The Intersection of Education and Technology at the Century Mark

Abstract: Since the inception of dental hygiene in 1913, we have witnessed the tremendous evolution of the profession. Within the past couple two decades a significant game changer has been technology. The ability to expand access to education through technology has resulted in an increasing number of dental hygienists seeking advanced degrees and gaining new skills and certifications. The evidence shows that dental hygienists are using their advanced education to address lack of access to oral health care services. The profession should remain focused on advocating for the increased education of the dental hygienist, by finding solutions to barriers that presently prevent the realization of this ultimate advancement.

Keywords: dental hygiene, dental hygiene education, technology, access to care

Introduction

Dental hygiene has been practiced throughout the ages. Several years ago it was reported that two molar teeth of a Neanderthal were found to have grooves formed by the passage of a pointed object, which suggests the use of a small stick or grass stalks for cleaning the mouth. In 1844, the American Journal of Dental Science carried an editorial titled “Dental Hygiene.”

After implementing dental hygiene into his dental practice for years, Fones educated the first dental hygienist, Irene Newman. She went on to treat patients in Dr. Fones’ practice. In 1913, he started the Fones School of Dental Hygiene by recruiting experienced professors and experts in medicine, basic science, public health and dentistry from Yale University, Harvard University, Columbia University and the University of Pennsylvania. Fones’ original school actually continues to educate dental hygienists today at the University of Bridgeport in Bridgeport, Connecticut (Figures 1, 2).

Fones is credited for writing the first textbook in dental hygiene entitled Mouth Hygiene and the first textbook on dental hygiene for dental schools entitled Preventive Dentistry. Since publication of these first textbooks and initiation of coursework, dental hygiene education has evolved. Although dental hygiene education originally began as a 1-year program, in 1919, the University of Minnesota began a 2-year program. By 1939 the University of Michigan offered a bacca laureate degree program in dental hygiene, followed by the establishment of Master’s degree programs at the University of Michigan, Columbia University and the University of Iowa during the 1960s.

The American Dental Association established a Council of Dental Education to oversee education programs in dentistry and dental hygiene in 1937, and within the next decade required all dental hygiene programs to be at least 2 years in length with a detailed curriculum standard, followed by the accreditation standards that went into effect in the early 1950s. In 1962, the National Dental Hygiene Board Examination was developed. All states eventually adopted the national accreditation standards and board examination, with the exception of Alabama.

From the beginning, Fones saw dental hygiene as a distinct profession and thought it should be positioned within dental public health, as opposed to being offered only in private dental practices. His far-sighted plan for dental hygiene included the provision of education and treatment outside of the dental office and emphasized the utilization of dental hygienists as outreach workers, who would bring patients in need of restorative dental care to private dental practices.
Table I provides further examples of Dr. Fones’ vision for dental hygiene.

In many ways today we see dental hygiene returning to its roots per se, and Fones’ original vision. The utilization of dental hygienists in school-based health centers is increasingly being practiced across the country to help improve access to and use of dental preventive care. In response to the National Call for Action, the American Dental Hygienists’ Association has adopted the creation of a dental hygiene mid-level oral health provider to provide not only preventive services, but also much needed restorative dental care to underserved populations. This model has already been established in Minnesota and is being discussed as a possibility in several other states.

The American Dental Hygienists’ Association’s environmental scan entitled Dental Hygiene at the Crossroads of Change focused on the premise that although many dental hygienists will work as they always have, some will be drawn to become pioneers in moving the profession to new places and seeking additional mechanisms to promote oral health. The report further suggested that although the job market would continue to be competitive for dental hygienists, that new opportunities would emerge for dental hygienists in nontraditional settings and that expanding access to oral health care may also be an influence on the dental hygiene job market. In order for dental hygienists to embark on new career opportunities it will be necessary that advanced educational opportunities be provided that equip them with the skills and competencies required for success.

**Dental Hygiene and the Influence of Technology**

Since the release of the landmark Surgeon General’s Report on Oral Health in 2000 there has been much attention given to expanding access to oral health care services. This manuscript draws reader’s attention to another issue, that of expanding access to education for dental hygienists, and by expanding access to education we ultimately are able to expanded access to care. One cannot pick up a newspaper, check email or follow the internet without reading something about distance and online education. The Babson Survey Research Group published their tenth annual report on the state of online learning in U.S. higher education. Their research has documented a decade of increased online enrollments that has far exceeded general enrollment in higher education. Their 2013 report documents that 32% of college students, or a total of 6.7 million students, report taking at least 1 online course, an all-time high. Dental hygiene education has responded to the issue of expanding access to education through the development of distance and online learning. In 1999 the first degree completion program went to online delivery at the University of Missouri-Kansas City, followed in 2000 by their graduate degree program. The ability to utilize technology to increase access to higher education has been a game changer around the world, but specific to dental hygiene education, distance education has provided the opportunity for individuals desiring to advance their degree, but unable to move, a way for meeting their goals. Today there are 44 online degree completion programs and 16 online graduate programs in dental hygiene education. As we continue to work on solutions for expanding access to oral health care services, distance and online education is finding a role in assisting dental hygienists to obtain additional education and certification for expanding their scopes of practice. For example, the University of Missouri-Kansas City Division of Dental Hygiene has offered an online dental public health course since 2006, which is specifically aimed at preparing dental hygienists to work in expanded roles and is the result of legislative changes in the dental practice act. This course assists practicing dental hygienists in obtaining an Ex-
Table I: Thoughts from the Writings of Dr. Alfred Fones, Founder of Dental Hygiene, Compared with the U.S. Surgeon General’s Report on Oral Health 2000

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Change perceptions regarding oral health and ideas so that oral health becomes an accepted component of general health.</td>
<td>• Since the days of Hippocrates, it has been known that infections of dental origin may be accompanied by serious systemic symptoms. The work of the dental hygienist is most important in the prevention of the systemic infection through the avenue of the mouth.</td>
</tr>
<tr>
<td>Accelerate the building of the science and evidence base and apply science effectively to improve oral health.</td>
<td>• It is no longer a theory that the service of the dental hygienist will better the mouth health and general health of all whom she is permitted to serve. • The research field in preventive dentistry is gradually widening into a study of constitutional causes that are believed to have an influence on the general health, and consequently on dental health.</td>
</tr>
<tr>
<td>Build an effective health infrastructure that meets the oral health needs of all Americans and integrates oral health effectively into general health.</td>
<td>• Hundreds of millions of dollars in public and private funds are expended to restore the sick to health, but only a relatively small portion of this amount is spent to maintain the health of well people, even though it is definitely known that the most common physical defects and illnesses are preventable. • It is not the intention to in any way belittle the efforts being made to aid the sick and needy, nor should such efforts be decreased. The vital point is that we have not commenced to cover the possibilities of true prevention.</td>
</tr>
<tr>
<td>Remove known barriers between people and oral health services.</td>
<td>• The dental hygienist was created from the realization that mouth hygiene was a necessity and that the average dental practitioner could not give sufficient time to it and that the toothbrush alone would never produce it. • The present need of the dental profession in solving the public health problem of mouth hygiene is an immense corps of women workers, educated and trained as dental hygienists, and therefore competent to enter public schools, dental offices, infirmaries, public clinics, sanitariums, factories, and other private corporations, to care for the mouths of the millions who need this educational service.</td>
</tr>
<tr>
<td>Use public-private partnerships to improve the oral health of those who still suffer disproportionately from oral disease.</td>
<td>• The actual results secured by dental hygienists in private and public services, particularly in public schools, affords incontrovertible proof of the value of the dental hygienists. Those who may still be skeptical are finding it difficult indeed to suggest other means by which similar good results can be accomplished for large groups of people. • The future of the dental hygienist in public schools work must be determined on a basis of cooperation between the dental profession and the educational authorities. • The Fones’s hygienists who were completing their course in 1917, when war was declared, had the unique experience of completing exams and cleanings and supplying each soldier with a toothbrush and individual instruction in the care of the mouth.</td>
</tr>
</tbody>
</table>
pace with technology and so the next challenge will be finding ways to overcome regulatory inhibitors.

Accreditation of Dental Hygiene Educational Programs

The accreditation process for dental hygiene education has historically been administered through the Commission on Dental Accreditation (CODA). CODA’s website states that they are recognized by the U.S. Department of Education to accredit dental and dental-related education programs. It can be argued that the same body accrediting different professions, e.g. dentistry vs. dental hygiene, creates an environment where a conflict of interest exists. For example, one can easily see how a conflict of interest could exist when it comes to expanding educational opportunities for dental hygiene. In a market driven environment where dentistry could perceive direct competition from dental hygienists with expanded education and scopes of practice, control of regulation by the same body that regulates dental education could prevent forward movement for dental hygiene. Over a century ago, Fones actually traveled to many state dental associations and boards to promote the use of dental hygienists. Although dentistry served as an advocate for dental hygiene in many ways, including the employment of dental hygienists, practice restrictions existed. In hindsight, it may have been beneficial for him to also meet with leaders of schools, hospitals, industry and other potential agencies to help promote the use of dental hygienists in these settings.

Dental Hygiene Scope of Practice and Regulations

National response to reports on the lack of access to oral health care services has resulted in the revision of practice acts in many states across the country to expand the dental hygienists’ scope of practice, yet there is much work to be done. For example, a recent report by the Pew Foundation found that 35 states and the District of Columbia do not have sealant programs in a majority of high-need schools, even though strong evidence exists that sealants prevent decay. Dental hygienists could be instrumental in providing these programs as well as in promoting oral health in many settings regardless of income levels and social settings.

Additionally, lack of self-regulation prevents or creates a difficult environment for dental hygiene to take bold and innovative steps to expand the practice of dental hygiene through legislative initiatives much like those taken in Minnesota with the advent of the Advanced Dental Therapist educational model. Regulation in general in the U.S. has a long and interesting history and provides context to the current environment in dental hygiene. As early as 1898 a U.S. Supreme Court decision authorizing states to set their own requirements for licensure of physicians has had far reaching implications for all health care professions. Today, “states’ rights” has resulted in a system of regulation that differs from state to state and an environment where 50 different legislatures must find their own unique solutions to educational requirements for the licensure and scopes of practice for health care professionals in their respective states. It is therefore easy to see why the issue of expanding the scope of practice for dental hygienist requires a dedicated and herculean effort.

Advancing the Future of Dental Hygiene

Dental hygienists have achieved so much over the past 100 years and owe such gratitude to those who have worked diligently to ensure that dental hygiene remains a critical player in the delivery of oral health care services. It is interesting to contemplate what will be accomplished over the next 100 years and who will be the new “pioneers” that propel the professional forward. With this in mind, the authors believe a recent publication by Jim Collins can provide guidance. In his book, Great by Choice, he explores how some companies have managed to thrive in times of uncertainty and chaos. Uncertainty and chaos certainly describe the environment in which we find dental hygiene and dental hygiene education today in the early part of the 21st century. He starts out by stating, “We cannot predict the future. But we can create it.” The authors of this article believe that creating the future should be the focus of all of our efforts, a focus on advancing the future of dental hygiene and dental hygiene education. Collin’s 9 years of research resulted in the emergence of 3 characteristics, or core behaviors that helped to define successful companies: discipline, empirical creativity and productive paranoia. We believe these characteristics/core behaviors have application for the future of dental hygiene. We have outlined examples of how dental hygiene has taken on this endeavor, e.g., through the use of technology we have been able to expand access to dental hygiene education.

First, is the characteristic of discipline defined as consistency of action. Consistency of action includes consistency with values, consistency with long-term goals, consistency with performance standards, consistency of method and consistency over time. True discipline requires the independence of mind to reject pressures to conform in ways incompatible with values, performance standards and long-term aspirations. Dental hygiene must “stay the course” when it comes to defining what our role will be in the years ahead. Public health forms the foundation of the profession and we must continue to keep our focus on the role of patient advocacy and extending dental hygiene
services to serve all citizens regardless of income level or social environment.

The second characteristic that emerged is empirical creativity, defined as relying upon direct observation, conducting practical experiments and/or engaging directly with evidence rather than relying upon opinion, whim, conventional wisdom, authority or untested ideas. In other words, having a deeper empirical foundation for decision making and action resulted in greater confidence while at the same time bounding or delineating risk for those companies Collins defined as “Great by Choice.” Dental hygiene must continue to both study existing research and engage in ongoing research that will provide the foundation for good decision-making.

Finally, the third characteristic that emerged is productive paranoia, described as the maintenance of hypervigilance in good times as well as bad. The outcome of this characteristic is behavior that results in turning hypervigilance into preparation and action. Collins found that successful companies did not worry so much about protecting what they have, but rather about creating and building something truly great, something bigger than themselves. We must continue to focus on how dental hygiene fits into an interdisciplinary health care system recognizing that what has worked to date may not be the answer to the future.

We must be willing to let the “sacred cows” go in an effort to build something even greater for future generations.

Conclusion

It is clear that accreditation and regulatory barriers will be areas in which dental hygiene will require discipline to ensure that we remain engaged in advocating for change. Gauging our actions on empirical evidence, e.g., lack of access to care, must be our guiding light. Working with private and public partners to continue to advocate for those segments of the population least able to advocate for themselves will be critical to ensuring that dental hygiene maintains a vital role in the solution to access to oral health care services. Finally, remaining vigilant to the changes around us, while at the same time dedicating ourselves to building educational programs that meet the needs of society first, and the needs of the profession second, will prepare us for our role in the 21st century and beyond.

Cynthia C. Gadbury Amyot, MSDH, EdD, is a professor and Associate Dean of Instructional Technology & Faculty Development at the University of Missouri-Kansas City School of Dentistry. Christine Nathe, RDH, MS, is a professor and Director at the University of New Mexico, Division of Dental Hygiene. She also serves as Vice Chair of the Department of Dental Medicine.
References


6. Fones AC. Personal Notes. Bridgeport, CT, circa 1900’s.


9. 100 Years of Dental Hygiene. ADHA [Internet]. 2013 [cited 2013 April 16]. Available from: http://www.adha.org/100-timeline/timeline.html


17. Dental Hygiene Programs. ADHA [Internet] [cited 2013 April 16]. Available from: http://www.adha.org/dental-hygiene-programs


