Rural Dentistry
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CDA

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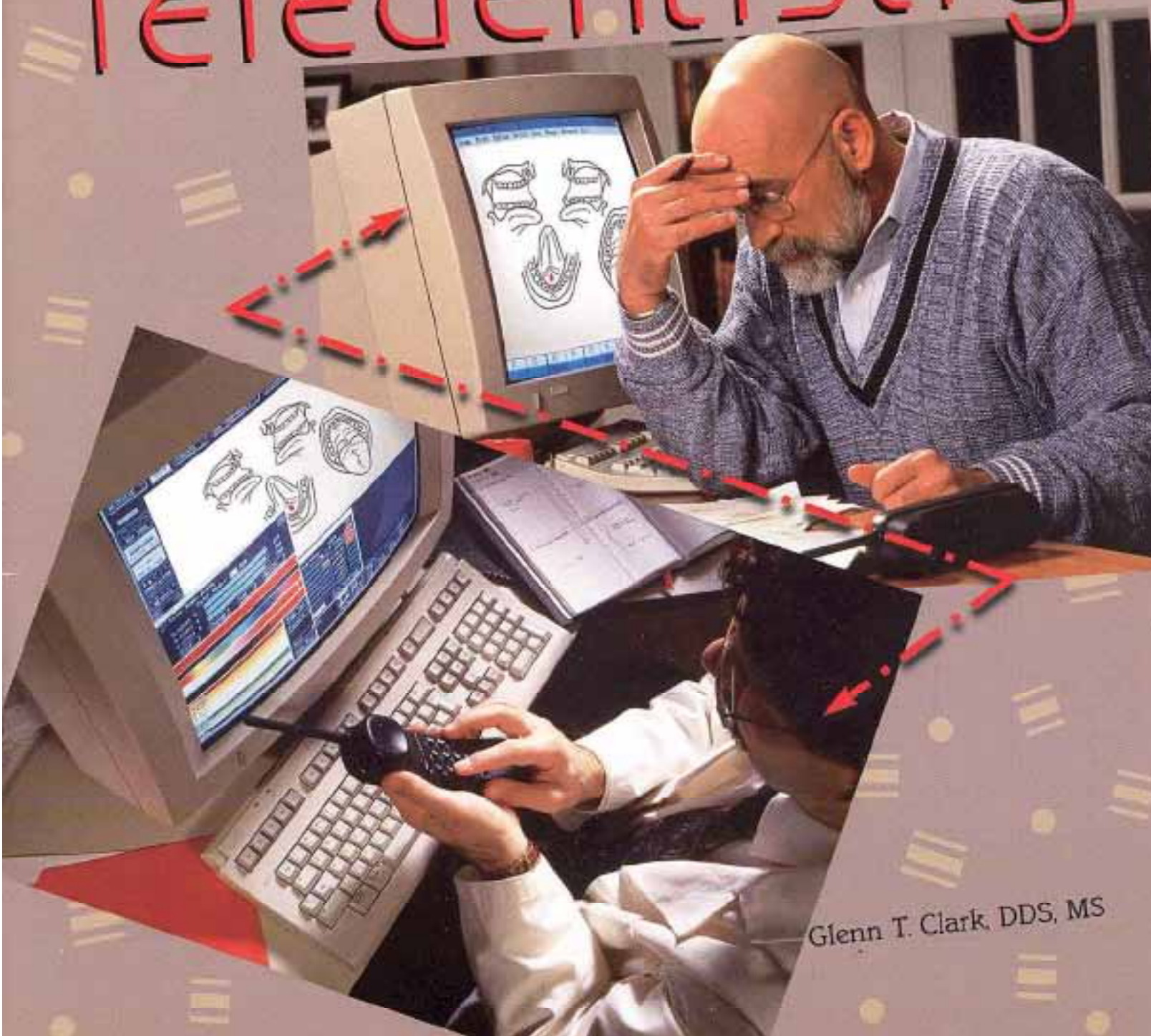
Teledentistry



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DEPARTMENTS

FEATURES

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On the Cusp of Scrutiny – Again

Jack F. Conley, DDS

Too often, the well-meaning, well-intentioned, responsible dental professional is placed in an uncomfortable defensive posture in the media and in his or her practice. Despite their efforts to inform their patients, provide exhaustive informed consent, utilize treatment protocols and materials that they believe are safe for patients and for management by their staff, dentists are made to look uninformed and insensitive.

Well-informed dentists know that some of their colleagues may be guilty of the shortcomings mentioned above. That is a given. What is unreasonable is that in an effort to placate consumer advocates, individuals in the public arena, who should know that the majority of dentists uphold contemporary standards of patient education, nonetheless allow themselves to be badgered into actions or words that suggest that the entire profession is guilty of the deficiencies under scrutiny and must be punished like a petulant child until all of its members are brought into line. The net result is to raise unnecessary concerns among the public about their safety when considering dental treatment.

It isn't easy to take actions or comments to reporters about issues of public concern, particularly if an issue erupts quickly or blindsides an individual who must respond to critical questioning. That is why leadership in organized dentistry must be exposed to spokesperson training from time to time so that when under pressure they will be better able to respond to hard inquiry. Sometimes it only takes a few ill-chosen "off the cuff" words to give an eager reporter an opening that inflicts damage that takes considerable time and effort to repair.

In this observer's opinion, general dentists as a group took a heavy hit in the press as a result of a special order of business placed before the Board of Dental Examiners in early December. A report of some of the discussions at that meeting subsequently carried in the Los Angeles Times and by the Associated Press were patently unfair to the well-educated, caring general dentists who currently do an outstanding job of providing education and informed consent to their patients.

The issue under discussion was the safety of dental amalgam, the controversy that seems to have no end. Our purpose here is not to raise amalgam as an issue for extensive discussion, but to show how an emotion-based issue backed the Board of Dental Examiners into words and action that placed dentistry in a very poor light. It is not clear exactly what revisions in the BDE Fact Sheet on Dental Materials will occur as a result of actions taken by the board or how recommendations that were incorporated in the board action will be enforced or carried out. In our review, we noted a variance between a preliminary reporting of the board actions and the press reports that immediately circulated. We will await the specifics that are distributed by the board before reaching any conclusions about the impact of the new guidelines.

However, what we object to most

strenuously are two items incorporated into the press reports that stand out. The first was the following:

"But the board also voted to include in both publications (the quarterly newsletter and the revised materials fact sheet) the array of toxic chemicals used in alternative fillings -- made of porcelain, ceramics, and resin -- despite objections from the mercury-free advocates that none are as dangerous as mercury."

We are concerned that the phrase "array of toxic materials" in the dental office sends the wrong message about dentistry. The term array is defined as "an impressively large number." It is also doubtful that the Board of Dental Examiners or any other agency will be able to provide an objective scientific assessment of the relative toxicity of these materials in the near future. In that regard, we recently read a referenced article in Oral Care Report, Vol. 9, No. 3, 1999, edited by Chester Douglas, professor of oral health policy and epidemiology at the Harvard School of Dental Medicine and School of Public Health.

He concluded, "As yet, there is little comparative data on the safety of the numerous agents (dental restoratives). Hence, the World Health Organization has called for an extensive postmarket surveillance on all dental materials so that risks can be assessed and practitioners can take the relevant precautions to protect both themselves and their patients. At present, the most thorough review of existing studies, reported by the Oral Health Division of the World Health Organization, concludes that composites and glass ionomers are not superior to traditional dental amalgam in their safety. They appear to be less effective for large restorations in stress-bearing areas, though they have the obvious advantage of being tooth-colored."

The news report also stated that one dentist board member "read a list of hazardous materials used in practicing dentistry, ranging from the latex in dentists' gloves to the triethylene in resin fillings." He went on to say, "There are quite a few. It would be good to look around our offices and see what's there." To this we wonder, what have dentists been dealing with for quite some time with MSDS's, OSHA guidelines, hazardous waste disposal, etc., etc.? This comment suggested that the average dentist is not well-informed about the number of dangerous materials in his or her office and has heretofore been insensitive in caring whether he or she is endangering patients or staff. We believe that even the average dentist is better informed than the critical comments suggest. Since it doesn't directly deal with the amalgam issue under discussion, the latter statement ("It would be good to look ...") should not have been made. What is the purpose of depicting the general dental practice as a supermarket of toxic hazardous materials?

We are all for efforts to improve the quality and safety of care in the dental office. But we are against any efforts or comments subject to public scrutiny that impugn the integrity of dentists that are doing their very best to uphold accepted standards of care. It is not appropriate to appeal to the emotions of the public by appearing to question the practices of an entire profession with public statements that, at best, are irresponsible.

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Dental Student Debt Looms Large

By David G. Jones

It's a problem looming large for dentistry, and it permeates virtually every area of the profession. The problem -- the large educational debt that many dental school students accrue -- is rippling outward, from dental schools, to individual dentists, and to the profession itself.

The problem is getting worse. According to the American Association of Dental School's Survey of Dental School Seniors, 1998 Graduating Class, dental education debt has climbed from a national average of $18,500 in 1980, to $54,550 in 1990, to $84,000 in 1998. And in California, student debt levels have now reached an average of more than $123,000.

Dental school debt has long been an issue with dentists who struggle to pay off the debt while trying to build a practice. Harold S. Harada, DDS, who in 1985 was CDA president, graduated from the College of Physicians and Surgeons, now the University of the Pacific, in 1956. Even though his debt, as he remembers it, was only a few thousand dollars, it required some hard work to pay it off.

"I was married with a child when I started dental school, so I had a lot of expenses," he said. "I was able to get it paid off pretty quickly, but I had to work evenings and Saturdays six days a week for a couple of years to complete the payoff."

For Nava Fathi, DDS, the debt from dental school and a two-year endodontic program totaled about $250,000.

"I couldn't get additional loans for the specialty training, so I got private loans, but the downside is higher interest rates," said the 1995 UOP graduate, who completed her endodontic training at the University of Southern California in 1998. "Generally, I think those starting out as specialists have a higher earning potential. Finding a job as a general dentist with an income high enough to pay off student debt is more difficult."

Fathi bought a practice in the Central Valley town of Gilroy last June. To help pay off her loans, she works as an associate in San Francisco, and teaches part-time at UOP. She said she enjoys teaching very much but realizes that being a full-time faculty member doesn't pay enough to afford monthly payments to retire her debt load.

"To teach full time, I would have to be debt free," she said.

No-Hee Park, DMD, PhD, dean of the University of California at Los Angeles School of Dentistry, said that student debt directly affects the quality of dental education.

"Nationwide, we have a crisis in recruitment and retention of faculty in dental schools, because of indebtedness," Park said. "New graduates have to make money and many can't afford to be further trained. This will undermine our educational quality, the quality of future academicians, and it will very seriously threaten our profession itself."

Arthur A. Dugoni, DDS, dean of the University of the Pacific School of Dentistry, said for the long term, dentistry should embark on a national endowment. He envisions a large dental education endowment over the next 25 years, to be funded through dental-related, government, and private industry resources.

Dugoni also said that because of student debt, many specialists don't locate in underserved or economically disadvantaged regions, and general practitioners are more likely to practice in metropolitan areas where there is the potential of higher income.

"Graduates who are deeply in debt will also be less prone to provide unreimbursed dental care or to establish practices in economically deprived regions of the country," Dugoni warned. "And because young graduates will need to establish a substantial cash flow immediately upon graduation, some have raised the concern that economic survival, rather than decisions based solely on what is best for each patient, will color decisions related to patient care, which could affect the quality of care."

CDA annually provides $6,000 in scholarship funds to each school to help selected sophomore students pay for their education. Park said that while the funds help, they are not sufficient to help solve the problem.

"When dentists don't care about the future of the profession or quality of care, who else will take care of it? I think CDA should take a stronger leadership role."

CDA President Kent Farnsworth, DDS, said that the association is restructuring its CDA Charitable Fund to direct more resources to scholarships in general, and the method of choosing the sophomore scholarship recipients is being re-evaluated.

"The money in the Charitable Fund has been growing, so we're looking at how we can best distribute it in scholarships," he said.

Farnsworth acknowledged that this is a short-term solution and said that there is a longer-term solution that hinges on the successful establishment of a CDA credit union.

"Once that's established, I'm going to personally head an appeal to our established members to contribute to a new professional loan fund, which would grant low-income loans to recent graduates, because they are the ones that have the most difficulty in obtaining relief while they get their practices started. And if they can't get additional funding, they can be forced into less desirable practice modes simply to keep their heads above

water financially, as opposed to developing a practice mode that would be kept in keeping with their education."

Farnsworth said that this is a win-win situation that would also serve as a recruitment and retention tool, because loan applicants would have to be members of the credit union, and to do that they would have to be CDA members.

"We have to break the downward spiral that dental educational debt creates."

Most problems between dentists and children can be handled through better communication, according to Greg Johnson, director of professional services for the Illinois State Dental Society, and staff liaison to the ISDS's Peer Review Committee.

In an article in the August 1999 Illinois Dental News, Johnson writes that of the 500 peer review cases handled by the committee each year, about 10 percent involve children. He writes that complaints involving children frequently include three issues: parents who are not allowed into the operatory with their child; "hand-over-mouth" behavior control techniques; and continuing a procedure even after a child indicates the dentist should stop. Johnson says that dentists can frequently eliminate these problems by addressing them ahead of time with the child and parent.

Dentists who prefer not to have parents in the operatory should make that office policy clear to the parent ahead of time. "I think at times if a parent objects to a particular policy, maybe it's best the dentist refer them to a colleague who will allow the parent in," says Dr. Richard Kirchoff, a past president of the Illinois Society of Pediatric Dentists. If the parent is to be allowed, ground rules need to be established, Kirchoff notes. The dentist should make it clear that a parent is to be a "quiet observer," sitting in front of the patient, and perhaps holding a child's hand for comfort.

The "hand-over-mouth" technique of controlling a child patient, while approved by the American Academy of Pediatric Dentistry, doesn't always please parents. For those who do use the hand-over-mouth technique, it should be done in a non-angry, non-aggressive manner, without reducing the airway.

Johnson's article notes many dentists find the hand-over-mouth technique ineffective, noting that if a child's behavior is out of control to the point where the dentist considers using it, it may be best to stop the procedure. According to the article, a parent should be informed prior to its use, and preferably a signed consent form should be obtained from the parent. Johnson notes other methods of control tend to work better, such as voice control.

For children in or near hysterics, another recommended method is the T.O.T.S., or Take Off The Shoe method, based on the theory that four-year-olds don't like to have their shoes taken off. Dentists can promise to replace the shoe if the child cooperates.

As for complaints about dentists continuing treatment after the child indicates he or she wants it stopped, it's important for the dentist to give the child a signal, such as raising a hand, when they want the dentist to stop. The dentist should stop, give more anesthetic, or take other measures to make the child more comfortable. Letting the child and parent know what the procedure involves ahead of time can alleviate problems. Better communication helps all the way around, Johnson notes.

CDC Presents More Fluoride Support

Dental treatment costs for low-income children can be twice as high and crisis intervention more frequent in nonfluoridated communities than in those with fluoridated water, according to a Sept. 3, 1999, report from the Centers for Disease Control and Prevention, published in the CDC Morbidity and Mortality Weekly Report.

Findings of the study, which was conducted in 19 Louisiana parishes (counties), suggest that very young children lacking access to fluoridated water were three times more likely to receive dental treatment in a hospital operating room than children in communities with optimal levels of fluoridated water.

"CDC's data are useful for community decision makers as they consider implementing water fluoridation," says Dr. Kimberly McFarland, vice chair of the ADA Council on Access, Prevention and Interprofessional Relations and chair of the council's National Fluoridation Advisory Committee. "From public health experience across the country, we have always known that fluoridation saves money. These data document that water fluoridation is beneficial especially for low-income populations."

The study reports that more Medicaid-eligible children in nonfluoridated

Average Student Educational Debt
(Only includes students who borrowed)

Loma Linda	$133,000
UCLA	$68,000
UCSF	$58,367
UOP	$157,000
USC	$200,000
Calif. average	$123,000
National average	$84,000

** American Association of Dental School's Survey of Dental School Seniors, 1998 Graduating Class*

1999 Tuition and Fees for Dental School (based on four-year degree)

Loma Linda	$131,531	
UCLA	$65,000 $102,558	(resident) (nonresident)
UCSF	$55,586 $93, 122	(resident) (nonresident)
UOP	$160,800	
USC	$174,600	
National average	$70,000*	(1997)

** ADA Survey Center, Surveys of Predoctoral Dental Education Institutions*

parishes received caries-related dental treatment and operating-room-based care at greater cost than did Medicaid-eligible children in fluoridated parishes. The expected annual reduction in dental treatment costs for at least 39,000 preschoolers in Louisiana, as a result of potential benefits from water fluoridation, would be $1.4 million.

Other studies have found that caries in the primary dentition disproportionately affect children from low-income households, including a study reported in the September 1998 Journal of the American Dental Association.

The authors of the CDC-reported study say they did not measure the length or magnitude of the children's exposure to fluoride and said the findings are subject to other limitations. Lower treatment costs associated with water fluoridation should not be generalized to preschool children from middle and high income families because of their lower prevalence of dental decay, the authors say.

Most Honest	Least Honest
The 10 occupations considered most honest by the American public:	**The 10 considered least honest by the American public:**
1. Nurses*	36. Real estate agents
2 Pharmacists	37. Lawyers
3. Veterinarians*	38. Gun salesman
4. Medical doctors	39. Congressmen
5. Grade and high school teachers*	40. Journalists who publish only in the Internet
6. Clergy	41. Insurance salesman
7. Judges*	42. HMO managers*
8. Policeman	43. Advertising practitioners
9. Dentists	44. Telemarketers*
10. College teachers	45. Car salesman

* New to the poll

Dental Inroads Harder to Find for Managed Care

Managed care organizations are unlikely to penetrate dental markets to the extent that they have medical markets, according to an article by a team of dentists in the Winter 1999 issue of the Journal of Public Health Dentistry.

In the article, the authors examine data collected by the National Association of Dental Plans, the Interstudy Competitive Edge HMO Census, and the Area Resource File from 1987 to 1995 to study the economics of dental and medical markets. The researchers found that the growth of managed care in dentistry is predictable by the same factors as in medicine and closely follows the pattern found in medical markets.

The authors conclude that despite the similarities in penetration rates, potential barriers to managed care exist in dentistry that may explain the slower growth to date. Those barriers may ultimately decide the extent of managed care penetration into the dental market. Potential barriers include a lower proportion of the population covered by dental insurance than by medical insurance, the relative infrequency of acute care in dentistry as compared to medicine, and the relative stability of dental expenditures compared to the sharp increase in medical expenditures in the past three decades.

The majority of cost savings by HMOs in medicine have been in the area of acute, inpatient services (e.g., the length of hospital stays and the lowering of rates of expensive hospital procedures), rather than in the area of preventive and wellness-oriented services that characterize most dental services.

"This source of savings in medicine suggests that dental HMOs may find savings to be more elusive than medical HMOs," the authors write.

Dentists Still Rank High in Honesty Poll

Dentists ranked ninth in Gallup's annual poll of American's views on the honesty and ethics of various occupations. Nurses, included in the poll for the first time, ranked first.

The poll was changed for 1999 to include 20 additional occupations. In addition to nurses, three newly included occupations ranked in the top 10: veterinarians, grade and high school teachers, and judges. In 1998, dentists tied for fourth.

Health care providers fared well on the list, with five in the top 10. HMO managers, however, ranked 42nd out of 45 occupations.

Trigeminal Neuralgia Can Masquerade as Dental Pain

A patient who complains of toothache or sinusitis-like pain with no apparent dental cause may be suffering from a neurological condition known as trigeminal neuralgia, according to an article in the May/June 1999 issue of Northwest Dentistry.

The article by Claire W. Patterson, president of the Trigeminal Neuralgia Association, and Dr. Judd S. Copeland, DDS, surveys the causes, symptoms, and treatment of the disorder. They write that the patient usually complains of a sharp, stabbing pain that is aggravated by chewing, drinking hot or cold liquids, brushing the teeth, or talking.

Misdiagnosis of the condition can

result in unnecessary dental therapies such as multiple extractions, endodontic procedures and TMJ surgery -- frequently with no effect on the patient's discomfort, write the authors.

Trigeminal neuralgia is usually caused by compression of a blood vessel at the trigeminal nerve root entry-exit zone, according to the article. It produces what many physicians consider to be the most excruciating of all types of pain. The symptoms may be mild in the early stages, but develop into recurring episodes of intense, electric shock-like pain in the distribution of one or more branches of the trigeminal nerve.

The article notes that the major diagnostic criterion is the presence of trigger points on the face. The slightest stimulation of any of these points results in an agonizing attack for the patient. About 25 percent of patients will respond to treatment with anticonvulsant drugs, but surgery is required for most.

Classic trigeminal neuralgia has distinct symptoms, which clearly separate it from other forms of facial pain:

- Pain is short, acute bursts rather than a dull, constant ache. Often described as electric shock-like in nature.
- Pain is usually triggered by light touch or sensitivity to vibrations, such as brushing one's teeth, a light breeze, shaving, or talking.
- The pain has a tendency to come and go with periods of intense, sometimes totally debilitating pain, followed by completely pain-free periods of remission lasting from weeks to months or possibly longer.
- Most patients experience pain during the day while they are up and about. Generally, they are free of pain while asleep unless it is triggered by the touch of bed linens or changes in position.

The patient history and description of symptoms are the major aids in confirming the diagnosis, the authors write. Most doctors will recommend a CAT scan or MRI along with other laboratory tests. These are intended mostly to rule out other causes of pain such as tumors or multiple sclerosis. There is no specific test to confirm the diagnosis, according to the authors.

Bacteria by the Mouthful

Stanford researchers have shown that the human mouth is awash with far more bacteria than previously thought.

Using a combination of old and new scientific methods to study a scraping of plaque from a healthy human mouth, the researchers found evidence of 37 unique bacteria that microbiologists had never before recorded. Some were closely related to bacteria that scientists are familiar with, but others were very different.

Knowing more about the bacteria that reside in a normal, healthy mouth may help dentists understand changes in the bacterial population that can lead to gingivitis, periodontitis, and tooth decay.

"Our data suggest that a significant proportion of the resident human bacterial flora remain poorly characterized, even within this well-studied and familiar microbial environment," said David Relman, MD, assistant professor of medicine and of microbiology and immunology at Stanford, and lead author of the study published in the Dec. 7 issue of the Proceedings of the National Academy of Sciences. Relman and colleagues conducted the research in his lab at the Veterans Affairs Palo Alto Health Care System.

Relman said the subgingival crevice has been repeatedly scrutinized in the search for microbes. Even though almost 500 bacterial strains have been identified already, Relman believes this may be only a fraction of the bacteria in the crevice.

Oral bacteria have traditionally been studied by taking a scraping or sample from inside the mouth, growing the bacteria in the laboratory and then identifying different species according to biochemical tests and the type of food source that each bacteria prefers. Using this method, the Relman team identified bacteria found in a sample of plaque taken from the subgingival crevice.

They also searched the same sample using molecular techniques. Instead of nurturing the bacteria in the lab, they prepared DNA directly from the plaque and studied each genetic sequence that had a bacterial signature. Comparing the results, they found that the molecular method yielded many new bacteria. Not only did the method reveal bacteria that had never before been found in the mouth, many were bugs that had not yet been documented by microbiologists.

The team discovered 31 bacteria using the molecular method. In contrast, the traditional approach, which only identifies bacteria that can be cultivated in the lab, uncovered only six new ones.

Honors

Harold C. Slavkin, DDS, PhD, has been named dean of the University of Southern California School of Dentistry. He will assume his new duties in August. Slavkin is currently director of the National Institute of Dental and Craniofacial Research.

Arthur A. Dugoni, DDS, dean of the University of the Pacific School of Dentistry, has received the 1999 Callahan Memorial Award. The award is presented each year at the Ohio Dental Association's Annual Session.

Eri Hatta, a dental student at the University of California at San Francisco, won third place in the category of basic science and research at the 1999 ADA/Dentsply Student Clinician Program. The program was held at the American Dental Association Annual Session in Honolulu in October.

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Teledentistry: Genesis, Actualization, and Caveats

GLENN T. CLARK, DDS, MS

AUTHOR

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The genesis of this issue of the *Journal of the California Dental Association* rests with many people. I want to acknowledge the chancellor of the University of California as Los Angeles, Dr. Albert Carnasale, who awarded an intramural grant to the Schools of Nursing, Medicine, and Dentistry to assist with the development of innovative collaborative programs at UCLA. Through this award, I was able to develop a program in teledentistry. I also wish to acknowledge a School of Nursing faculty member, Professor Betty Chang, who led the telehealth team, of which teledentistry was one part. Most importantly, I want to acknowledge Dr. Jack Conley who encouraged me to pursue the idea that an entire issue of the CDA Journal could be devoted to teledentistry.

Following the genesis of an idea comes its actualization, and the individuals who assisted in this effort are many. The guest authors of the component parts of this volume were selected for their expertise and willingness to write the constituent pieces. In addition to my own thoughts on teledentistry, honed during my struggles to set up and operate a teleconsulting service, this issue has a cyber-law expert discussing several aspects of the legality of telehealth Web sites; three community dentistry experts comparing the pros and cons of practicing in a rural setting (where teledentistry will play an important role in patient care); an experienced telehealth industry executive offering his views on the future of teledentistry; and, two oral medicine authorities presenting a pilot study they conducted on the validity of oral mucosal disease consults conducted via e-mail. Each author was solicited to write these components with only vague directions from me, but they turned these vague ideas into crystal-clear reality. I can't thank them enough for contributing their efforts to this journal and to the advancement of teledentistry in California. Of course, there were at least three ideas that I would have liked to include but was unable to find the proper authorities to bring them to fruition. I was looking for an article on teledentistry in extremely inaccessible environs such as outer space, polar ice cap settlements, mountain climbing expeditions, and ocean-going vessels. I would have also

liked an article where precedent-setting case law was discussed. As of yet, these cases have not been widely litigated. Lastly, I would have requested an article replete with the sage wisdom of a teledentistry practitioner with years of experience to share with readers. Alas, this field is in its infancy, and we cannot learn from the mistakes of others at this point.

Before concluding, I must discuss some caveats associated with teledentistry. The clear-cut advantage it holds is making accessible to general dentists individuals who have spent lifetimes gathering expertise in specific areas of patient care. This advantage should far outweigh the drawbacks, the primary one being that if the proper information is not provided or not accurate, the resulting opinion will not be either. A good teledentistry consultant is one who makes sure that adequate information is provided by the consultee (e.g., good photographs, adequate patient history, general health and review of systems information, and accurate physical examination findings). The two major undeterminables in the teledentistry process are the accuracy of the consultation and the legal liability of the expert. As for the accuracy, this information will take a series of studies. One could study the results of a patient consultation with an expert as compared to information received via the same patient consulting with a non-expert who has had access to the original expert via a teleconsult. There is a high likelihood that some of the myriad of orofacial diseases will lend themselves to high accuracy and some will not.

As for liability, fear of medical-legal actions should not dictate medical procedures and policy. Moreover, liability is yet undetermined since case law is not available. It would, however, seem logical that providing consultations directly to licensed dentists and physicians is no more likely to result in a lawsuit than giving a lecture on a topic. In both cases, the treating doctor could misapply the information. On the other hand, cyberdentistry (directly dealing with patients over the Internet) is inherently more dangerous, both from the patient's perspective and from the perspective of the legal actions against the consultant. For the dentist or physician who is considering seeking a teleconsult, the safe bet is to use a consultant of impeccable credentials. The path that telehealth experts and their consultees travel and the adventures and misadventures they have along the way are yet to be determined. I would like to think this issue of the Journal will help keep their misadventures to a minimum and will define the best direction for others to follow.

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Teledentistry: What Is It Now, and What Will It Be Tomorrow?

GLENN T. CLARK, DDS, MS

ABSTRACT A few years ago, teledentistry involved calling an expert on the telephone for advice. Now it involves consulting experts using the Internet. This article explains the basic ideas underlying teledentistry. It involves the local dentist digitizing and electronically transmitting drawings, diagrams, photographs, and X-rays to a specialist. Along with these data, the dentist will most likely need to fill out a standard consult form from the specialist's Web site. In return, the specialist will develop and return a confidential consultation report to the dentist or physician requesting help. For this service, a time-based fee will be paid to the expert. Unfortunately, it is likely that some doctors will use the Internet to set up and seek direct patient contact, thus becoming "cyberdentists." In most cases, cyberdentistry will not be in the best interests of the public. However, teledentistry should not only be a practice builder for the local dentist but also has the potential for helping dentists better serve their patients while increasing their own knowledge.

AUTHOR

Glenn T. Clark DDS, MS, is a professor at the University of California at Los Angeles School of Dentistry. He is also director of the Oral Medicine and Orofacial Pain Faculty Practice at UCLA.

To some dentists, teledentistry means searching the Web for information that might help a patient. To others, it is partaking of online continuing education courses. These two activities are actually Web surfing and distance learning. Teledentistry, on the other hand, is using the Internet to consult with an expert. This consultation could be direct (between the patient and the expert) or indirect (between the patient's doctor and the expert). The former has made the news recently in the form of cautionary stories to the public about the dangers of using "cyberdocs" for health care. Cyberdocs will be discussed further in this article. For the present, the discussion will focus on the primary care dentist's need to consult with an expert about a specific patient's problem.

Only a few years ago, teledentistry was performed by calling an expert on the telephone and asking for advice. In the past few years, however, dentists and physicians have been able to consult with acclaimed and acknowledged experts at any location by using the Internet. The doctor who desires a teleconsult will have to fax or electronically transmit scanned chart notes or fill out a standard consult form obtained from the particular specialist's Web site. Along with these text-based data, some consults will require the doctor to digitize and transmit drawings, diagrams, photographs, or X-rays. Technology also allows doctors to transmit questions via audio recordings rather than text. The doctor who has this capability will be able to attach these digital audio messages to the other information sent. In return,

the specialist, based on the data received, will develop and return a confidential consultation report or a request for more information to the dentist or physician requesting help, usually within 48 hours. For this service, a time-based fee will be paid to the expert. The information provided to the requesting doctor will enable him or her to better treat the patient in question. In medicine, this service is active and growing in a rapid fashion, but in dentistry the process is just beginning.[1] Specifically, data derived from the Association of Telemedicine Service Provider's (ATSP: www.atsp.org) 1998 Report on U.S. Telemedicine Activity, done collaboratively with Telemedicine Today magazine, indicates there were more than 40,000 teleconsults among 139 U.S. programs performed in 1997. In contrast, there were only 200 dental teleconsultations reported. Probably the largest teledentistry undertaking in the world is being performed by the U.S. military to service their troops and their dependents around the world. For information about the military system, access its Web site at http://tdent.tatrc.org.

Table 1. General Categories of Orofacial Disease (partial listing)

- Intrabony jaw cysts, infections, neoplasia, and deformities
- Genetic craniofacial/dental deformities
- Acquired craniofacial/dental deformities (including trauma and malocclusions)
- Oral-pharyngeal infections (viral, fungal and bacterial, including caries and periodontal disease).
- Intraoral mucosal and gingival tissue diseases (including neoplasias)
- Extraoral tissue/gland disease (neoplastic disease; white, red and blue lesions; ulcers and bullous lesions; allergic reactions; autoimmune reactions; dry mouth; burning mouth; systemic disease effects; and salivary and lymphatic disease)
- Temporomandibular disorders (myalgia, arthritis, derangements)
- Mandibular mobility disorders (ankylosis, contracture, hypermobility)
- Neuropathic orofacial pains and trigeminal sensory deficits (phantom tooth pains, trigeminal sensory disorders, c-fiber sensitization, neuritis, neuromas, neuralgia and neuropathies associated with systemic disease and toxicity)
- Headache disorders (migraine, tension, cluster, chronic daily, rebound, ice-pick, cervicogenic)
- Orofacial motor disorders (bruxism, dyskinesia, dystonia, tics, tremors, spasm)

Reasons for Teleconsulting

The reason dental teleconsulting is going to be increasingly necessary is that modern dentists must differentiate and manage well more than 200 oral diseases (**Table 1**), and medical and dental knowledge is rapidly changing. As recently as 25 years ago, HIV/AIDS did not exist. Antibiotic-resistant infections were also virtually non-existent, and our life span was substantially shorter. For some, there is the inaccurate perception that training dentists is less important than it once was; but this perception is wrong. $50.6 billion was spent on dental care in the United States in 19972 and 21 million work days are lost every year because of dental disease.[3] Each year, more than 30,000 new cases of oral or throat cancer are diagnosed, and 9,000 U.S. citizens die from this disease (more than ovarian or cervical cancer).[4] Chronic pain costs society $100 billion each year, and 20 percent to 25 percent of all chronic pain is orofacial in origin.[5] Dentistry is continuing to grow and flourish as it creates new treatment and diagnostic methods for the myriad of oral diseases and conditions in its purview.

When a patient presents to a dentist's office with a difficult diagnostic dilemma, the dentist will typically do one of three things:

- Ignore the problem and hope it goes away;
- Try to do something that has a substantial chance of being the wrong treatment;
- Refer to a another doctor in the area (possibly a dental specialist) who also may not have the knowledge to diagnosis the problem and who might also try an incorrect treatment approach.

In a large urban area, the chances of having a wide range of specialists to choose from is much higher, and the chances of getting the correct diagnosis and treatment are far higher than in a rural area where the pool of experts is smaller. It is now possible to add a fourth option to the above list – seek an electronic consultation from an expert. As mentioned, the old form of the teleconsult was to make a phone call to an expert. While this is commonly done, the degree of information imparted over the telephone is minimal. These telephone consults have overwhelmingly been free, and the level of service may have reflected this informality. With the digital revolution, these limitations can now be eliminated. Since large amounts of information can be transmitted quickly and the process is both more documentable and formal, a fee can be set and agreed upon a priori.

Previous Obstacles

As little as 10 years ago, the Internet was operational at only a few university sites; and the World Wide Web was conceptualized only by science fiction writers and futurists. As the technology has developed, it has become apparent that low-cost teleconsulting will be as

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available to private medical and dental practitioners as word processing is now. All of these changes are producing a very rapid change in society that futurists have termed the digital revolution. In the arena of telehealth, the main reason it has not been more readily available is that the laws governing telehealth across federal boundaries have not yet been established. In addition, an easily managed system for connecting local medical practitioners with experts (and not disenfranchising them from patient care) does not yet exist. Also, most individuals who have conceptualized the telemedicine process have visualized it as needing expensive and logistically difficult to achieve live-teleconsults as the core of the service. With the advent of the Web, some not-too-expensive hardware, a good organizing store-and-forward software program, telemedicine and teledentistry are possible. These methods will open the door to a new way of providing quality health care to individuals in regions of the world where this care is not as readily available. Restrictive laws not withstanding, telemedicine will essentially eliminate geographic obstacles, thereby letting experts provide their knowledge to all that will partake of it.

Growth of Medical Web Sites

A recent article in Fortune magazine described the massive growth of Web sites on the Internet.[6] It reported that in the past three years, hundreds of new health-related Web sites have popped up. The need to consult an expert is becoming more and more necessary each year as the medical knowledge explosion continues to gain pace. More than 360,000 articles are published in medical journals every year. In fact, it has been estimated that medicine accounts for perhaps 10 percent of the information on the Internet. It is clear that no single general practitioner could keep current on this new information. Recently, a survey conducted by PSL Consulting, Inc., demonstrated that 44 percent of physicians and dentists around the world access the Web for health-care related purposes. The survey also reported that this number was expected to rise to 64 percent by the spring of 1999, and to 78 percent shortly thereafter.7 These findings give a powerful pointer to the fact that health care can and will be provided over the Internet. The two-part survey was a telephone survey of 1,103 physicians in 11 countries, and the second was a questionnaire answered by 2,532 physicians in 105 countries who were experienced Internet users. The study found that of their time on the Internet, physicians spend 47 percent accessing medical or health-related information. The heaviest use of the Internet was in the United States, Canada, and the United Kingdom, where almost 75 percent of physicians claimed to access the Internet on a daily or weekly basis. In other countries, the rate of daily or weekly access ranged from 55 to 65 percent. According to the survey, doctors used the Internet most frequently to access information on diseases (95 percent). Seventy percent of doctors surveyed said they use the Internet to consult with colleagues in their own country, while 45 percent used it to consult with colleagues in other countries.

Store and Forward

Until recently, the idea that a teleconsult had to be done live using point-to-point expensive dedicated teleconferencing equipment was commonplace. With the advent of E-mail, it is clear that it is possible to collect the necessary information and then when ready, forward it to an expert for comments. This store-and-forward method eliminates time zone and schedule logistics and makes the teleconsult readily available to most doctors with a computer and an Internet connection. Certainly, acute medical crises exist, and they need immediate attention. Live conferencing is better suited for these emergency situations, but most complex diagnostic medical and dental dilemmas are not acute problems and do not need the live teleconference.

One area of society where telehealth consulting is both needed and most advanced is the U.S. military. In fact, the military medical units face the challenge of delivering the latest medical knowledge and advances to remote areas of the world. A recent study[8] described the utilization patterns of the tertiary care telemedicine consultation group at the Walter Reed Army Medical Center. Using a satellite-based system, within a three-year period, 240 consults were received from 12 remote telemedicine sites supporting military medical missions. The consults used a combination of store-and-forward technologies and interactive video conferencing systems. The distribution of consults included medicine (40 percent), surgery (36 percent), radiology (21 percent), and dentistry (3 percent). The most frequently consulted medical subspecialty was dermatology (29 percent), followed by orthopedic surgery (16 percent). Most consults were routine (88 percent) and were completed within the predefined telemedicine response criteria (24 hours for routine consults and three hours for emergencies). They concluded that a responsive telemedicine service at a tertiary facility provided valuable support to the various medical missions ongoing in the military.

The Need to Teleconsult

Any physician or dentist who has a modern desktop computer, one of several software programs to facilitate teleconsulting, a modem connection to the Internet, a digital camera, a radiograph/text scanner, and a minimum amount of training will be able to access a teleconsultant. This individual can send appropriate patient history and examination findings and high quality images to the expert teleconsultant. It is anticipated that complete patient records can be transmitted in just minutes. The addition of high resolution digital photos; audio and video clips; and MRI, CT or standard radiographs that have been digitized will require some additional

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transmission time, depending on the size and number of images to be sent (however, the transmission time is not always critical since most teleconsults are not real-time events). For the largest imaging files (e.g., MRI), regular telephone service will not be adequate because transmission time is far too long. In these instances, cable and satellite transmission methodologies will need to be used.

A report out of the University of North Carolina Dental Radiology Department evaluated the accuracy of Internet-transmitted tomograms of the temporomandibular joint using three different digital formats.[9] Three series of TMJ images were transmitted by telephone, and transmission times were measured. The original radiographs, the digitized images (seen on a computer monitor), the transmitted images and the transmitted-and-printed images were presented to 10 observers, who were asked to rate image quality. No difference in image quality was found between the initial digitized and the transmitted images. However, transmitted and transmitted-and-printed images were of significantly lower quality than the original radiographs or the digitized images viewed on a computer monitor.

Practice and Knowledge Builder

Of course, if the primary care dentist does not wish to go to the trouble of getting a teleconsult for his or her patient, then the best thing to do is to refer the patient to someone else. This is certainly easier, but in the competitive world of health care, teleconsulting would not only be a practice builder, but substantial information could be gathered in the process. Moreover, in rural areas, the availability of specialists may involve an all-day trip to a bigger city. Of course, until more experience is gathered, it is only speculation, but it appears that a substantial advantage might accrue to the dentist (and the patient) who gets a teleconsult with an expert. First, teleconsulting between the expert and the local dentist (who knows the patient, ultimately makes the diagnosis, and delivers the care) does not involve direct patient care. Therefore, this process could and should be considered exempt from state dental board laws that require the individual providing care to hold a license in the state. This allows the primary care dentist to seek help from experts who might not reside in the local jurisdiction. Of course, until the state board rules on this issue formally, it is subject to interpretation by lawyers. The second advantage is that the teleconsultation does not disenfranchise the local dentist or physician but, instead, involves them in the care (unless the recommendation requires a specific set of skills that cannot be provided by the local doctor). This means that the more the primary care dentist partakes of expert advice, the more he or she will become adept at the diagnosis and treatment of such cases. Not only will the doctor benefit, but the next patient who has a similar problem will get earlier and better local care.

Finding Experts

It can be difficult to find the best, most knowledgeable expert to consult. If the primary dentist selects an individual with excellent credentials, he or she will usually be well-served. Although not always, such individuals are usually at a major medical center in a large urban setting at a research university. It would also be wise to select a teleconsulting group that not only consults but also sees patients, to make sure the members provide practical advice.

Accuracy

It should be assumed that true diagnosis cannot be done via the Internet except for those conditions for which a visual inspection of the problem produces the definitive diagnosis (i.e., dermatologic lesions that are pathognomonic in their appearance). There are also some problems for which a careful history is definitive for the disorder. For most problems, however, the ability to arrive at a definitive diagnosis is beyond the scope of the teleconsult. This means that exact diagnoses are not likely. What can be achieved, however, is differential diagnosis advice about what should be done to get a clearer picture of the problem. Moreover, general information about what approach to take in treatment and detailed information about the latest forms of treatment for specific problems can be provided. In two or three years, individuals who engage in teleconsulting will have to conduct ongoing research on the validity of their consults.

Although no validation work on teledentistry consulting has been conducted, research in several areas of telemedicine gives some insight on this issue. Specifically, a study10 evaluated 15 elderly patients who participated in a teleconsultation with an orthopedic surgeon as well as a conventional, face-to-face consultation. The comparison between the surgeon's ratings for both types of consultation suggested that the telemedicine consultation was satisfactory in terms of the quality of image and sound, the clinical examination, and general simplicity. The telemedicine consultations did not generate a need for any additional clinical investigations, although in two cases a face-to-face consultation was necessary to clarify clinical signs (shortening of a limb and scar tissue). The surgeon's rating of his decision level was superior in the face-to-face situation in four cases, and for 11 patients it was equal. Similarly, the surgeon's level of confidence in decision-making was superior in the conventional situation for five patients and equal for 10 patients. Patient attitudes toward teleconsulting were favorable. There was a high level of patient satisfaction. Teleconsulting between orthopedic surgeons and elderly patients therefore appears to be possible, provided that certain technical, clinical, and psychological considerations are addressed.

Another study,11 evaluated use of real-time and store-and-forward teleconsulting methods for inpatients who presented to the New York Eye and Ear Infirmary

for otolaryngology care. Forty-five patients were seen in the study. There were no significant differences between local and remote otolaryngologists when interpreting the examinations, indicating that transmission did not affect the ability of a qualified physician to make an accurate diagnosis. In the store-and-forward examinations, only 62 percent of the electronic records provided sufficient information for a confident diagnosis. Records were judged inadequate primarily due to poor selection or an insufficient number of stored images. The study demonstrates that both interactive and store-and-forward techniques can be used to provide accurate clinical consultations in nasopharyngolaryngoscopic examinations.

Table 2 A List of the Top Informational Health Web Sites as Determined by a Survey

Organization	Address
National Library of Medicine, MEDLINE, Pubmed, National Institutes of Health	http://www.nih.gov/
British Medical Journal	http://www.bmj.com/http://www.medscape.com/
Intelihealth	http://www.intelihealth.com/
Mayo Health System	http://www.mayohealth.org/
Centers for Disease Control and Prevention	http://www.cdc.gov/
HON	http://www.hon.ch/
The Lancet	http://www.thelancet.com/
Healthgate.com	http://www.healthgate.com/

Public Interaction

There are many ways for physicians and dentists to interact with the public via the Internet. The two basic areas are health information-based Web sites and direct "cyberdoc" Web sites. In the former category, there are many valuable sites. One of the most famous sites in this arena is the one endorsed by former Surgeon General Dr. C. Everett Koop. This site is at http://www.drkoop.com. It does not provide direct patient-to-doctor consultations but instead provides information about health care problems, much in the same way as a good textbook. In this arena, there was a recent survey of more than 4,000 individuals conducted by the Health on the Net group (http://www.hon.ch/Survey/Apr99/). They asked "Which 3 medical /healthcare Web sites most closely meet your needs?" The results of this survey are presented in **Table 2**. No such top 10 list exists for dentistry's informational Web sites.

Of course, there are doctors who provide consultations directly to the public over the Internet. These individuals have been labeled "cyberdocs." The problem with giving specific advice directly to a patient is that it might be bad advice for the right problem or good advice for the wrong problem. Both of these problems can and do occur in a direct patient-to-doctor interactions, but at least the patient has an individual to deal with face-to-face. Moreover, if something goes wrong, the patient has recourse with the local professional society peer-review boards, state boards, or the legal system. Certainly, the cyberdoctoring process is susceptible to lawsuits, but it is more difficult to conduct these suits if the individual is not in the same state or country. It is also difficult to say that the teleconsult was done improperly because there is no standard of practice for direct doctor-to-patient telemedicine or teledentistry.

Since it is likely that abuses will occur in the cyberdoc arena, dentists would be wise to keep abreast of problems. It would be valuable to periodically check several Web sites that monitor and deal with health care fraud. One is the National Council Against Health Fraud, Inc. at http://www.ncahf.org. The other is a Web site called Quackwatch (http://www.quackwatch.com/). There is a third Web site that is valuable to know about, and it is run by the Health on the Net Foundation Code of Conduct (HONcode) for medical and health Web sites (http://www.hon.ch/). This organization addresses one of the main issues of the Internet: the reliability and credibility of medical and health information. The problem is not finding information but finding good information. For example, in many cases, a Web site provides no appropriate documentation regarding the scientific design of a medical study, nor are studies made available that support given claims. The Code of Conduct for medical and health Web sites has been elaborated on by the Health on the Net Foundation to help unify and standardize the reliability of medical and health information available. The HONcode doesn't intend to rate the quality or the information provided by a Web site. It only defines a set of rules designed to make sure the reader always knows the source and purpose of the data accessed.

Applicable Areas

The U.S. military has elected to incorporate all of the basic areas of dentistry into its teleconsultation process (e.g., restorative, periodontics, orthodontics, pediatric, oral pathology, endodontics, prosthodontics). The military has special needs that would not apply to the public sector. First, the military dentist cannot go outside of the military health care system. Second, military clinics are often in an isolated location, and military specialists

are not readily available. Even if the patient is willing to travel, his or her duties may not allow it. Alternatively, military patients might be relocated so that needed follow-up care cannot be done by the doctor who performed the original procedure. In contrast, in the private dental marketplace, there are more dentists to handle the more routine aspects of dentistry. It is, therefore, unlikely that the demand for teleconsultation will be high in the more routine areas of dentistry such as restorative or periodontal care. Of course, with more difficult cases, specialized knowledge will be required, and teleconsultation is more likely. If dentistry parallels medicine, the arenas of oral medicine (mucosal lesions) and chronic facial pain will be areas in which teleconsultations will be desired. The first area is likely because there are many different oral tissue lesions, and many are recognizable from their appearance. Secondly, the areas of TMD and chronic orofacial pain are diseases that can be nearly diagnosed by a careful history. In the private medical arena where telemedicine activity is already present, the consults seem to occur in very rural settings; and dermatology, orthopedics, emergency neurosurgery, ophthalmology, pulmonology and radiology are frequent users.

Conclusions

With teledentistry, there is good news and bad news. The bad news is that it is highly likely that some doctors will set up and seek direct patient contact via the Internet, thus becoming "cyberdentists." In most cases, cyberdentistry will not be in the best interests of the public, and state dental boards should monitor cyberdentistry and punish abuses. The good news is that for many, teledentistry will produce wonderful advantages for the patients of a primary care doctor who partakes of the vast expertise available through teleconsultation. The title of this article poses two questions with regard to teledentistry. The first is, "What is it now?" Right now, except for the U.S. military and in a few places around the globe, teledentistry is not much more than an idea whose time has come. The second question is "What will it be tomorrow?" The answer to this question is yet to be written, but it is hoped that it will become an everyday event where primary care doctors can consult with experts and deliver the best care to their patients. As the digital revolution moves forward, it is only a matter of a few months or years before most dentists will gain familiarity with and have the necessary technology to make teledentistry a reality. Hopefully, the various state boards will rule that it is not a violation of the law if an out-of-state expert consults with local licensed dentists who actually provide care. Finally, the dental leadership in California should help make this hope a reality, since it would be a win-win situation for the public and the dental profession of California with very little downside.

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Virtual Health Care: Unresolved Legal Issues

Stuart Biegel, JD

ABSTRACT As online health care begins to look more like the practice of medicine, a range of legal questions has emerged. This article examines issues of concern to both Internet users and health care practitioners, focusing in particular on the laws relating to negligence and disclaimers. It concludes that interactive contact between doctor and patient in cyberspace may very well be viewed by the courts as akin to the practice of health care and that the typical disclaimer may not insulate practitioners from liability.

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In many ways, the United States is moving rapidly toward computer-based health care. For those who are already connected to the Internet, the online world seems to have become a gold mine of interactive health-related information and activity. Chat rooms and newsgroups engage people in online discussions about their respective health problems, and participants are encouraged to share valuable personal information. Individual doctors exchange e-mail messages with their patients, sometimes tying their conversations to the results of simple tests that patients can perform by themselves at home. And prototypes for combining e-mail with video – enabling patients to actually show doctors their physical symptoms – are in various stages of development.

Most virtual health care is Web-based. Web sites in this area have proliferated, focusing on everything from well-known diseases to highly obscure health conditions. It has been estimated that at least one-third of all searches on the Internet are health-related.

As more people come to rely on the range of health care resources available in cyberspace, a variety of new concerns have emerged. Indeed, both online users and health care professionals have reason to be concerned about a number of very tricky issues that have legal implications.

First and foremost, to what extent should online users even be able to rely on virtual health care today? How accurate is the information? How timely is it? What sort of quality control is or is not at work here? Veteran net users

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know that the time-tested rule of caveat emptor (let the buyer beware) applies to everything on the Internet, and nothing is taken for granted. But there is something about the printed word coming onto the computer screen in a manner akin to a television broadcast that leads people to believe that the information has greater validity than words on a flier distributed by a stranger on a street corner. And with the Internet gaining in stature as a place to conduct research of the most scholarly nature, people tend to lose sight of the fact that much of the material posted online may be even less reliable than those fliers distributed by strangers.

Next, what are the respective responsibilities of the online health care providers and the online users? What precautions must be taken? Should people approach online interaction in the same way that they approach day-to-day communication in clinics and hospitals, or are there different realities at work in cyberspace that would require additional precautions on both sides?

Finally, what ability might online users have to prevail in a lawsuit if they are injured or their condition deteriorates as a result of the online interaction? Should health care professionals in virtual clinics and hospitals be as sensitive to malpractice concerns as they would be in the real world? What about the role of insurance companies? Would standard medical and dental malpractice policies cover doctors who provide advice online? Should these policies cover such actions? Is virtual health care really just another way for health care professionals to practice their profession, or is it something completely different?1

Online Regulations

If online health care were regulated in any way, then the answers to these questions might be found in published guidelines. But specific regulations have yet to be written. Relevant laws in related areas might be consulted, but these doctrines come from a different era, when most people could not even imagine such a thing as cyberspace. For some, it does not matter that the authors of current legal doctrine did not have the online world in mind. Laws are laws, the argument goes; and the principles can be applied to any new technological development that comes along. For others, however, cyberspace is the proverbial new frontier, and only a new legal structure would be appropriate.[2]

In any case, whether or not new laws and regulations are written, disputes are bound to arise; and lawsuits are bound to be filed. One area that is always particularly ripe for such disputes is the area of negligence.

Information vs. Care

From a legal perspective, it may be very important to determine ultimately whether the Web site, newsgroup, bulletin board, or chat room is characterized as information or care. If it is viewed as information, then it may be much harder to show that the online provider was negligent or that any unauthorized practice of health care took place. Statements or documents posted on the Internet might then be viewed by the public as no more or less reliable than a private conversation or articles in newspapers and magazines. However, if the online interaction is characterized as care, then negligence or unauthorized practice of health care might be much easier to demonstrate.

Negligence

Most lawsuits currently filed against health care professionals are based on negligence law. Negligence is not typically a crime, but simply a civil wrong (a tort) that our legal system has recognized. If someone is injured, he or she can often win significant monetary awards if the other side is found negligent in a court of law or if a settlement is reached out of court.

Under negligence law, every person owes every other person a duty to act reasonably. The standard of care for such reasonable action varies depending on the circumstances. Thus what might be reasonable in an emergency might not be reasonable in normal circumstances. And professionals are typically held to a higher standard of care. Thus, the level of care that doctors provide is measured objectively against the level of care that an ordinary reasonable (or average) doctor would typically provide to a patient. If the doctor's actions fall below this level, and the patient is injured or his or her condition deteriorates as a result of these actions, then the doctor can be found negligent.[3]

Standard of Care

What should the standard of care be for health care professionals in the online world? Should they be held to the same standard as any ordinary citizen who posts information online, or should they be held to the higher standard of a doctor interacting with a patient? From a legal perspective, this is a very important question, because if they are held to the higher standard, it will often be much easier to find them negligent if injuries occur as a result of their action or inaction.

Many additional questions will also arise in this context. For example, what is the standard of care that we might expect under the law from an ordinary citizen who posts information online? Does a person who sets up a Web site, for example, have an obligation to check the validity of all factual statements he or she might post? At what point is it the responsibility of the online user, and not the Web site owner, to ascertain the truth? Should it depend on the nature of the Web site? Should it depend on who the Web site owner is? Will people be expecting more from an apparent expert posting information online than they might from, say, a high school student posting information online? Should there be any difference under the law?

And even if health care professionals are held to the higher standard of doctors interacting with patients, should this

standard of care be the same in the online world as it might be in a clinic or a hospital? Are people going to expect doctors to be as careful and correct in the virtual world as they are in the real world? Should it depend on the nature of the interaction? Will people be expecting more from health care professionals who answer questions and perhaps even view videos of their conditions than from those who simply post standard boilerplate advice in newsletter format online? At what point might online care be seen as equivalent to real-time care? These are the sorts of questions that are currently being debated, and the answers will go a long way toward determining the nature and extent of liability in this setting.

Online Disclaimers

Virtual health care providers are clearly concerned about negligence, and these concerns have led many of them to include disclaimers on their Web sites. The disclaimers vary in form and content, but they all admonish the online patient not to rely on what is being presented. Advice may be given, but the recipients are then told that they should not consider it to be advice. The home page of the Dr. Robbins Headache Clinic, for example (www.headachedrugs.com), presents Internet users with a simple table of contents that includes "medications," "patient's corner," "general advice," and "headache herbs." It then states:

"This Web page is not for treatment or therapy; you should not act on any of this advice without the advice and consent or your physician. This site is opinion only and does not represent treatment or standard therapy."

"Ask Dr. Weil," a much more elaborate corporate site that features a variety of resources and a detailed answer to a single anonymous question (cgi.pathfinder.com/drweil/home), includes the following at the bottom of the home page:

"Disclaimer. All material provided in the Ask Dr. Weil program is provided for educational purposes only. Consult your own physician regarding the applicability of any opinions or recommendations with respect to your symptoms or medical condition."

The Massachusetts General Hospital Neurology Department Web site -- an elaborate, interactive site that includes Web forums and chat rooms where doctors post responses and answer questions in real time (http://neuro-www.mgh.harvard.edu/) – contains an intricate and sometimes contradictory disclaimer page. At one point, the hospital indicates that:

"Any information posted by MGH physicians is not medical advice and should not be taken as medical advice. Information posted by MGH physicians must be recognized as personal opinions only. To obtain medical advice, patients must consult an MGH physician one-on-one (telephone, official visit, or private email)."

At another point on the disclaimer page, however, the systems operator says that "These forums are not designed to be places where you can get unlimited medical advice." This might suggest that, contrary to what is expressed in other paragraphs on the page, officials recognize that at least some medical advice is dispensed on this site – albeit not in an unlimited fashion.

The most aggressive disclaimers actually attempt to build in a contractual agreement between the online user and the virtual health care provider. For example, "YourHealth.Com" – a commercial site focusing on preventive care and fitness (www.yourhealth.com) – includes the following disclaimer:

"All information on this site is intended for your general knowledge only and is not a substitute for medical advice or treatment for specific medical conditions. You should seek prompt medical care for any specific health issues and consult your physician before starting a new fitness regimen. Use of this online service signifies your agreement to the disclaimer and the terms and conditions, which you should read, or have read before going further."

Legal Impact of Disclaimers

Disclaimers all sound very legal, and it is tempting for Web site owners to believe that by simply including such boilerplate language they are insulating themselves from liability. Yet the legal impact of disclaimers has emerged as one of the most significant questions in this area of cyberspace law, and the answers are not as clear as many would hope.

As a general rule, a person cannot avoid liability by simply declaring that what he or she is doing is not really what people think he or she is doing. Thus a lawyer cannot avoid liability by saying he or she is not really representing a client when in fact he or she is really representing a client. An architect cannot avoid liability by saying he or she is not really designing a house when in fact he or she is really designing a house. And a doctor cannot avoid liability by saying he or she is not practicing medicine online when in fact he or she is really practicing medicine online.

Of course, it is still not clear whether even the most interactive health care sites are the equivalent of medical practice. And whether or not disclaimers will insulate a Web site owner from liability may very well depend on how the legal system ultimately characterizes such online activity.

From a legal perspective, virtual health care can be seen as analogous to at least three different categories of activity -- each with its own set of rules for determining liability. Under one scenario, online health care would be viewed as a product, and any resulting injuries would be analyzed under the well-established rules of products liability. Under a second scenario, interactive health care Web sites would be deemed analogous to medical practice itself and subject to the same rules of negligence that apply whenever a doctor sees a patient in his or her office. Under a third scenario, the health-related sites would be viewed as little more than information, subject to the detailed law of negligent misrepresentation if anyone gets hurt.

Disclaimers and Product Liability

In product liability law, attempts by manufacturers to disclaim liability for injuries are typically invalid.[4] At first glance, this may appear to be a poor analogy to virtual health care, since medical Web sites would seem to be a service rather than a product. But the line is often blurred between products and services in this area of the law. A product is defined as "something produced by physical labor or intellectual effort or something produced naturally or as result of natural process as by generation or growth."[5] Arguably a Web site or chat room – which is essentially a form of software – can qualify under this definition, particularly since software has itself been recognized as a product under the law. In the end, however, the analogy might break down because injuries in this context must occur as a result of a defective product. And with a health care Web site or a chat room, injuries are likely to result from incorrect information rather than from defective software.

Disclaimers

A more appropriate analogy, of course, would be to health care practice itself, especially when doctors go online and either participate in chat rooms or post answers to questions. And some doctors are actually beginning to charge money for these services. Increasingly, such online services are being viewed as the equivalent of "telemedicine," which is defined by the American Medical Association as "medical practice across distance via telecommunications and interactive video technology."[6] Experts are in fact predicting that by 2002 "90 percent of telemedicine will be done on a multimedia e-mail format, and consultations will be done in real-time using Web technology."[7] And the current research into Internet², a high-speed next-generation Internet for academic and research institutions, is "expected to allow for digital libraries that feature streaming high-fidelity audio and video content, and give way to telemedicine, including remote diagnosis and monitoring."[8]

It may be that the analogy to health care practice will depend on the nature of the interaction provided, with some sort of sliding-scale test being used by the courts. Passive information alone may not qualify as medical practice, while the use of digital images – which might range from snapshots exchanged via e-mail to more elaborate video streaming – would be seen as the equivalent of telemedicine and would therefore qualify as health care practice. Simply answering questions online might be viewed as somewhere in the middle.

Charging money for online services might be an additional variable. It may be that courts will decide that only those practitioners who charge for their services can legally be viewed as practicing health care for purposes of upholding disclaimers. Under this view, those who are simply providing the online information for free can legally disclaim liability.

Negligent Misrepresentation

Members of the health care professions might argue that virtual health care amounts to nothing more than the providing of information. Under this view, nothing online can take the place of an office visit, and any exchange – active or passive – would be seen as a form of patient education only. Injuries or other negative results of relying on this information would then be analyzed under the "gentler" laws of negligent misrepresentation. Plaintiffs have a much harder time winning lawsuits in this context, and disclaimers have a much better chance of standing up in court. Online users who are injured as a result of their reliance on the information would probably have to prove that this reliance was reasonable under the circumstances. Virtual health care providers who have included disclaimers on their Web sites might be able to insulate themselves from liability even if they are found to be negligent. Ultimately, this analysis might depend on the nature of the negligence and the precision of the disclaimer language.

Unless and until specific regulations are adopted or disputes resulting in lawsuits are brought before the highest courts in the land, these issues will remain unresolved. In the meantime, health care practitioners must be aware that as the technology continues to improve, online interactions between doctor and patient will begin to look more and more like the practice of health care to the courts. Disclaimers may help in certain instances, but they should not be relied upon to insulate doctors from liability. In the end, the responsibilities of health care professionals are likely to be the same, whether the contact is in virtual time or in real time.

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Rural Dentistry: Opportunities for the Next Millennium in Fixed and Mobile Practices

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ABSTRACT Many dentists assume that practice in California's rural counties would be hindered by lower income potential, professional isolation, and lack of specialists for assistance. The evidence suggests otherwise, however. Income data shows that the population of many rural counties can well afford dental care. In addition, new uses of the Internet for teleconsulting and idea exchange has the potential for reducing isolation and providing access to specialized knowledge. Particularly for those practitioners who enjoy the rural lifestyle, such counties offer excellent potential for dental practice.

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When one speaks of a rural community, images of bucolic expanses of pasture or farmland and small town squares filled with neighborly people spring to mind. Indeed, locating a dental practice in such an environment is appealing to many who are anxious to embrace the positives of a rural existence or perhaps flee the negatives of the big city. Reduced stress coupled with fewer lines and a dearth of bureaucracy can be a compelling enticement for practicing in rural settings.[1] Since this paper compares and contrasts practicing dentistry in these diverse locales, it is important at the outset to define how the terms "rural" and "urban" are used. Although typically in the United States, an area (e.g., village, town) having a population of greater than 2,500 is considered urban,[2] the authors here have chosen to use the term more loosely. For this paper, rural counties are defined as those that do not contain any towns with populations greater than 6,000.

Rural Population Growth

As is true of most idyllic images, there are downsides. Enticing dentists to open a practice in a setting where there are no or extremely few practitioners in the surrounding areas, as appealing as it may seem on the surface, can offer a number of unique considerations. The biggest might be the perception that California, the most populous state of the union, has no possibility of harboring such an alternative as a rural practice within its confines. Although much of the population of California is contained in large cities, it is the small rural counties where the biggest growth in population is expected to occur.

Consider, for example, the estimated growth between the years 2000 and 2010 as computed by the Demographic Research Unit of the state of California.[3] **Table 1**

displays these rates as percentages. In the south, the urban counties are expected to have the following population increases: Los Angeles County, 14 percent; Orange County, 10 percent; and San Diego County, 17 percent. In the north, the urban counties of San Francisco, Alameda, and Marin are predicted to increase their populations by 3 percent, 9 percent, and 0 percent respectively over the same period. In the rural counties, the picture is much different. The estimated population increase in the next 10 years for Del Norte is 31 percent, Amador, 35 percent, and Calaveras, 49 percent, to mention only a few.

Active Dental License Holders per County

Nor does one need to wait until the year 2010 to consider practicing in a rural location. In many areas, rural counties presently offer appealingly low numbers of dentists who hold active dental licenses in a particular locale (**Table 2**). Colusa County in north central California has only four licensed dentists; Alpine County has no active licensed dentists within its boundaries, whereas Sierra County has two.4 Admittedly, some of these counties have relatively small populations[5] (**Table 1**); however, since growth projections are higher for the rural locations than the urban, these areas demonstrate increasing promise as desirable practice locations.

Individually, population statistics or the numbers of active licensed dentists don't tell the entire story unless dentist-to-population ratios are computed. Such figures can be eye-opening (**Table 2**). For example, in Glenn County, the ratio of residents to active licensed dentists averages 4,833 residents per one dentist. Compare this to Los Angeles County, which has a ratio of 1,406 residents for each active licensed dentist, or San Francisco County which has a ratio of 686 per active licensed dentist.

Rural County Incomes

Some fail to consider the possibility of a rural practice, fearing that the income of those who live in the area will not support a dental practice. That may be true for some of the rural locales in California, but it is certainly not true of all. Over the years, utilization of dental services has been shown to be directly correlated with family income.[6] The National Center for Health Statistics' National Health Interview Survey reports that in the highest annual income group of $35,000 or greater, nearly three dental visits occurred every year. Those who had less than $10,000 in annual income visited the dental office at a rate of slightly more than once per year. Those with income levels between these two groups sought dental care at a level that fell between the two rates cited.

Since data supplying dental utilization rates for the individual counties in California is not available, median household incomes can be substituted as a proxy for dental care utilization (**Table 3**).[7] It is clear that there is a wide range of incomes in the diverse rural counties of California. Examples of this variability as reported by the 1995 estimated median household incomes for counties are $25,124 for Modoc County and $31,012 for Sierra County. For comparisons, the median incomes for selected urban counties are: Los Angeles, $33,828; San Francisco, $37,854; and San Diego, $37,239.

Other economic data that are available to shed additional information on the economic status of each county include Denti-Cal eligibility rates.8 Sierra County has an 11 percent eligibility rate whereas Modoc County's eligibility rate is 23 percent. (For comparison purposes, the eligibility rate for Denti-Cal in Los Angeles County is 14 percent.)

Given these statistics, particularly those that show the numbers of dentists per county, it is probably no surprise that the Office of Statewide Health Planning and Development has deemed that California has a maldistribution of dentists, with many rural areas sorely undersupplied. In 1996, the California Department of Health Services convened a forum to develop recommendations to increase access to dental care for residents of rural areas.[9]

Distribution of Dentists

What are some of the reasons this maldistribution of dentists exists in California in spite of the presence of five dental schools? National figures show that in 1998 graduates left dental school shouldering an average debt of $84,089 (with graduates of private schools owing $108,256).[10] One might understand why these new graduates would not want to immediately open a private dental practice when start-up practice expenses can easily top $250,000.[9] Since there are so few dentists in rural areas, finding a practice in which to associate or arrange a buy-out may prove difficult. Yet many recent graduates will also state that finding an associateship in a well-regarded office in an oversupplied urban area can also be a Herculean task. Stories of discomfort or downright unhappiness with current prospects or present employment arrangements abound in the experiences of those in their initial years of practice.

Rural Opportunities

What is often unappreciated is that in addition to private practice opportunities, there are numerous federally qualified health clinics and fee for service clinics located in rural areas with jobs currently going unfilled. The Web pages of the California Rural Health Policy Council, an organization established by the State of California, Health and Human Services Agency, to improve rural health (http://www.ruralhealth.ca.gov/ruraljob/jobsearch.htm) displayed 33 ads for health care practitioner positions in rural clinics. One-third of these ads were for single or multiple positions for dentists. Ads in community newspapers in adjacent counties can offer other possibilities. A review of the Oct. 9, 1999, Bakersfield Californian newspaper listed classified ads for dental clinics in San Luis Obispo County and in a rural Indian Health Service clinic.

Table 1
County Population Estimates for 1998 and Percentage Change in California County Populations between 2000 and 2010 Based on Projections Performed in 1996

County	Population Estimate for 19985	% Change[3]	County	Population Estimate for 19985	% Change[3]
Alameda	1,400,322	9	Orange	2,721,701	10
Alpine	1,209	23	Placer	229,259	28
Amador	33,334	35	Plumas	20,370	11
Butte	194,597	19.5	Riverside	1,478,838	39
Calaveras	39,830	49	Sacramento	1,144,202	21
Colusa	18,572	26.5	San Benito	48,744	32
Contra Costa	918,200	14	San Bernardino	1,635,234	34
Del Norte	27,000	31	San Diego	2,780,592	17
El Dorado	158,502	25	San Francisco	745,774	3
Fresno	755,730	33	San Joaquin	550,445	27
Glenn	26,234	25.5	San Luis Obispo	234,366	18
Humboldt	122,262	10	San Mateo	700,765	8
Imperial	144,051	22	Santa Barbara	389,502	13
Inyo	18,125	17	Santa Clara	1,641,215	10
Kern	731,459	32	Santa Cruz	242,994	12
Kings	118,866	27	Shasta	164,349	19
Lake	55,147	29	Sierra	3,380	12
Lassen	33,285	13	Siskiyou	44,044	14
Los Angeles	9,213,533	14	Solano	377,415	18
Madera	114,748	30	Sonoma	433,304	14
Marin	236,770	0.005	Stanislaus	426,460	32
Mariposa	15,877	26	Sutter	76,976	40
Mendocino	83,734	21	Tehama	54,073	16
Merced	197,730	33	Trinity	13,117	15
Modoc	9,998	14	Tulare	355,240	27
Mono	10,288	27	Tuolumne	53,248	26
Monterey	365,605	19	Ventura	731,967	18
Napa	119,288	13	Yolo	153,849	26
Nevada	91,334	29	Yuba	60,067	28

[3] Data derived from Interim County Population published by the California State Department of Finance

[5] Data derived from County Population Estimates for July 1, 1998, published by the U.S. Census Bureau

Providing dental care in a salaried arrangement allows one to meet financial obligations while learning to build efficiencies gained with experience in care delivery without incurring additional debt. It also allows one to sample the experience of living in a rural setting without committing to a permanent relocation. Serendipitously, the contact with the local private practitioners through professional and personal interactions provides opportunities for the new dentist at the clinic in town to become known. Future offers from the local dentists for associateships in their offices as they modify their practices are much more likely to be extended to someone with whom a relationship has already been formed.

Impediments to Rural Practice

So, why aren't dentists flocking to rural areas if there are jobs available? Are their reasons similar to those of physicians who indicate that they are disinclined to work in rural settings because of the lack of all-around activities, lower standards of living, few spousal career opportunities, and the inability to refer to and consult with local specialists.9

At an international meeting, one of the authors had an opportunity to interview two Canadian dentists who practiced far from the urban areas of their country. One was located in a town of 4,000 to 5,000 and the other in a town of 10,000 to 12,000. Although one was originally raised in a large city, both extolled the virtues of practicing in small towns. They liked being general dentists providing every type of dental service they felt comfortable performing. They liked treating families and noted that they have a lot of children in their practices. They enjoyed the absence of competition for their services. Neither seemed frustrated by the lack of specialists for referrals for they felt that the desires of their patients were for basic dental care that was well within their repertoires. Of course, specialists are not totally missing from the rural picture. In the larger Canadian town, the general dentist

Table 2
Dentists With Active Licenses and Number of Residents per Dentist: By California County ¾ 1999*

County	# of Dentists	# Residents/ Dentists	County	# of Dentists	# Residents/ Den1,102tists
Alameda	1,196	1,188	Orange	2,527	1,102
Alpine	0	N/A	Placer	227	1,038
Amador	25	1,528	Plumas	14	1,500
Butte	137	1,550	Riverside	692	2,297
Calaveras	18	2,583	Sacramento	880	1,400
Colusa	4	5,000	San Benito	16	3,125
Contra Costa	777	1,201	San Bernardino	911	1,956
Del Norte	17	1,870	San Diego	2,084	1,375
El Dorado	117	1,406	San Francisco	1,140	686
Fresno	453	1,929	San Joaquin	311	1,883
Glenn	6	4,833	San Luis Obispo	183	1,350
Humboldt	87	1,500	San Mateo	725	999
Imperial	42	3,626	Santa Barbara	306	1,358
Inyo	13	1,500	Santa Clara	1,664	1,027
Kern	243	2,990	Santa Cruz	190	1,377
Kings	41	3,165	Shasta	113	1,579
Lake	20	3,130	Sierra	2	1,700
Lassen	27	1,274	Siskiyou	26	1,773
Los Angeles	7,032	1,406	Solano	246	1,725
Madera	45	2,762	Sonoma	385	1,169
Marin	326	741	Stanislaus	234	2,040
Mariposa	7	2,571	Sutter	59	1,427
Mendocino	65	1,406	Tehama	20	2,935
Merced	71	3,105	Trinity	4	3,525
Modoc	4	2,650	Tulare	155	2,502
Mono	6	1,966	Tuolumne	44	1,313
Monterey	270	1,412	Ventura	532	1,420
Napa	103	1,197	Yolo	97	1,778
Nevada	79	1,263	Yuba	17	3,912

*Data derived from county count summary for clear licenses. Department of Consumer Affairs4 and Interim County Population Projects published by California State Department of Finance.[3]

N/A Non-applicable since there are no dentists in this county although there are 1,300 residents.

explained, a visiting periodontist was available on an as-needed basis, although most of the more common specialists' practices (endodontics, periodontics, pediatric dentistry, orthodontics) are a distant 50 miles away. Professionals with knowledge in less common areas (Of course t (orofacial pain, oral medicine, infectious diseases, oncologists, etc) are likely to be even more distant. Although w(With the advent of online education and telehealth consulting options via the Internet, however, even this problem will be a thing of the past. Future models predict the end of the need and for a patients won't have to take a full day and a 100-mile round trip to obtain geta specialist's consult)). Neither dentist feels that he is enjoying a lesser quality of life. In fact, both love the outdoors and their proximity to hunting, fishing, and winter sports.

Since California dentists might not harbor the same attitudes as those of their Canadian counterparts, interviews of a handful of rural dentists in this state were arranged. Admittedly, their responses can hardly be considered to be obtained under a rigorous scientific protocol. However, this anecdotal information may help to shed light on the opportunities and pitfalls of rural dental practices in California. Similar questions were asked (by R.M.) of the California dentists as were asked of the Canadian interviewees.

The California dentists also praised previously cited attractions of small town life: the slower pace, closer community bonding, outdoor lifestyle, and positive experiences growing up in a small town. were all high on the list for our California interviewees. In addition, escape from big city crime was alsocited.

Urbanites perceive that the positive attributes of a small town atmosphere are unable to offset significant declines in the social and economic needs of the dentist and his or her family that occur whether the dentist becomes a salaried employee of a clinic or works as a private practitioner. On the economic side, the ads

referred to on the Web site above posted salaries that compared favorably with many urban opportunities. In addition, during interviews it became clear that a number of these clinics provide incredible incentives to lure dentists to their areas, including substantial assistance in the repayment of education loans and generous continuing education benefits. Some clinics are so desperate for dentists that they are paying finder's fees to the referral source for the successful referral of an employable dentist.

The dentists Iinterviewed were quite satisfied with their respective incomes. The consensus seemed to be that the income was less, but only slightly, and more than offset by factors such as the lower cost of living, minimal employee turnover, higher profitability, no arduous commutes to work, and so forth.

None of the dentists found spousal employment to be an issue, although one reported that the local hospital has problems recruiting physicians if the spouses have careers not typically found in small towns. In particular, those spouses of dentists who were teachers found positions in the local schools easier to secure than in the city.

What some dentists view as a positive – the strong sense of community and accountability for each other – others interpret as life under a microscope, with few professional or personal secrets. Or to put it in the words of one dentist "Since everybody knows you, . . .you have to leave town if you want to dance on the piano top with a lampshade on your head." Knowing everyone and everything about one's patients, their friends, and their family can breed a familiarity that easily invites interruption at the grocery store, during a dinner out, or at other times when a break from providing professional services and opinions would usually be expected.[1]

A personal style that thrives on such informality and familiarity is a prerequisite for success. On balance, the interviewees felt that the tradeoffs were well worth the occasional personal inconvenience that their visibility in the community causes.

Alternative Strategies for Care Delivery

From another reality of rural practice is that there are some communities any sites in California and elsewherethere are towns with too fewer inhabitants people than the two where our interviewees were located. In some cases towns may be too small to support a full-time dental practice. Alternatives to practicing in a fixed location changing the service delivery method may makepositively affect the feasibility of a rural practice. more feasible. Whereas in far-flung wilderness areas without adequate roads, the dentist may fly in with a team to provide dental care,1 in California if a rural population is not large enough to sustain a practice, a mobile clinic operating from a nearby area where a practice is sustainable is an option. Using the mobile clinic during the better weather of the summer to reach more remote populations in mountainous terrain in a combined holiday/working getaway may be a practical and fun approach.

Yet, Mobile dental clinics are frequently downplayed as a strategy for reaching rural populations. They do require planning and organization to operate. Thirty-four years of experience operating theThe longest running mobile dental clinic program serving the residents of rural communities in California is the University of Southern California's Mobile Dental Clinic has shown that repeatedly.. In its 34th year of existence,the The USC Mobile Clinic's mission of the USC Mobile Clinic has not changed: to bring high quality dental care to members of low-income families in California who are unlikely to have access to or receive dental care iand n their current environs while at the same time to involveing dental and dental hygiene students in community dentistry and public health educational outreach programs. SWhat has changed is the scope of its operation. Since its beginning in 1965, the clinic has functioned operated continuously.. Initially prepared to Initially treatment was limited to mmanageing only the most serious dental problems to relieve pain and infection, i. It was not long before equipment was constructed so that routine dental care (restorations, extractions, and prophylaxes) could be provided. Each seven-day clinic now results in comprehensive care provided to 200 children. in addition to extractions and dental prophylaxes. Since its launch, then the USC Mobile Dental Clinic has provided care in more than 70rural communities in California to 75,000 children.

Increasingly, more and more of the communities theThe USC Mobile Dental Cclinic visits are in the rural counties of the state. today has out of necessity expanded its operation 10 fold. Each seven-day clinic now results in comprehensive care provided to 200 children. For years, because of the geographic expanse of the state, Previousclinical sites were limited to ruralcounties in southern and central California. have been expanded to additional clinics held in the northern counties of California. Within the past year, as aSuch expansion was result of identified shortages of dental care opportunities in the northern rural counties of California, the operation has been expanded into those areas as well.. ose areas.

The USC Mobile Clinic has for some time been fully booked two years ahead by agencies and organizations and at times even individuals that contract with it for services year after year as the need for dental care in far-flung parts of the state seems endless.

Using the USC Mobile Dental Clinic as an example, the financing of a mobile clinic operation may readily be met by a variety of funding sources. In spite of its sponsorship by the dental school, since 1971 the mobile clinic has operated exclusively from contracts, grants, and private donations. The new northern California clinical venues are financed through a grant from Delta Dental. Frequent contributors and

contractors include the Bureau of Migrant Education;, Sstate programs including Denti-Cal and Healthy Families;, numerous county governments, local hospitals, and foundations;, civic groups such as Kiwanis clubs;, and individual donors such as former students, practicing dentists, and the lay public who hear about the work of the clinic. A Web site that enumerates federal, state and private funding sources for rural areas of California can be found at http://www.ruralhealth.ca.gov/funding.htm.

Antidotes for Isolation

Isolation from peers, specialists, and continuing education opportunities are negative aspects of a rural practice cited in the literature and by some of the interviewees. One dentist interviewed left a rural practice 25 years ago in part because of the isolation. Rural dentistry was frequently cited by interviewees as requiring a command of a wide variety of general dentistry procedures and therefore a need for ongoing continuing education in a variety of areas.[11] Modern electronics including computers, video teleconferencing, and interactive television are all part of the emerging health care technology that is particularly well-suited for rural practices.[12] Although use of computers in dentistry appears to be gaining ground, all areas of potential use are not equivalent. Whereas 66.8 percent of dentists have office computers, a 1994 study indicated that only 7.5 percent of the 48.3 percent who had computers equipped with modems participated in on-line discussion groups; and 19.7 percent used e-mail.[13] A 1996 study of Internet-using dentists indicated that 19 percent of the respondents participated in Internet continuing education courses.[131] Twice that rate were planning to use the Internet for access to continuing education in the future.[14] A 1997 study indicatedpointed out that 32 percent of dentists with computers used them for diagnosis and monitoring treatment.[15]

The uses of the Internet for rapid access to experts for consultations through teledentistry and telemedicine, free Medline access from the National Library of Medicine, on-line library access for reprint services, on-line texts and databases for the latest treatment protocols, evidence-based medicine care models, and drug interaction information are only a few of the possibilities that help to eliminate the isolation of a rural practice from intellectual pursuits and provide access to specialists as a result of this electronic age. Connectedness with other dentists can easily be achieved through e-mail, listservers, and chat rooms dedicated to the specific professional interests of the dentist. Dentists have commented that that the sense of

Table 3
Estimated Median Household Income: By California County - 1995*

County	Income Estimate	County	Income Estimate
Alameda	$44,653	Orange	$48,701
Alpine	$28,492	Placer	$46,687
Amador	$35,647	Plumas	$30,759
Butte	$28,229	Riverside	$36,189
Calaveras	$32,696	Sacramento	$36,642
Colusa	$28,030	San Benito	$39,729
Contra Costa	$53,055	San Bernardino	$35,725
Del Norte	$28,103	San Diego	$37,239
El Dorado	$42,658	San Francisco	$37,854
Fresno	$30,984	San Joaquin	$33,339
Glenn	$26,293	San Luis Obispo	$35,683
Humboldt	$28,468	San Mateo	$50,957
Imperial	$22,201	Santa Barbara	$36,889
Inyo	$30,238	Santa Clara	$53,490
Kern	$32,183	Santa Cruz	$40,596
Kings	$28,337	Shasta	$30,761
Lake	$25,474	Sierra	$31,012
Lassen	$34,032	Siskiyou	$26,429
Los Angeles	$33,828	Solano	$45,369
Madera	$31,644	Sonoma	$41,016
Marin	$53,266	Stanislaus	$34,575
Mariposa	$29,339	Sutter	$32,650
Mendocino	$30,073	Tehama	$26,314
Merced	$27,125	Trinity	$25,173
Modoc	$25,124	Tulare	$25,935
Mono	$32,885	Tuolumne	$31,462
Monterey	$34,461	Ventura	$46,955
Napa	$41,378	Yolo	$35,620
Nevada	$37,113	Yuba	$24,960

* Data derived from county estimates for median household income for California: 19957

professional isolation they previously experienced has been reduced with their participation in an on-line discussion list.[153] E-mail has been shown to be an important way to rapidly distribute new or evolving material to health care providers at extremely low cost.16 Videoconferencing in telehealth models is a particularly attractive model for rural sites.[17] Consultations can be achieved no matter how remote the source through telecommunication with specialists in a variety of health care disciplines that previously would have seemed unlikely participants in such a venture. Witness the telepsychiatry program in eastern Oregon.[18] Can the fields of oral medicine and orofacial pain be far behind?

Summary

Final Caveats

It is apparent from the experiences with the USC Mobile Dental Clinic and data from organizations interested in rural care delivery that thousands of young people are still not receiving dental care in rural California, though children have many more programs targeted to them than adults. The rural adult population faces an even more severe problem in obtaining care, since typically the treatment needs of the adult population are much more complicated as a result of accumulated years of lack of treatment and available services.

Practicing dentistry in the rural areas of California offers a great deal in the way of availability and opportunity. Many of the negatives associated with such practices have been neutralized through communication advances and the realization that quality of life in rural settings may in mvarious any ways exceed that of urban environs. When interviewees were asked what words of wisdom they would extend to recent graduates about practicing in a rural environment, they were upbeat regarding the professional and personal satisfaction of living their lives in a rural setting. They did recommend that each person considering such a choice look at the advantages and disadvantages with their eyes wide open to be sure the match will be a fortuitous one.

Although this paper has attempted to provide an accurate representation of a variety of factors one could consider when making a practice location/employment decision, there are many intangibles, personal and impersonal, to be considered. No matter how comprehensive the database is, some information is just not available without the investment of personal time and energy in meeting and talking to the populace and potential employers and/or colleagues, observing first hand the culture and energy of the people and place. From the business perspective, for example, there is no database that would give the proportion of dentists in each county nearing retirement (or just considering cutting back), presently working part-time, or no longer accepting new patients.

The goal of this paper was not to provide all the answers but to pique the readers' interest in a professional opportunity not previously considered as feasible. Nothing will replace the individual's investigation, on paper and in person, of such an important life decision. Such research is to be encouraged so that more people can consider practicing dentistry in the less populated and dentally needy localities of the state.

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The Future of Teledentistry

Jeffrey M. Birnbach

ABSTRACT Teledentistry is a rapidly forming subset of telehealth, a field that already has considerable impact on the health care industry. Recent advances have created new opportunities for teledentistry, and changes in diverse technologies have created new tools for the practitioner. Technologies currently available are beginning to change the dynamics of dental care delivery. As teledentistry evolves, it will offer new opportunities to improve the level of patient care and reshape current business models.

AUTHOR

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Telehealth, both medical and dental, is a new facet of overall patient care that is rapidly increasing in popularity and value. Uses range from telehouse-call systems and monitoring patients in their homes, to globally deployable, self-contained biomedical sensing units that can link anyone from astronauts to oil rig workers with care providers. Fields as diverse as telepsychiatry, teleurology, and teledermatology are rapidly becoming established segments of traditional health care. Teledentistry will experience a similar growth as new tools become available for the practitioner and new business models are defined.

Earlier obstacles to implementing telehealth programs fell into one of two distinct areas: sociological or technological. As the technologies have become available to facilitate valuable telehealth applications, practitioners and patients have been forced to undergo a paradigm shift in the way they interact. The Orwellian image of a robotic health care provider in a sterile and impersonal environment dispensing care like a vending machine was touted by some to be just on the horizon. The reality, however, is that people who previously went without care or who received inadequate care can have access to a vastly improved level of services. Initial concerns regarding the dehumanization of health care are being quickly washed away by the overwhelming benefits that can be provided using innovative telehealth concepts to deliver care. Innovative journals and periodicals evolved such

as Telemedicine & Virtual Reality and TeleHealth that specifically focus on increasing the understanding and effective utilization of telehealth in everyday applications.

As technology has advanced, patient benefits have continued to increase. Changes in the size, features, and costs of various technological components created entire new types of communications tools that facilitate telehealth in general and teledentistry in particular. The intraoral video camera, which has gained widescale popularity and general acceptance only within the past five years, is one example. This tool allows dental care providers to document and communicate their visual observations. Similarly, other solutions for storing, retrieving, managing, and communicating images and other aspects of a total patient record have also improved during this time. Practitioners now have a wide array of telehealth tools at their disposal. With technologies ranging from basic store-and-forward applications running on inexpensive laptops to real-time A/V satellite links, care can be provided to those patients that, in the past, often suffered due to economic, political, or geographic limitations. In the near future, wireless communication technologies will be available that will make Internet communication truly ubiquitous, further providing access to care in the most remote regions of the globe.

Several seemingly unrelated technologies have helped contribute to the reduced cost and increased availability of telehealth solutions. The miniaturization of charge-coupled device chips has allowed smaller, lighter, and less expensive video imaging cameras to be developed. New compression technologies have resulted in better image quality, and increases in bandwidth have made high-speed transfer of information affordable. One finite example of the convergence of discrete technologies is a new telehealth device soon to be commercially available from CyberMDx Inc. that combines a number of diverse technological advances used by NASA into a single unit that can be deployed virtually anywhere on Earth (or beyond), linking the most remote patients with care providers.

As capability has increased, the cost of technology has decreased. A 9,600 bps modem in 1989 cost more than $500. Today, a 56,000 bps modem is less than $150. That same year, a video frame grabber required a full-sized PC with two ISA slots, was extremely slow to process, and cost $2,000 or more. Installation was a day-long affair. Today, PCMCIA frame grabbers are less than $200, support near real-time conferencing, fit in a notebook, and install in less than two minutes. The increasing performance and decreasing cost of technology has not been confined to computer-related products. Other technology areas -- such as video imaging, hard copy printing, and voice recognition -- have also experienced similar evolutions and are continuing to improve.

Today's practitioner has a wide array of telehealth solutions available. There are primarily three types of telehealth modalities: store-and-forward, real-time, and near-real-time. Each has value for specific subspecialties in specific situations. Store-and-forward solutions have the lowest cost and can often provide ample benefit for a wide range of applications. On the other end of the spectrum, true real-time solutions require expensive transmission equipment and extremely fast connections that are not usually available outside of major metropolitan areas unless a satellite is deployed. Near-real-time solutions range from low-resolution, low-frame-rate to something that looks like jittery television. For most dental applications however, store-and-forward technologies will provide excellent results without excessive costs for equipment or connectivity.

A typical store-and-forward teledentistry system might consist of an intraoral video camera, fame grabber, standard consumer-grade paper scanner, computer, color printer, 33.6 Kbps modem, and an Internet connection via regular telephone service. A second video camera and an X-ray viewer might also be used to acquire and digitize radiographs. The price for a hardware configuration such as this would be approximately $9,000; however, most practices will already have many of these components, greatly reducing the cost. For extremely cost-conscious practices and clinics, a care provider could use a Polaroid or other camera with close-up attachments and scan the resulting photograph. While this will not provide the same quality as a good video image, it eliminates the need for a video camera and frame grabber and would be a reasonable substitute for many applications.

This component configuration would allow a practitioner to create a multimedia patient chart that would include intraoral and exterior images; copies of handwritten paper-based patient records, charts, and diagrams; and virtually any other type of relevant patient data. New software that can compile all of this information into a single electronic patient chart, encrypt the chart for security, and transfer the chart via the Internet is now being introduced for teledentistry. This software streamlines and simplifies the process of gathering and securing data, as well as communicating it via the Internet.

While the issue of Internet security of health records makes good headlines, in reality a well-encrypted patient chart sent via the Internet is far more secure than an ordinary fax left sitting in the in-basket

at the front office. While the media has warned of the ease of breaking encrypted files, they often fail to mention that the file broken was usually nothing more than a string of 16 numbers such as a credit card account secured with minimal encryption. This is a much simpler task than decoding a 120,000-bit image. Using a 128-bit proprietary encryption routine, a single file that contains an image of a tooth would be virtually impossible to decode.

The benefit of teledentistry, in fact in all of telehealth, lies in linking patients with care providers. The scenario of a rural practitioner coordinating the care of a patient with a subspecialist at a major teaching facility is one of the most likely uses for teledentistry. Here, a general practitioner could continue to manage a patient's treatment while giving the patient access to specialized expertise in difficult or unusual cases. Beyond this, teledentistry will allow practitioners to link up into virtual dental health clinics. In a time of increasing consolidation and payment capitation throughout all of health care, this could create an entire new dynamic within dentistry. Imagine the impact of multiple providers creating virtual care groups to coordinate not only care, but also contracts for the delivery of services.

In the future, multiple care providers will coordinate the care of a single patient electronically, sharing a complete multimedia chart and all of the documentation therein. For instance, a reconstructive specialist in Encino might share a record with a orofacial pain specialist in Los Angeles. A dental lab in Long Beach could be linked with dentists in the surrounding area, reducing time and expenses. A university teaching center in Southern California could increase services in community outreach programs and clinics in Third World countries, helping local practitioners and technicians improve the level of care they deliver. Third-party reimbursement might also be expedited, not by electronic claims filing, but by providing secondary documentation, such as radiographs, electronically as well. This would reduce the cost of film duplication and potentially streamline the reimbursement process.

In conclusion, telehealth and teledentistry are on the verge of exciting new growth and opportunity. Care providers will soon be able to take advantage of remote resources and define new business models and patient care synergies. Alliances to provide teledentistry services are already beginning to take shape. Technologies will continue to provide practitioners benefits and savings. But above all else, it is the patient that will benefit the most from better care, more accessible care, and more affordable care.

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E-Mail-Based Oral Medicine Consultation

Fariba S. Younai, DDS, and Diana V. Messadi, BDS, DMedSc

ABSTRACT A pilot study was undertaken to assess whether text-based electronic patient data transmission (e-mail) is a reliable source of information for the diagnostic decision-making process. The main objective was to determine if information contained within a transmitted text could be reliably used as basis for making general recommendations for diagnostic tests and follow-up or referral plans pertaining to a variety of oral mucosal pathologic conditions. The results suggest that face-to-face patient examination is more accurate in establishing a correct diagnosis for oral mucosal pathologies than transmitted descriptive patient data alone.

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The explosive growth of the Internet and World Wide Web over the past few years has created great opportunities for rapid exchange of information online. With the Internet's use having surpassed 60 million people,[1] its potential in facilitating communication within the health care industry cannot be ignored. An increasing number of physicians and institutions maintain Web sites and post e-mail addresses for a wide range of communications, including patient consultations.[2] In fact, over the past few years, e-mail communication has facilitated individual patient contacts with physicians, while telemedicine in general has made possible rapid communication between remote sites and major health care facilities. Most telemedicine programs in the United States support either interactive video-medical consultations or store-and-forward technology, with teleradiology being the most common application.[3] Telemedicine has the potential to replace more-costly consultative services for hard-to-access areas such as rural communities and prisons,[4-7] as well as for home health care services.[3]

Despite the massive growth of telemedicine and its application to telecare, very little information is available in regard to its accuracy, cost-effectiveness, level of patient satisfaction, confidentiality issues, and licensing requirements. Since 1993, the Health Care Financing Administration has had studies in progress to assess the feasibility, acceptability, cost,

quality, and access to services available through Medicare reimbursement of teleconsultations.[3] Several other studies have focused on the quality of care issues related to telemedicine from both the medical and consumer standpoints.[8-10] There are no studies on the utility of telemedicine for dental consultations. Although online consultation may have application to many dental specialties, one logical application may be in the area of oral medicine. In the absence of published studies that can validate the use of teledentistry, information available in the medical field may be used until such studies become available in dentistry. Because of similarities between the diagnostic process and the management strategies of dermatology and oral medicine, published reports on telemedicine in dermatology may be used as models to assess the usefulness of an online oral medicine consultative service.[10-19]

As the first step in developing an Internet-based oral medicine consultation service, a pilot study was undertaken at the University of California at Los Angeles Oral Medicine Department to assess whether text-based electronic patient data transmission (e-mail) is a reliable source of information for the diagnostic decision-making process. Although, e-mail-based communication may be useful for expert consultations in several areas of oral medicine – such as management of medically compromised patients, orofacial pain, and temporomandibular joint diseases – the authors focused this study on the diagnosis and management of oral mucosal diseases. Therefore, the main objective of the study was to determine if information contained within a transmitted text could be reliably used as basis for making general recommendations for diagnostic tests and follow-up or referral plans pertaining to a variety of oral mucosal pathologic conditions.

Study Objectives

To test the reliability and the accuracy (validity) of a diagnosis based on text-based information transmitted through e-mail.

Methods

Using the existing Oral Medicine Clinic patient database, 100 charts were randomly selected for the projects. The chart numbers were selected from a computer printout of the Oral Medicine Clinic patients list covering a five-year period, 1994-1999. These patients had been seen each time by a team of two faculty consisting of oral pathologists or oral medicine specialists attending the clinic. Two postgraduate residents from the orofacial pain program were asked to retrieve the charts and transfer all the relevant information from the charts to a standard patient data form previously designed for on-line consultations. The form consisted of a health history as well as the presenting signs and symptoms. To obtain consistent data on each patient, as well as the lesion in question, the form was designed to contain standard choices for each characteristic category (e.g., color, texture, comparison to the surrounding tissues, frequency, duration). **Table 1** lists the contents of the patient data form. The sources of information used by the residents included patients' registration forms, the health questionnaires, the faculty's SOAP notes and the results of all appropriate diagnostic tests available in the charts (e.g., radiographs, blood workups, tissue biopsies, cytological smears). Each form was then coded by a unique identifier number and given to two oral medicine faculty judges (the authors) for review. The judges were blinded to the identity of patients and did not have access to any images from the patients. Using mainly the descriptive information contained in each form, each judge rendered two opinions about each patient: the most likely diagnosis and a recommendation consisting of a diagnostic test or a type of management and/or follow-up (mostly a broad category such as observation, excision, corticosteroids, or antifungal treatment).

All the forms were then returned to the residents, who independently scored them for agreement between the two judges as well as the accuracy of the opinions against the result of previous clinical examinations and confirmatory diagnostic tests (the gold standard).

To assess the level of agreement between each judge and the gold standard, as well as the level of concordance between the two judges, kappa analysis was used for both the "likely diagnosis" and the "recommendation" categories. Kappa analysis measures the degree of concordance between two observers while controlling for chance agreement. A kappa statistic of 0 implies levels of agreements that are completely attributable to chance alone. The closer the kappa value gets to 1.0, the higher the level of concordance between two measures unrelated to chance.

Results

A total of 78 charts from the original 100 had enough clinical information to be included in the study. Therefore, 78 lesions with intra- and extraoral presentations were documented and submitted to the judges for evaluation. Tables 2 and 3 (See printed version of the Journal for Tables 2 and 3.) list all the major categories of lesions found in the sample and the level of diagnostic agreement between each of the two judges and the gold standard (diagonal boxes from the upper left to the

Table 1
Patient Information Transfer Form

PATIENT INFORMATION
Patient identifier (first initials only)
Age
Sex (M/F)
Married (M/D/W)

DESCRIPTIVE HISTORY OF THE PROBLEM
Chief complaint? (in patient's words):

Describe patient's symptoms:
- Constant
- Intermittent
- When eating
- When sleeping
- Upon waking

List all significant past and present medical conditions:

List all major illnesses, hospitalizations, and allergies:

List all current medication:

List all medications taken during the past year:

List relevant psychosocial history and habits:
- Psychiatric conditions:
- Social conditions (loss of job, homelessness, major personal problems):
- Habits (tobacco, illicit substances, alcohol, or other):

Has there been any treatment done for the conditions?
- No
- Yes (describe)

If treated, has the problem stayed the same, gotten worse or better?
- Same
- Worse (Describe)

What makes the problem worse?
- Eating
- Drinking
- Brushing teeth or mouth wash
- Touching area
- Stress
- Other:

Other accompanying signs or symptoms?
- Skin:
- Eyes:
- Nose:
- Throat:
- Other (describe):

RESULTS OF PATIENT EXAMINATION
Indicate site with "X", mark on diagram, and describe
Lips
Labial mucosa
Buccal mucosa
Mucobuccal fold
Gingiva (buccal, lingual, tooth or tooth site)
Alveolar mucosa
Tongue (dorsal, R or L lateral, R or L ventral, base), palate
Tonsilar area
Posterior pharyngeal wall
Floor of the mouth
R or L parotids salivary glands
R or L submandibular salivary glands
Lymph nodes (submandibular, anterior cervical, posterior cervical, buccal, other)
Neck (midline, R o L lateral, posterior)
Facial skin
Hairline
Other:

DESCRIPTION OF THE LESION
Color:
Appearance:
- Raised (papular)
- Flat (macular)
- Fluid filled (vesicular):
- Papillary (verrucal):
- Ulcerative:

Size (in millimeter):
Consistency:
- Firm
- Soft
- Fluctuant
- Not different than surrounding mucosa or skin

Pain on palpation:
Other information:

CONSTITUTIONAL SYMPTOMS?
Fever
Malaise
Lymphadenopahty
Loss of appetite
Recent weight loss
None

IMAGE FORWARDED?
Yes (format):
No

RADIOGRAPHIC INFORMATION?
Not relevant
Relevant and as follows:

TOOTH VITALITY INFORMATION?
Not relevant
Relevant as follows:

ANY OTHER INFORMATION?

bottom right). For the ease of analysis, whenever a diagnosis was not relevant (i.e., normal anatomy) or was rare, the designation "Other" was used in coding the lesions.

The accuracy of diagnoses standard error (SE) for judge 1 and judge 2 was 58 percent 5.6 SE and 64 percent 5.4 SE respectively. The level of concordance between each judge and the gold standard was 0.60 (judge 1) and 0.53 (judge 2) kappa. The reliability (interjudge agreement) of the diagnoses made was shown to be 78 percent 4.7 SE with a concordance level of 0.76 kappa. The accuracy of the recommendations against the gold standard for judge 1 and judge 2 was 81 percent and 73 percent respectively. The level of agreement between the judges for a management plan (i.e., a biopsy or a similar laboratory diagnostic test, observation or pharmaceutical management) was 67 percent with a level of concordance of 0.43 kappa.

Discussion

The published information available on e-mail-based medical communications is limited. From the anecdotal reports in the literature, there seem to be an expansion of patient-physician e-mail contacts. Although there are no official reports of the number of physicians supporting a Web site, the impression is that the number is ever increasing.[18] A physician Web site's main application may be direct e-mail access for transmission of electronic patient history forms, appointment schedules, referrals, patients' health reports (e.g., children's camp forms), and, most importantly, patients' concerns and questions.18 An increasing number of hospitals and health plans also support Web sites for introducing their personnel, services, and resources, including e-mail contacts.

Internet access to major health centers may facilitate not only patient inquiries but also professional consultations among various providers across the country and worldwide. In one retrospective chart review of all e-mail consultations received by the Children's Medical Center at the University of Virginia at Charlottesville, it was shown that of 1,001 consultations requested during a 33-month period, 81 percent were initiated by the children's parents or guardian, 10 percent by physicians and 9 percent by other health professionals (nurses and pharmacists).[20] In the same study, it was shown that the consultation requests were received from 39 states and 37 other countries.

Telemedicine services are expanding and exploring new areas of patient services such as home health care. Projections are that home health care will change to a point where:

- An electronic stethoscope enables a physician or a home health nurse to listen to the heart and lungs of a patient with congestive heart failure;
- A pulse oximetry and respiratory flow data may be electronically transmitted to a physician for better management of a patient with chronic obstructive pulmonary disease;
- Visual observation of the insulin injection will improve the blood glucose monitoring of a poorly controlled diabetic; or
- Fetal heart monitoring of an obstetric patient becomes possible at home.3

There are many advantages to establishing telemedicine services. Telemedicine can offer a unique opportunity for improved access to specialty services by medically underserved areas. Starting this year, recognizing the growing use of telemedicine, the Health Care Financing Administration is reimbursing physicians for some telemedicine consultative services to Medicare patients. Through expanded reimbursement for services, individual practitioners or health centers that are located in rural communities can obtain rapid Internet access to specialty services in larger cities. Reports from several of these types of telemedicine programs, using mostly a video or store-and-forward technology, show rather high levels of diagnostic accuracy, patient satisfaction, and cost-effectiveness.[6,7,13] The diagnostic accuracy of teledermatology, using a captured image vis-à-vis a face-to-face examination, has been reported to range from 57 percent to 83 percent.[10-19] Burgiss and colleagues found that compared to the actual referral of a skin lesion for diagnosis and management by a dermatologist, the cost of obtaining a dermatology consultation via a telemedicine line and subsequent follow-up by the primary care provider was 37 percent lower.6 Recently published reports have also indicated that teledermatology consults significantly reduce the duration of a lesion prior to receiving an appropriate treatment.[6,21] One group showed that the average length of time for referral to a dermatologist was 13 weeks, while a teledermatology consultation was accomplished within 18 days.21 Clearly, shortening the duration of a dermatological condition has significant implications in early detection of premalignant or malignant lesions.

Despite all the advantages of telemedicine consultations (e.g., access to expertise), one must also note that there are still many legal and ethical issues to be considered. The legal ramifications of electronic transfer and storage of confidential patient information, the record-keeping requirements, the patient's informed consent of electronic consultation, the licensing requirements, and the legal liabilities of the consulting specialists are all important considerations that have not been fully explored.[22] In addition, the qualification requirements of the "consulting expert" must also be established.

In developing a telemedicine consultation service, the validity of the diagnoses made based on the electronic patient data transmission must be established. Depending on the complexity of the data transfer equipment used by the health care professional requesting the consultation, the information transmitted may contain descriptive patient data, digitized images or both. The pilot study described in this paper was designed as the first step in developing an oral medicine consultation service at UCLA Oral Medicine Department. The study's objective was to test a patient data collection tool, designed for text-based consultation requests for oral mucosal pathologies submitted to the program's Web site, but without any transmitted images of the patient. Although only one report had included the kappa calculation in its study (shown to be 0.3),[17] the diagnostic agreement with the face-to-face examination reported by the dermatology literature (ranging from 57 percent to 83 percent, as described earlier)10-19 is somewhat higher than the rate measured in this study (58 percent to 64 percent with the kappa equaling 0.5 to 0.6). It must be noted that the dermatologic studies published so far have all incorporated still or live images of the lesion in the diagnostic process. Therefore, the moderate diagnostic accuracy shown in this study, in all likelihood, is related to the lack of any visual information for the lesions. When adequate diagnostic information was available, the level of agreement between the two judges was high (78 percent with the kappa equaling 0.76).

Although the level of agreement for the recommendations between the two judges and the gold standard was relatively high, the in-between judge concordance was low 67 percent (the kappa equaling 0.43). This may in part be related to differences in individual practitioner's clinical experiences and management styles. For instance, one judge recommended a biopsy or a cytology procedure in 67 percent of cases, medications for 13 percent of lesions, observation for 12 percent of cases, and dental intervention (prosthodontic or restorative care) for 8 percent of lesions. The same categories for the other judge consisted of 55 percent biopsies or cytological examination, 23 percent medications, 18 percent observations, and 4 percent dental interventions.

The results of this pilot study suggest that face-to-face patient examination is more accurate in establishing a correct diagnosis for oral mucosal pathologies than transmitted descriptive patient data alone. Any general recommendations for a likely diagnosis or a type of management can be made at a moderate level of accuracy at best. Future studies focusing on the quality and reliability of intraoral image transfers, which should supplement text-based patient data, are necessary for establishing the accuracy of diagnoses made through teleoral medicine consultations. Based on the levels of diagnostic accuracy shown in this study, text-based information, without any transmitted images, should only be used for triaging of the consultations prior to the actual diagnostic decision-making. Until the time when adequate data transfer (including text and visual information) by the consulting practitioner is possible, the e-mail may be best used for exchanging ideas, disseminating the latest scientific information, and discussing the potential diagnoses only. It is clear that with appropriate data transfer equipment teleoral medicine may become a viable option for remote practitioners who require specialty consultations. The ultimate goal of a teleoral medicine consultation would be to enable the consulting provider (general dental practitioner, dental specialist, or medical provider) to make a sound patient management decision that may in some instances involve referral to an appropriate specialist.

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Anger Management

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I've been thinking about how fortunate we are to have lawyers. People are only capable of being the target of so much fear, hate, and anger before they lose it completely and are put away someplace where they are denied access to sharp instruments and their own armament. Our friends the lawyers go out of their way to divert some of this heat off dentistry, directing it instead to their own broad shoulders. Lawyer-bashing frequently takes the form of crude lawyer jokes, which -- ha ha, I'm sorry, I really shouldn't say this -- are right on and pretty funny. Lawyers can take it, though, and join in the fun all the time by filing $20 million lawsuits against their tormentors and even each other sometimes -- just to show what sports they are.

We don't have this luxury to relieve tensions in dentistry. Even though I haven't heard any good anti-dentist jokes during my lifetime, this doesn't mean there isn't a lot of animosity, fear, and loathing out there taking its toll on us.

As compleat professionals, we have had to learn to understand our own anger and how we can cope with it. Keeping it bottled up inside eventually turns us into bitter, hateful people fit only to work in the complaint departments of major retail stores.

It is perfectly normal to experience anger when, say, a patient refuses X-rays you believe are necessary and he implies your primary mission in life is to render him penniless for your own greedy ends. It is not considered professional, however, to throw him bodily out of the office and pray that if he ever does come back, he'll have interproximal cavities larger than basketballs. No, what you have to do is smile understandingly and sublimate your mounting tensions by one of several methods.

Some practitioners have a punching bag in their lab. There they can go back and lambaste it a few times before it reciprocates, loosening a couple of centrals or fracturing one of their hand bones. I have found that a preferable method is to kick the bejeezus out of one of those inflatable dummies that always return to an upright position after they have been knocked over. Mine came with a complete kit of interchangeable visages such as lab faces, staff faces, IRS and OSHA faces, and a nice selection of generic patient faces.

The family dentist we had when I was young (At that time he didn't know he was a "family dentist." He was just a dentist like every other dentist.) had trouble dealing with his practice-generated stresses. With enough provocation, like my biting off the marginal ridge of his freshly-placed amalgam, he would gather up a handful of instruments and fling them to the floor, accompanied by fine examples of his colorful vocabulary. I vowed that if I ever became a dentist, I would never have single-ended tools like his, but would go

for the double-ended variety that would at least last me through two outbursts.

I have determined the average dentist's day is made up of two or three really good things, about seven to 10 really wretched things, and the balance of things so boring and enervating that when he gets home at night and his spouse says, "How was your day?" he can't remember who came in or what he did. He may remember how many times he went back and kicked his dummy because those memories are not recessive like the good things, which happen so infrequently.

If you are not fortunate enough to have a dummy at your office, it is not a good idea to mistake your spouse for one. This leads to a lot of microwaveable food substitutes in studio apartments and overdrawn checkbooks. Members of your staff make poor dummy substitutes also. They have been known to just up and quit for no good reason other than the fact that you couldn't remember their name and referred to them in public as "the girl."

So you see that even if anger is officially identified as one of the basic human emotions, you have to ask yourself if an ill-fitting partial or a kid who eats his braces for breakfast is really more important than trade meetings among the world's leaders or Senate hearings on health care reform. Yes, you bet it is, and that's why I wish to announce the availability of a large supply of double-ended instruments for flinging purposes. Both ends are already missing, but they are otherwise like new and much less likely to impale a tender piece of your anatomy.