brought home to all Americans. In this regard, a fourth theme of the report is that general health risk factors, such as tobacco use and poor dietary practices, also affect oral and craniofacial health. The evidence for an association between tobacco use and oral diseases has been clearly delineated in almost every surgeon general's report on tobacco since 1964, and the oral effects of nutrition and diet are presented in the surgeon general's report on nutrition (1988). All the health professions can play a role in reducing the burden of disease in America by calling attention to these and other risk factors and suggesting appropriate actions.

## The Science Base for the Report

This report is based on a review of the published scientific literature. Standards established to determine the quality of the evidence, based on the study design and its rigor, were used where appropriate. In addition, the strength of the recommendations, where they are made, is based on evidence of effectiveness for the population of interest.

## Organization of the Report

The report centers on five major questions, which have been used to structure the report into five parts.

### *Part One: What Is Oral Health?*

The meaning of oral health is explored in Chapter 1, and the interdependence of oral health with general health and well-being is a recurrent theme throughout the volume.

Chapter 2 provides an overview of the craniofacial complex in development and aging, how the tissues and organs function in essential life processes, and their role in determining our uniquely human abilities.

### *Part Two: What Is the Status of Oral Health in America?*

Chapter 3 is a primer describing the major diseases and disorders that affect the craniofacial complex. The findings include:

- Microbial infections, including those caused by bacteria, viruses, and fungi, are the primary cause of the most prevalent oral diseases. Examples include dental caries, periodontal diseases, herpes labialis, and candidiasis.
- Tobacco use, excessive alcohol use, and inappropriate dietary practices contribute to many diseases and disorders. In particular, tobacco use is a risk factor for oral cavity and pharyngeal cancers, periodontal diseases, candidiasis, and dental caries, among other diseases.

Some chronic diseases, such as Sjögren's syndrome, present with primary oral symptoms.

Oral-facial pain conditions are common and often have complex etiologies.

Chapter 4 constitutes an oral health status report card for the United States, describing the magnitude of the problem. The findings include:

- Despite improvements in oral health status, profound disparities remain in some population groups as classified by sex, income, age, and race/ethnicity. For some diseases and conditions, the magnitude of the differences in oral health status among population groups is striking.
- National and state data for many oral and craniofacial diseases and conditions and for population groups are limited or nonexistent. Available state data reveal variations within and among states in patterns of health and disease among population groups.

### *Part Three: What Is the Relationship Between Oral Health and General Health and Well-Being?*

Chapters 5 and 6 address key issues in the report's charge -- the relationship of oral health to general health and well-being. Chapter 5 explores the theme of the mouth as reflecting general health or disease status. The findings include:

- The oral cavity and its functions can be adversely affected by many pharmaceuticals and other therapies commonly used in treating systemic conditions. The oral complications of these therapies can compromise patient compliance with treatment.
- Animal and population-based studies have demonstrated an association between periodontal diseases and diabetes, cardiovascular disease, stroke, and adverse pregnancy outcomes. Further research is needed to determine the extent to which these associations are causal or coincidental.

Chapter 6 demonstrates the relationship between oral health and quality of life, presenting data on the consequences of poor oral health and altered appearance on speech, eating, and other functions, as well as on self-esteem, social interaction, education, career achievement, and emotional state. An examination of efforts to characterize the functional and social implications of oral and craniofacial diseases reveals findings that include:

- Oral-facial pain, as a symptom of untreated dental and oral problems and

as a condition in and of itself, is a major source of diminished quality of life. It is associated with sleep deprivation, depression, and multiple adverse psychosocial outcomes.
- Self-reported impacts of oral conditions on social function include limitations in verbal and nonverbal communication, social interaction, and intimacy. Individuals with facial disfigurements due to craniofacial diseases and conditions and their treatments can experience loss of self-image and self-esteem, anxiety, depression, and social stigma; these in turn may limit educational, career, and marital opportunities and affect other social relations.

### *Part Four: How Is Oral Health Promoted and Maintained and How Are Oral Diseases Prevented?*

The next three chapters review how individuals, health care practitioners, communities, and the nation as a whole contribute to oral health. Chapter 7 reviews the evidence for the efficacy and effectiveness of health promotion and disease prevention measures with a focus on community efforts in preventing oral disease. The findings include:
- Community water fluoridation, an effective, safe, and ideal public health measure, benefits individuals of all ages and socioeconomic strata. Unfortunately, over one third of the U.S. population (100 million people) are without this critical public health measure.
- Community-based preventive programs are unavailable to substantial portions of the underserved population.
- Chapter 8 explores the role of the individual and the health care provider in promoting and maintaining oral health and well-being. The findings include:
- All primary care providers can contribute to improved oral and craniofacial health. Interdisciplinary care is needed to manage the oral health-general health interface. Dentists, as primary care providers, are uniquely positioned to play an expanded role in the detection, early recognition, and management of a wide range of complex oral and general diseases and conditions.
- New knowledge and the development of molecular and genetically based tests will facilitate risk assessment and management, and improve the ability of health care providers to customize treatment.

Chapter 9 describes the roles of dental practitioners and their teams, the medical community, and public health agencies at local, state, and national levels in administering care or reimbursing for the costs of care. These activities are viewed against the changing organization of U.S. health care and trends regarding the workforce in research, education, and practice.
- The dentist-to-population ratio is declining, creating concern as to the capability of the dental workforce to meet the emerging demands of society and provide required services efficiently.
- Current and projected demand for dental school faculty positions and research scientists is not being met. A crisis in the number of faculty and researchers threatens the quality of dental education; oral, dental, and craniofacial research; and, ultimately, the health of the public.

### *Part Five: What Are the Needs and Opportunities to Enhance Oral Health?*

Chapter 10 looks at determinants of oral health in the context of society and across various life stages. The findings include:
- Preventive interventions, such as protective head and mouth gear and dental sealants, exist but are not uniformly used or reinforced.
- Federal and state assistance programs for selected oral health services exist; however, the scope of services is severely limited, and their reimbursement level for oral health services is low compared to the usual fee for care.

Chapter 11 spells out in greater detail the promise of the life sciences in improving oral health in the coming years in the context of changes in American -- and global -- society. The critical role of genetics and molecular biology is emphasized.

Chapter 12, the final chapter, iterates the themes of the report and groups the findings from the earlier chapters into eight major categories. These findings, as well as a suggested framework for action to guide the next steps in enhancing the oral health of the nation, are presented below.

## Major Findings

Oral diseases and disorders in and of themselves affect health and well-being throughout life. The burden of oral problems is extensive and may be particularly severe in vulnerable populations. It includes the common dental diseases and other oral infections, such as cold sores and candidiasis, that can occur at any stage of life, as well as birth defects in infancy, and the chronic facial pain conditions and oral cancers seen in later years. Many of these conditions and their treatments may interfere with vital functions such as breathing, eating, swallowing, and speaking and with activities of daily living such as work, school, and family interactions.

Safe and effective measures exist to prevent the most common dental diseases --dental caries and periodontal diseases.

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Community water fluoridation is safe and effective in preventing dental caries in both children and adults. Water fluoridation benefits all residents served by community water supplies regardless of their social or economic status. Professional and individual measures are additional means of preventing dental caries.

Lifestyle behaviors that affect general health such as tobacco use, excessive alcohol use, and poor dietary choices affect oral and craniofacial health as well. These individual behaviors are associated with increased risk for craniofacial birth defects, oral and pharyngeal cancers, periodontal disease, dental caries, and candidiasis, among other oral health problems. Opportunities exist to expand the oral disease prevention and health promotion knowledge and practices of the public through community programs and in health care settings.

There are profound and consequential oral health disparities within the U.S. population. Disparities for various oral conditions may relate to income, age, sex, race or ethnicity, or medical status. Although common dental diseases are preventable, not all members of society are informed about or able to avail themselves of appropriate oral health-promoting measures. Similarly, not all health providers may be aware of the services needed to improve oral health. In addition, oral health care is not fully integrated into many care programs. Social, economic, and cultural factors and changing population demographics affect how health services are delivered and used, and how people care for themselves.

More information is needed to improve America's oral health and eliminate health disparities. We do not have adequate data on health, disease, and health practices and care use for the U.S. population as a whole and its diverse segments, including racial and ethnic minorities, rural populations, individuals with disabilities, the homeless, immigrants, migrant workers, the very young, and the frail elderly. Nor are there sufficient data that explore health issues in relation to sex or sexual orientation. Data on state and local populations, essential for program planning and evaluation, are rare or unavailable and reflect the limited capacity of the U.S. health infrastructure for oral health.

The mouth reflects general health and well-being. The mouth is a readily accessible and visible part of the body and provides health care providers and individuals with a window on their general health status. As the gateway of the body, the mouth senses and responds to the external world and at the same time reflects what is happening deep inside the body. The mouth may show signs of nutritional deficiencies and serve as an early warning system for diseases such as HIV infection and other immune system problems. The mouth can also show signs of general infection and stress. As the number of substances that can be reliably measured in saliva increases, it may well become the diagnostic fluid of choice.

Oral diseases and conditions are associated with other health problems. Oral infections can be the source of systemic infections in people with weakened immune systems, and oral signs and symptoms often are part of a general health condition. Associations between chronic oral infections and other health problems, including diabetes, heart disease, and adverse pregnancy outcomes, have also been reported. Ongoing research may uncover mechanisms that strengthen the current findings and explain these relationships.

Scientific research is key to further reduction in the burden of diseases and disorders that affect the face, mouth, and teeth. The science base for dental diseases is broad and provides a strong foundation for further improvements in prevention; for other craniofacial and oral health conditions, the base has not yet reached the same level of maturity. Scientific research has led to a variety of approaches to improve oral health through prevention, early diagnosis, and treatment. We are well-positioned to take these prevention measures further by investigating how to develop more targeted and effective interventions and devising ways to enhance their appropriate adoption by the public and the health professions. An intensified effort to understand the relationships between oral infections and their management, and other illnesses and conditions is warranted, along with the development of oral-based diagnostics.

## A Framework For Action

All Americans can benefit from the development of a National Oral Health Plan to improve quality of life and eliminate health disparities by facilitating collaborations among individuals, health care providers, communities, and policymakers at all levels of society and by taking advantage of existing initiatives. Everyone has a role in improving and promoting oral health. Together we can work to broaden public understanding of the importance of oral health and its relevance to general health and well-being, and to ensure that existing and future preventive, diagnostic, and treatment measures for oral diseases and disorders are made available to all Americans. The following are the principal components of the plan:

Change perceptions regarding oral health and disease so that oral health becomes an accepted component of general health.

- Change public perceptions. Many

people consider oral signs and symptoms to be less important than indications of general illness. As a result, they may avoid or postpone needed care, thus exacerbating the problem. If we are to increase the nation's capacity to improve oral health and reduce health disparities, we need to enhance the public's understanding of the meaning of oral health and the relationship of the mouth to the rest of the body. These messages should take into account the multiple languages and cultural traditions that characterize America's diversity.

- Change policymakers' perceptions. Informed policymakers at the local, state, and federal levels are critical in ensuring the inclusion of oral health services in health promotion and disease prevention programs, care delivery systems, and reimbursement schedules. Raising awareness of oral health among legislators and public officials at all levels of government is essential to creating effective public policy to improve America's oral health. Every conceivable avenue should be used to inform policymakers -- informally through their organizations and affiliations and formally through their governmental offices -- if rational oral health policy is to be formulated and effective programs implemented.
- Change health providers' perceptions. Too little time is devoted to oral health and disease topics in the education of nondental health professionals. Yet all care providers can and should contribute to enhancing oral health. This can be accomplished in several ways, such as including an oral examination as part of a general medical examination, advising patients in matters of diet and tobacco cessation, and referring patients to oral health practitioners for care prior to medical or surgical treatments that can damage oral tissues, such as cancer chemotherapy or radiation to the head and neck.

Accelerate the building of the science and evidence base and apply science effectively to improve oral health. Basic behavioral and biomedical research, clinical trials, and population-based research have been at the heart of scientific advances over the past decades. The nation's continued investment in research is critical for the provision of new knowledge about oral and general health and disease for years to come and needs to be accelerated if further improvements are to be made. Equally important is the effective transfer of research findings to the public and health professions. However, the next steps are more complicated. The challenge is to understand complex diseases caused by the interaction of multiple genes with environmental and behavioral variables -- a description that applies to most oral diseases and disorders -- and translate research findings into health care practice and healthy lifestyles.

This report highlights many areas of research opportunities and needs in each chapter. At present, there is an overall need for behavioral and clinical research, clinical trials, health services research, and community-based demonstration research. Also, development of risk assessment procedures for individuals and communities and of diagnostic markers to indicate whether an individual is more or less susceptible to a given disease can provide the basis for formulating risk profiles and tailoring treatment and program options accordingly.

Vital to progress in this area is a better understanding of the etiology and distribution of disease. But as this report makes clear, epidemiologic and surveillance databases for oral health and disease, health services, utilization of care, and expenditures are limited or lacking at the national, state, and local levels. Such data are essential in conducting health services research, generating research hypotheses, planning and evaluating programs, and identifying emerging public health problems. Future data collection must address differences among the subpopulations making up racial and ethnic groups. More attention must also be paid to demographic variables such as age, sex, sexual orientation, and socioeconomic factors in determining health status. Clearly, the more detailed information that is available, the better can program planners establish priorities and targeted interventions.

Progress in elucidating the relationships between chronic oral inflammatory infections, such as periodontitis, and diabetes and glycemic control as well as other systemic conditions will require a similar intensified commitment to research. Rapid progress can also occur with efforts in the area of the natural repair and regeneration of oral tissues and organs. Improvements in oral health depend on multidisciplinary and interdisciplinary approaches to biomedical and behavioral research, including partnerships among researchers in the life and physical sciences, and on the ability of practitioners and the public to apply research findings effectively.

Build an effective health infrastructure that meets the oral health needs of all Americans and integrates oral health effectively into overall health. The public health capacity for addressing oral health is dilute and not integrated with other public health programs. Although the Healthy People 2010 objectives provide a blueprint for outcome measures, a

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national public health plan for oral health does not exist. Furthermore, local, state, and federal resources are limited in the personnel, equipment, and facilities available to support oral health programs. There is also a lack of available trained public health practitioners knowledgeable about oral health. As a result, existing disease prevention programs are not being implemented in many communities, creating gaps in prevention and care that affect the nation's neediest populations. Indeed, cutbacks in many state budgets have reduced staffing of state and territorial dental programs and curtailed oral health promotion and disease prevention efforts. An enhanced public health infrastructure would facilitate the development of strengthened partnerships with private practitioners, other public programs, and voluntary groups.

A closer look at trends in the workforce discloses a worrisome shortfall in the numbers of men and women choosing careers in oral health education and research. Government and private sector leaders are aware of the problem and are discussing ways to increase and diversify the talent pool, including easing the financial burden of professional education, but additional incentives may be necessary.

Remove known barriers between people and oral health services. This report presents data on access, utilization, financing, and reimbursement of oral health care; provides additional data on the extent of the barriers; and points to the need for public-private partnerships in seeking solutions. The data indicate that lack of dental insurance, private or public, is one of several impediments to obtaining oral health care and accounts in part for the generally poorer oral health of those who live at or near the poverty line, lack health insurance, or lose their insurance upon retirement. The level of reimbursement for services also has been reported to be a problem and a disincentive to the participation of providers in certain public programs. Professional organizations and government agencies are cognizant of these problems and are exploring solutions that merit evaluation. Particular concern has been expressed about the nation's children, and initiatives such as the State Children's Health Insurance Program, while not mandating coverage for oral health services, are a positive step. In addition, individuals whose health is physically, mentally, and emotionally compromised need comprehensive integrated care.

Use public-private partnerships to improve the oral health of those who still suffer disproportionately from oral diseases. The collective and complementary talents of public health agencies, private industry, social services organizations, educators, health care providers, researchers, the media, community leaders, voluntary health organizations and consumer groups, and concerned citizens are vital if America is not just to reduce, but to eliminate, health disparities. This report highlights variations in oral and general health within and across all population groups. Increased public-private partnerships are needed to educate the public, to educate health professionals, to conduct research, and to provide health care services and programs. These partnerships can build and strengthen cross-disciplinary, culturally competent, community-based, and community-wide efforts and demonstration programs to expand initiatives for health promotion and disease prevention. Examples of such efforts include programs to prevent tobacco use, promote better dietary choices, and encourage the use of protective gear to prevent sports injuries. In this way, partnerships uniting sports organizations, schools, churches, and other community groups and leaders, working in concert with the health community, can contribute to improved oral and general health.

## Conclusion

The past half century has seen the meaning of oral health evolve from a narrow focus on teeth and gingiva to the recognition that the mouth is the center of vital tissues and functions that are critical to total health and well-being across the life span. The mouth as a mirror of health or disease, as a sentinel or early warning system, as an accessible model for the study of other tissues and organs, and as a potential source of pathology affecting other systems and organs has been described in earlier chapters and provides the impetus for extensive future research. Past discoveries have enabled Americans today to enjoy far better oral health than their forebears a century ago. But the evidence that not all Americans have achieved the same level of oral health and well-being stands as a major challenge, one that demands the best efforts of public and private agencies and individuals.

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# Jack Conley, Gentleman Editor

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CDA *Update* news item:

Sacramento, Calif. -- Jack F. Conley, DDS, MEd, editor of the Journal of the California Dental Association, will be honored at the Fall Scientific Session in San Francisco for his 17 years of service.

Conley, who began his CDA career as a member of the Council on Dental Education in 1972, has been editor since 1983. CDA President Kent Farnsworth, DDS, chose to dedicate the Session to Conley because of his long personal dedication to the profession.

"Dr. Conley personifies why CDA is the leading constituent association in the nation," Farnsworth said. "He is truly the voice of CDA, in the same league as Edward R. Murrow and Walter Cronkite."

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We want you should nip down to your nearest Blockbuster and rent the following: "The Front Page," both the original 1931 version with Adolphe Menjou and the 1974 remake with Walter Matthau. While you're at it, pick up a copy of "His Girl Friday" with Cary Grant, which is a remake of the remake.

These films are supposed to be comedies, but for our purposes they are a factual study of what constitutes an editor. Menjou, Matthau and Grant do sterling jobs of portraying the public's idea of how an editor should behave. Without exception, they are hard-nosed, abrasive, overbearing, obnoxious, underhanded, and not very nice tyrants. Hard-drinking, cigar-chomping, irascible and a pain in the posterior to their staffs, these three thespians epitomized editors to the cinema-going world -- martinets to the core.

The message is: If you're going to put out a publication that has any more pizzazz than the Pennysaver, you've got to have the person in charge exercise all the authority of a free-range dictator, else the little people under you will monumentally screw things up.

With that stereotype firmly in mind, we invite you to consider an editor who is so far off the other end of the scale, he makes Mr. Rogers come off like Jack the Ripper. He is so incredibly patient, he has to have "road rage" explained to him. So humble and self-effacing, casting directors would laugh him off the lot when the

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editor's role in "The Front Page" is recycled once more. Think Gregory Peck in "To Kill a Mockingbird," Jimmy Stewart in "Harvey," Bob Newhart in anything. That pretty well encapsulates our vision of Jack F. Conley, editor of the Journal of the California Dental Association since 1983.

Jack never met an organization he didn't like and that didn't instantly embrace him. Because he is the perfect choice for every task -- from emptying the wastebaskets to chairing every committee corporate minds can concoct -- Jack has been welcomed and honored in more organizations than can be listed here. That he accomplishes all this without breaking a sweat or tarnishing his Mr. Nice Guy image is commendable, even though it confuses the heck out of people who thought Ed Asner playing Lou Grant was an accurate depiction of the genre.

October 1992 -- In a freshet of impetuosity, we agree to accompany Jack to Orlando, Fla., where he is to be honored as incoming president of the American Association of Dental Editors. Somewhere in the list of Conley's accolades is one for being the best inexhaustible nonstop talker and explainer-of-complex-issues this side of a Senate filibuster. In this instance, though, he defers to me and Charlie Hayward, Journal cartoonist and cover designer. He wants us to explain to the assembled dental editors why we think we can get away with a monthly humor column inserted into an otherwise outstanding scientific publication.

Our own ADA Journal is notoriously strait-laced. If you were looking for laughs, the New England Journal of Medicine would not be your first choice. Conley is on his own here as a dental editor, neck out, marching to a different percussionist.

Not for nothing have we knelt at the feet of the Master. Our explanation and justification for leavening the heavy-duty technical Journal agenda has Conley beaming paternally in the background. After a short pause for stupefaction, the assemblage comes to the unanimous conclusion, "Only in California!" The meeting concludes with at least 10 more organizations pleading with Jack to join them. Our work here is done.

Eight years later -- The International College of Dentists concludes that Editor Conley's Journal deserves to "receive a Special Citation in the Year 2000 USA Section of the International College of Dentists Journalism Awards Competition [because it] in such a graphic way recognizes a face of dentistry (humor) not usually seen in a publication." Jack's commitment is justified; it's good to be the King.

What's his secret? We have no idea. Staffers who work closely with him say he's as close to a true gentleman as they've ever met. He doesn't gossip, he doesn't talk out of school, he works a political minefield and hasn't lost a limb yet. It is Jack's idée fixe to make his baby the best dental journal in the entire universe.

You call that an editor? We do!