

# The American Dentists: Ethics, Technology and Education for the Twenty-First Century

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*This paper was presented at the 58<sup>th</sup> Annual Meeting of the American Academy of the History of Dentistry, June 12<sup>th</sup>, 2009 in Chicago, IL.*

Throughout the twentieth century, dentistry has been answering a powerful call to embrace science-driven oral health care, and align dental education with interdisciplinary biomedical training. Now, as we enter the twenty-first century, “evidence-based practice” has raised new challenges for scientific collaboration and professional education. Central to this new landscape is the task of realigning the vision of oral health science to provide a more comprehensive view of how dental science and technology can best serve the health of expanding populations, the underserved and global cultures. This article discusses examples of how educational challenges are beginning to be addressed, and how new technologies like teledentistry, while helping solve certain problems of outreach, raise their own challenging ethical questions of professional obligation and responsibility.

## Introduction

This article examines issues regarding technology and its impact on the relationship between health practitioners and patients. My references are not only relevant to dentistry, but to the broader community of professionals involved with oral healthcare.

In a previous article, I discussed how the evolution of the profession of dentistry helped redefine the mouth as site of complex pathology.<sup>1</sup> With the emergence of epidemiological studies, the health of one’s mouth was seen to have an impact on the health of whole populations, since an individual’s oral health and hygiene became a measure of need for public health interventions. In the early 20th century, American dentists

developed what I referred to as the ‘ethical core’ of their professional identity, which was linked to public health service.

Clifton and Lois Dummett once wrote that: “Traditionally, the dental profession took pride in its entrepreneurship and its independence.”<sup>2</sup> But in the early 20th century, with increased attention to “social aspects” of dental practice, there was a newly perceived need to reform the professional identity to win the public’s trust. The American Dental Association (ADA) then backed the Oral Hygiene Movement, but three problems affected the promotion of dental public health. First, the “professionalization paradox” made it difficult to recruit dentists for public

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service, since dentistry's success hinged on the growth of its elite professional status, which is not conducive to offering low cost or free service to underserved populations. Training and education are expensive, and bills do not get paid by giving away free services. This is a problem that remains throughout the health fields to this day. Second, the promotion of dental public health was met with cynicism and skepticism by critics who suspected profit-driven motives. Third, dentistry's association with the politics of health insurance intertwined the concerns of private practitioners for their professional futures with the commercial interests of insurers. Navigating the scientific, technological and social milieu of the 21st century still requires dentists to overcome these challenges, and yet more which arise when facing "newfangled" solutions to the problems of providing oral healthcare to an expanding population.

In this article I will develop two narratives: One is a story about the development and impact of a dental technology that, it is hoped, will provide one solution to the dilemmas of increasing access to dental healthcare among underserved populations. The other story is about the future challenges in dental education and training. Both share an underlying theme: the difficulties that the profession of dentistry faces in providing oral healthcare in the interests of public health. At heart, this returns to a discussion about the ethical core of any health profession. At issue is how health professions can train for and accommodate increasing access to healthcare. This issue, with its social, ethical and economic entanglements, may prove to be among the most difficult things to navigate as we proceed into the 21st century.

### **Teledentistry and Access to Oral Healthcare**

Problems of access to oral healthcare in America can be conceptualized and approached from a number of different angles. One way is approach it as a technological problem. When the Internet was new, there was a lot of talk about how it would democratize knowledge. Libraries worldwide could scan their collections and make

them available online for everybody. This was a noble idea, but the problem was (and is) access: not everyone has a computer and Internet access; not everyone could read. This is a clear example of how the unequal distribution of resources resulted in "free" knowledge, but only for select and privileged segments of society. Despite the underlying issues of socioeconomic inequality, this was still conceived of as a technological problem. One partial solution was making computers cheap and wireless access free. In what ways might we think about increasing access to healthcare as a technological problem, that might also be overcome through technological intervention?

Teledentistry is being pursued as a means of improving access to oral healthcare in remote populations (of course the concept of a "remote" population is culturally relative.) If you cannot bring a doctor to the patient, then bring the patient to the doctor, virtually, through the Internet. E-mail is one such method. There are interesting pilot programs in teledentistry underway across the country, but they raise ethical and legal questions of their own, relating to jurisdiction, and more so whether or not the patient wants to interface with his or her provider in this way. These are points to consider, but first, some background to this technology.

*Teledentistry* is the application in the dental field of what is broadly considered "telemedicine" or "telehealth." In the 1950s, NASA partnered with the US Public Health Service to provide tele-consultations for the Papago Indians from a reservation in Arizona. Arizona provided good ground for the US military to test equipment which would later be used to connect doctors to Antarctic survey stations, offshore oil exploration rigs, and space-station astronauts.<sup>8</sup> The University of Arizona remains one of the leading centers for the study of telemedicine.

Teledentistry was first put into practice by the US Army in 1994. Fifteen patients underwent periodontal surgery at Fort Gordon in Georgia. A week later their sutures were removed at a clinic at Fort McPherson, 150 miles away. Intraoral color photos were taken and sent via a 9600 band mode

back to the periodontist who had performed the surgery. Consequently, only one patient needed to make a return trip for a follow-up procedure.<sup>3</sup>

California was one of the first states to allow Medicaid reimbursement for telehealth services. The California Telemedicine and eHealth Center (CTEC), founded in 1997 in Sacramento and partnered with UC Davis, created a teleophthalmology program for Indian Health Clinics. Since problems associated with diabetic retinopathy can lead to blindness, the goal was to use telemedicine to increase vision screenings.<sup>4</sup>

One of the key strategies for rural health maintenance and disease prevention is providing health education. CTEC has experimented with setting up e-health kiosks at agricultural worker clinics. These kiosks have touch screens that show a cartoon in Spanish, which provides information about asthma, diabetes and heart disease for the Hispanic population in the central valley. The diabetes program issues eye-screening vouchers which the patient is asked to take to a nurse to arrange an appointment. The rationale is that if people do not know they need the test in the first place, the lack of early detection makes them more likely to go blind.

There are a number of different genera and species of telemedical systems—some are designed solely to share information between healthcare providers. But telehealth is also largely about linking providers to distant sites, and reaching previously “marginalized” people. This particular aspect of telehealth raises questions suited to research in the social and behavioral sciences:

How do technologies of telehealth change or challenge concepts of what defines an underserved population? Do these technologies have an impact on health policy? If telehealth transcends geographical limitations—barriers of physical distance—in what ways do we redraw our conceptual boundaries about who is “inside” or “outside” the system? What are the ethics of using or relying on a particular communications system to open up access to healthcare? We are thus forced to think about risk, technological imperatives, unintended costs, and different concepts of

communication skill and technological literacy (of patients and practitioners alike). How do we teach “chairside manner” in a virtual world?

As suggested above, telehealth is a class of technology that cuts across many different healthcare disciplines. Another question is: what concerns or problems cut across medical disciplines but are inherent to their use of this particular medical technology? Cross-field comparison allows us to think about how teledentistry, and the future of this area of dental practice, might be shaped. Issues and experiences that affect other healthcare specialties could potentially provide insight to future collaborations in training and practice, among physicians and dentists alike.

How has teledentistry been used to date? In 2003, a partnership between the Children’s Hospital Los Angeles and the University of Southern California School of Dentistry initiated a Teledentistry Project. This project provides free service to low-income children. Medical students were trained to collect patient information and digital images, and the information was then sent to faculty dentists for treatment suggestions. The system “greatly streamlines the patient flow into the clinic in the field, eliminates field screening field days, [and the need to] schedule visits from faculty dental specialists.”<sup>4</sup> The impact of teledentistry on provider–provider (and not just provider–patient) communication is another area that has been examined. A 2004 article in the *International Journal of Dental Hygiene*:

A teledentistry system can allow dental professionals to share patient information. Radiographs, both periodontal and hard tissue charting, treatment notes, photographs and any other needed drawings or information can be transferred between multiple providers. ... When a dental hygienist has a patient who presents with a painful periapical abscess, the dental hygienist could send a radiograph of the area, an intraoral photograph, all charting and health history information, and then consult with their dentist.<sup>5</sup>

Other studies have examined the impact of the technology on patient referrals. In 2002 fifteen dental practices in greater Manchester in the UK participated in a randomized trial to

evaluate the validity of teledentistry screenings for new patient orthodontic referrals. The study, which involved over 300 patients, found that teledentistry was a valid screening mechanism for positively identifying appropriate new patients. This system, like many others which can be reviewed in the literature, proved successful for managing time and coordinating the relationship between different medical centers.<sup>6</sup>

In order to raise awareness of community health issues relating to access to care, some dental schools have recently started including courses in teledentistry for dental hygienists. An outcomes assessment published in 2007 showed an association between an increase in practitioner skills and the use of teledentistry systems, and also revealed that these systems encouraged students to form the opinion that teledentistry could play an important role in increasing access to care.<sup>7</sup> The message that is being conveyed to the students of the study's focus group reaffirms the sanguine declaration made in 2004 in the *International Journal of Dental Hygiene*:

Teledentistry has the potential to expand the oral healthcare being provided. It can be utilized by any dental care professional who wishes to gain advice, improve diagnostic care or determine referrals. The prospects of teledentistry are enormous. It has the ability to alleviate many barriers that currently exist in access to oral healthcare.<sup>5</sup>

Not to be disenchanting, but the benefits that have been primarily touted in the literature appear to outstrip any mention of disadvantages, by such an overwhelming proportion that it begins to sound like science fiction. One social scientist who has studied the nascent implementation of telemedical systems has argued that these technologies are not only a feature of healthcare, but furthermore work to redefine the composition of society (or perhaps 'citizenship') itself:

Telehealth may thus be seen within a wider process of empowering citizens and workers, [the] democratization of public institutions and making service delivery process more localized and responsive to people's needs. Thus telehealth can, at times, promote a view of communities and

individuals as more active participants in the health process, not passive receivers of medical treatment, and be developed and used with the aim of limiting social exclusion.<sup>8</sup>

Above-mentioned concepts like *empowerment, democratization, active participation, and social exclusion* are worth close examination and careful consideration.

The cornerstone of telehealth is the presumed increase in access to care for remote populations. Geography, or measures of distance, seems to be the obvious framework for analyzing the uses of this technology; but time is also important. Dramatic reductions in travel time, no appointment backups, even the very digitization of medical data (particularly medical images for radiological analysis, or electronic health records) promises to speed everything up.

The imagined potential of teledentistry is predicated on the proposition that it collapses time and space. However, it has been much more difficult to anticipate its effects on the quality of care. In the history of medical technology, we find numerous examples where the introduction of yet another technology further alienates the patient or dehumanizes the clinical encounter. Telehealth goes one more step further in this transformation of the clinical encounter. In the pursuit of dental public health, which was originally conceptualized as an ethical core to the profession and a way to establish public trust, how might technologies such as teledentistry affect that social bond?

## Teledentistry and Patient Trust

What does history suggest will be the impact of "diagnosis at a distance" on patient satisfaction? To answer this, we need to examine notions of trustworthiness and lifestyle integration of this unique technological system. Part of the reason that "technologization" of healthcare was considered dehumanizing throughout the 20th century was because previous technologies that intervened in the doctor/patient encounter were unfamiliar to patients.

The trust that first underwrote the provider-patient relationship drew on notions of expertise

and faith in human judgment. The “human bond” can be empathetic and insightful of a patient’s particular problems. Even medical specialization, which began to erode the paternalistic ideal of the general practitioner, was still rooted in assumptions and cultural attitudes about the value of human skill and perception. Attitudes about the introduction of computer-generated pictures and computer aided diagnosis reveal the tensions surrounding the displacement of human skill.<sup>9</sup> Our present culture has a sophisticated approach to visual media, one where people are increasingly skeptical of pictures as reliable proof. Thus the idea that computer-generated pictures or even video can be used for diagnostic purposes is problematic, even though popular culture suggests that the public is dazzled by colorful MRIs. But this awe does not automatically confer upon these pictures privileged epistemological status. Patients still want their healthcare providers to see things for themselves, “in the flesh”. Patients still want to be seen by human eyes rather than cameras alone.<sup>10</sup>

Historical precedent may suggest that patients are prone to reject telehealth (referring only to that kind of telemedical practice which recreates the clinical encounter virtually, rather than the simple transmission of data between providers). But surprisingly, much of modern telehealth—even those methods which would seem most “dehumanizing” of the clinical encounter—is not being rejected. Why not? And in what ways should dentists consider the integration of these new technologies into their practices? How does this affect social trust, and the notion of evidence-based practice in the future?

A closer analysis of patients’ perspectives on telehealth systems throws new light on the conditions that create a trustworthy relationship between doctors and patients. Studies from the 1990s suggest that there was resistance among medical practitioners to use telemedicine systems, because removing patients from the clinic was seen as a bad move for the future of the business component of providing healthcare. Another concern: if the system ever became widely adopted, and not solely used for “remote populations,” how

will the practitioner maintain the bond with the patient? Are not computer relationships weaker than face-to-face relationships? However, instead of thinking about the weakening of social bonds as a result of a technological intervention, one might instead consider how this technology has the potential to foster a stronger business model, due to an increase in familiarity with the technological system. Patients might prefer convenience and speed over a paternalistic doctor/patient relationship.

However, the message from those who promote teledental systems, quite obviously seen in the industry literature, is that telehealth can help build one’s practice by recruiting patients from further afield. Own the system, and in a sense you own the people who put faith in that system. Once again, instead of seeing telehealth as a concern about the transformation and destabilization of the clinical encounter, one must also analyze this as an issue of technology transfer between one established social world and another. Once one understands, for instance, how Amazon.com became trustworthy and successful as an online retailer, it becomes easier to understand how telemedicine can be “good for business”. Thus history suggests we look at the role of computers and online communication as a way of thinking about teledentistry’s future prospects, rather than what people feel about waiting in a doctor’s reception area, or driving long distances to seek healthcare.

But this perspective is inadequate when addressing the ethical issues raised by the development of telehealth systems, since it takes into account only those patients who have already have access. Putting that discrepancy aside, other reasons why healthcare providers have hesitated in adopting telehealth systems shed light upon the way practitioners navigate the scientific, technological, and social milieu of the 21st century.

First, practitioners have resisted the adoption of teledental systems for fear of the loss of business. Studies suggest some resistance within the professional organizations to the implementation of telehealth, for fear that it will

make smaller, rural practices redundant and run the practitioners out of business. (Consider again Amazon.com—but in relation to smaller booksellers). The telemedical industry replies that this is precisely why practitioners should adopt these technologies and not get left behind—it could potentially increase their business in the longer term.<sup>11,12</sup> So the issue of increasing patients' access to care is, inversely, intertwined with questions about professional access to patients.

Next, there are worries about the expense of the system. For all the rationale behind the system as a way of reducing healthcare costs by collapsing space and time, new technology is never cheap. What will be the technological requirements for minimum standards of care? In other words, if telehealth becomes an ethical, moral and healthcare policy imperative, this will have implications for standards in telecommunication systems. In fact, it soon might mean that not having access to the internet becomes a health risk!

Third, there is concern over the fragmentation of professional identity. This is mainly a generational issue: in research on telemedicine, looking specifically at its impact on radiological workflow, there has been criticism by older radiologists about the fact that traditional 'departments' no longer exist.

Finally, there are a host of unresolved issues over jurisdiction, regulation, and licensing. These matters have received by far the most attention in the literature, because they have a direct impact on the practicality and logistics of telemedicine. In the wake of the ADA and Alaska Native Tribal Health Consortium debacle over the uses of dental therapists from New Zealand, you can imagine that teledentistry is a sensitive topic. Legal issues bear upon the integration of such technology, particularly those systems that facilitate provider/patient contact, which might cross over state or even national boundaries. These issues include a range of concerns, from ensuring patient confidentiality; to collecting informed consent; to malpractice insurance coverage.<sup>13</sup> There are calls for a national or even international registration system for telehealth practitioners. State licensing appears

to be the preferred method, but since teledentistry can cut across jurisdictional lines, this leads to the question of who can practice where. The problem revolves around regulating the qualifications of those who engage in telemedicine consultations. With the introduction of a technology that both separates and yet "virtually" connects doctors and patients, states differ in their interpretation of the changes in the doctor-patient relationship. One legal question raised in this circumstance is that of malpractice: whether a "relationship" has been established in the eyes of the law between doctor and patient when the encounter is mediated through this technology. If doctors are sued, in which state are they being sued? Do they need to hold a license in the state that their patient is in?

We are obliged to take a slightly broader perspective on this major new technology which the years to come has the potential to change oral healthcare and dental practice. It is a technology that it is hoped will solve a major social problem: remove all-too-common barriers to the provision of healthcare.

The question that remains is whether telehealth provides appropriate solutions to the larger problem of quality healthcare provision. Perhaps what is to be resisted is not the technology itself, but the naive positivist notion that such technology can itself solve the social problems that create health disparities to begin with.

There is something comforting and optimistic in the idea that science and technology provide solutions to social problems. Yet the history and philosophy of science teach us to be cautious of the idea that technology has its own agency to offer far-reaching solutions, rather than merely serving as a tool which might encourage us to think differently about problems.

There will be major ethical issues at the heart of what it will mean to be trained as a dentist in the 21st century, especially in light of the scientific and technological developments to come. Current and future dental students will face increasing challenges in navigating their role in the healthcare system. When confronting the pressing social issue of the provision of care to the poor and

underserved, the question they will face is one of whose responsibility it will be to offer that care and ensure its quality.

### **Professional Obligations in Dental Education**

When one examines ethics in the history of dentistry, conversations often separate into two categories. On the one hand, the matters of how to avoid malpractice, how to maintain good bookkeeping, and so on. The other category revolves around dental education and the need to instill a sense of professional obligation in the next generation of students about delivering care to the underserved.<sup>14,15</sup> The best way to widen public health is to begin upstream, at the point of passage where professionals are the closest together. Thus the focus should turn to the obligations teachers and mentors have in shaping the awareness of dental and other health professional students about major social issues.

We need to change the prevailing attitude about responsibility; while respecting students' choices of career path and specialization, to encourage them to engage with social health discourse; to raise the profile of discussions about shared responsibilities and define the place of all stakeholders in the social contract of health; to teach healthcare collaboration by example. Problem-based learning (PBL) modules illustrate how different health researchers collect information and tackle complex scenarios. There is still an underdeveloped interest in mapping the intellectual contours of our institutions to connect those people of diverse backgrounds who share common interests. By structuring research and teaching around shared health problems, it becomes easier for students to combine different perspectives and achieve otherwise unattainable goals.

There is a body of literature on interprofessional education (IPE) that provides inroads to pedagogical models.<sup>16</sup> Many curricula today have "cultural-competency" components and ethics modules, but too often they are didactic lectures with the objective of raising awareness and promoting self-reflection. The coming ethical

landscape will require more than self-reflection. It will demand an interdisciplinary understanding of how many distinct contributions can be combined to compose a strategy. An obesity clinic, for instance, would be a good place to bring in a diverse team of students. Junk food is a problem for dentists, nutritionists, physicians, and social scientists alike, so an interdisciplinary perspective could foster a sense of collective responsibility and lead to new attitudes about how to collaborate on solutions.

It is also necessary to better train students to see healthcare problems through the eyes of patients. It should matter less what the professor thinks about oral healthcare access than what the patient population thinks. Students should research the perceived need for interventions, so that good intentions do not backfire due to an unresponsive patient population. Grant money is often awarded to faculty and students to travel somewhere to deliver healthcare, but often they have done very little to demonstrate that what they want to do is considered necessary or a priority by the patient population itself. If practitioners take the paternalistic attitude that they "know best" what is good for the patient, it invites more debate about ethical principles of treatment. Instead, instructors and students must communicate with social scientists, historians and anthropologists who examine the social and cultural beliefs of different populations, to see what kinds of interventions would work well. This collaboration is not routinely done. A study at the University of California San Francisco on "oral-health related cultural beliefs" found the literature on this to be nearly non-existent.<sup>17</sup> These strategic alliances must be built within pedagogical curricula. There are serious obstacles to overcome, because disciplines speak different academic languages.

From one perspective, social problems are not categorically different from scientific problems. Many medical students choose their career path because they love science, and many were undergraduates at places that did not require any study of humanities. They are still motivated by humanitarian goals, however; but they may pursue

these goals through lab tests rather than social analysis. Educators can do a better job of showing how science and society are interdependent. Students can be shown that lab tests are socially conditioned; that the behavior of the patient affects every micro-analysis one can do; that faith in test results should be contingent on an understanding of the patient and his or her community. To use again the example of the obesity clinic, patients can be asked whether they eat a lot of sugar, or lab tests can be ordered to check their glucose level—different approaches that ask the same questions. The pursuit of hard data is never to be abandoned, but all data collection must be recognized as part of a continuum, one of many worthwhile elements to building a strategy for healthcare delivery.

The “research cluster” concept would, for example, link dentists to people involved in smoking cessation programs who have access to populations and are collecting patient data. Such collaboration would synergize efforts and maximize the value of the brief contact time practitioners have with their patients.

Let us take it for granted the ethical core of the profession of dentistry. The problem we face with regard to access to healthcare is not an ethical problem in the sense that anyone has forgotten the ethical responsibility to help the underserved. The problem lies less with any diminished sense of moral responsibility, and more with the provision of practical education about how to effectively engage in community service. The discussion, the literature, and the reflections of ethicists need to move away from generalized propositions about social justice, and instead ground themselves in case studies of community-based pedagogy and the practical aspects of implementing technological solutions like teledentistry. Navigating scientific, technological and social issues of the new century will demand collaboration, and the diverse range of work being done studying these issues is a sign of how powerful cross-disciplinary communication will be in the coming century.

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## **Bremner Award for Pre-Doctoral Dental Students**

**A certificate, \$500 cash prize and up to \$500 travel and related expenses will be awarded to the winning unpublished essay on:**

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*Selection:* A special committee of the Academy will judge all entries received prior to March 1, 2010, for the current year's award. The winner will be announced prior to June 1, 2010, so that said winner may be in attendance at the annual meeting of the Academy.

*Application:* Send typed essays (in triplicate), following the Instructions for Authors for the *Journal of the History of Dentistry*, along with a statement of authenticity by the Dean or responsible faculty, by March 1, 2010.

**The Award is presented at the annual meeting of the American Academy of the History of Dentistry.**

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