CAMBRA: From Research to Practice

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Correspondence should be addressed directly to the Editor:
Cathy Draper, RDH, MS
E-mail: Drapercatherine@foothill.edu
Mail: 1310 Regency Drive • San Jose, CA 95129

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Sean McDonald
CDHA Corporate Relations Consultant
1900 Point West Way, Suite 222
Sacramento, CA 95815-4706
Phone: 916-993-9102
E-mail: memberservices@cdha.org

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California Dental Hygienists’ Association
1900 Point West Way, Suite 222
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About the Cover: RDH volunteer, Andrea Giang, is shown performing an oral screening for the Child Care Health Program of the Maternal, Child and Adolescent Health division of the San Francisco Department of Public Health. Photograph courtesy of Americorps member, Chantal Berry.
“Making a Difference in Our Lives”

This issue’s focus on “From Research to Practice” couldn’t have come at a more opportune time as the dental hygiene profession mourns the loss of our esteemed colleague and friend, Margaret “Peggy” Walsh, RDH, MS, MA, EdD. Inspired to pursue a career in dental hygiene at the age of 16, because of a hygienist she met while working in an Oakland dental office, Peggy devoted her professional life to teaching and learning. Her teaching career began the year after she graduated from the University of California, San Francisco (UCSF) in 1970 and continued up until the last days of her life. Interacting with students was Peggy’s great love in teaching and her devotion to her student learners will be one of her everlasting legacies.

While teaching was her great love, Peggy is often first thought of as a researcher. She was a strong believer that a profession, such as dental hygiene, does not define itself at its entry level access point; we must also define ourselves at the upper end by creating new knowledge through research and scholarly activities. Peggy first became involved in conducting her own research by her desire to test some of the unsubstantiated assumptions of dental hygiene practice. Once, when asked about her divided passions of teaching and research, Peggy replied with a smile, “research should really be considered as just another form of teaching.”

As a profession, we have the responsibility to provide the data to support our patient care recommendations through conducting our own research. Taking that commitment a step further, we also have the responsibility to make patient care recommendations based on scientific evidence. Caries Management by Risk Assessment or CAMBRA, is a perfect example of science that is in the process of being put into practice. Using the most current caries research, practitioners are now challenged with incorporating this essential science into patient care. What a perfect example of using research as a form of teaching!

This issue’s “Lifelong Learning”, features authors, Karan Bershaw and Cheryl Davis, 2015 graduates of the UCSF Master’s Degree in Dental Hygiene program, and mentees of Dr. Walsh. They, along with 36 other graduates of the UCSF MSDH program, are making significant contributions to increasing the dental hygiene body of knowledge and our credibility as a profession.

Peggy’s philosophy was to always learn from our mistakes and move forward in a positive way. She would say, “As long as you continue to try, you are not failing. When you embrace barriers in the same way you embrace success, you become much more empowered to problem solve.”

Peggy chose dental hygiene because she saw an opportunity to positively influence lives. She most definitely achieved her professional goal.

Cathy Draper, RDH, MS
Editor
Tribute to Peggy Walsh

Celebrating Margaret “Peggy” Walsh, RDH, MS, MA, EdD

It is with great sadness that we announce the passing of our longtime colleague, mentor and friend, Dr. Margaret (Peggy) Walsh, Professor Emerita. Dr. Walsh contributed to the University of California, San Francisco’s mission and vision for over 37 years. She was a highly distinguished international and national leader, educator and researcher in the areas of dental hygiene, community-based oral disease prevention, and tobacco cessation.

Dr. Walsh was tireless in her efforts to research the effects of smokeless tobacco on health and to find ways to decrease its initiation and use. She would provide tobacco cessation counseling to users including baseball players, allowing them to call her on nights and weekends; and she traveled tens of thousands of miles to reach high school and college students in rural areas for her research. In addition, Dr. Walsh devoted years of research to further develop and test ways to provide dental professionals with evidence-based knowledge, skills and tools to treat tobacco use and dependence in the dental setting. Her largest study involving dental professionals included 250 dental practices in California, Pennsylvania and West Virginia.

Dr. Walsh’s leadership legacy includes forming an interdisciplinary community-based safety-net partnership between UCSF and Contra Costa Regional Medical Center and Health Centers (CCRMC) to implement fluoride varnish application and oral health education to reduce early childhood caries for all 1- to 5-year-olds in eight CCRMC clinics. As of April 2014, the program was sustained with 97 percent of these children receiving fluoride varnish applications during their well-child visits.

A premier researcher, Dr. Walsh was one of a few dental hygienists to receive National Institutes of Health (NIH) funding for research. She authored more than 100 scientific articles and was awarded more than 10 million dollars in grants from the NIH and the state of California making her one of dental hygiene’s most prolific researchers.

Dr. Walsh’s leadership and work with dental hygiene researcher and scholar, Michele Darby, resulted in the co-creation of the “Dental Hygiene Human Needs Model”. Their collaborative work and the subsequent textbook “Dental Hygiene Theory and Practice”, changed the prototype for teaching and learning in dental hygiene programs around the world. First published in 1995, Darby and Walsh’s text, now in its 4th edition, has guided dental hygiene students around the world, in learning how to incorporate evidence-based knowledge into their decision making processes.

During her full and illustrious career, Dr. Walsh received special recognition for her leadership in the areas of dental hygiene and tobacco prevention and cessation. Other highlights of her many awards include being one of the first recipients of the Award for Professional Excellence in Dental Hygiene from the American Dental Hygienists’ Association in 1988, being honored by the International Association of Dental Research with its Oral/Dental Hygiene Researcher Award in 1996, induction to both the National Dental Hygiene and National Dental Honor Societies, recipient of the 2006 Medal of Honor and the 2011 Legacy of Leadership Award from the UCSF School of Dentistry Dental Alumni Association, and the Esther Wilkins Dental Hygiene Lifetime Achievement Award in 2014.

The textbook, “Dental Hygiene Theory and Practice” has been able to move an entire world-wide body of health care practitioners to position the expertise and abilities of the dental hygiene profession, so we as a group understand it, engage in it from our conceptual and theoretical perspective, and contribute profoundly to health/oral health for all”.  

~ Laura McDonald, Dip DH, BScD, Med, Associate Professor College of Dentistry, University of Manitoba, Canada
Dimensions of Dental Hygiene also named her “One of Six Dental Hygienists You Need to Know” in 2015.

Dr. Walsh was an exemplary educational leader. She taught in UCSF’s baccalaureate dental hygiene program for 30 years, serving as its director from 1986-1992, until it closed in 2005. Walsh continued to teach dental, medical, and pharmacy students while also providing the leadership to create the first dental hygiene graduate program in California. In 2008, she submitted a proposal for a new Master of Science degree program in dental hygiene (MSDH). Her proposal was subsequently approved by the UC Office of the President and the UC Board of Regents in 2010. Twelve graduate learners enrolled in the summer of 2011, with Dr. Walsh serving as the program director. Graduates of the program all have benefited from Dr. Walsh’s creative energy, wisdom and guidance. Today, 38 UCSF MSDH graduates are continuing her legacy of leadership with positions in research, faculty appointments throughout California, state governing committee appointments, and positions within the oral health care industry.

Dr. Walsh’s legacy will most definitely live on through her research findings and the seemingly endless number of students and colleagues she mentored over the last 4 decades. Dr. Walsh was especially known for her ability to inspire others to reach far beyond their perceived limits and come into their own as dental hygiene scholars, interdisciplinary research collaborators, visionary leaders, and more compassionate human beings. Those of us, who were fortunate to have entered her world, feel immensely privileged to have known this amazing woman, superb scholar, and pioneer in our profession. Most recently, Dr. Walsh’s goals were to encourage the development of a doctoral education program in dental hygiene and the creation of conceptual models of oral disease prevention and health promotion from the dental hygiene perspective. If you are in a position to carry on Dr. Walsh’s work in these areas, please do so in her honor, so these models can be used to guide and advance dental hygiene research, education, and practice.

Although Dr. Walsh was grateful for her many achievements and the associated professional recognition she received, her greatest joys were found within her family; her son, TJ Langer; daughter-in-law, Rachel Langer; and precious granddaughter, Gemma Rose Langer.

In recognition of Dr. Walsh’s dedication to the Master of Science in Dental Hygiene program, the family prefers that donations be made in Dr. Walsh’s honor to the UCSF Master of Science in Dental Hygiene Program. Checks may be made out to: UCSF Foundation. Please include: School of Dentistry, Dental Hygiene, in the memo section. Donations should be mailed to: UCSF Foundation, Attn: Lynnette Teti, Box 45339, San Francisco, CA 94145-0339.

Letters of condolence may be sent to: TJ Langer, c/o Joanna Hill, UCSF, 3333 California St., Suite 495, San Francisco, CA 94143-1361.

Adapted from UCSF NEWSBREAK – In Memoriam – February 3, 2016
Move a moment and close your eyes. Imagine that it is 2020, just four short years into the future. What will the dental hygiene profession look like? Will we have a role in health care as essential primary care providers who are able to expand access to oral health care for the underserved? Will our education prepare us for an expanded scope of practice in a wide range of settings outside of the traditional brick and mortar dental practice? Will we lead the transformation of our profession so that we play a key role in improving the public’s oral and overall health? Or will we find ourselves with fewer employment opportunities, and no control over our future in the new world of oral health care? Will we wake up in 2020 to find that our role as specialists in preventive oral health has been taken by some other health care provider? The future of dental hygiene is full of possibilities but only if we are willing to work for them. The American Dental Hygienists’ Association (ADHA) is focused on leading the transformation of the dental hygiene profession so that we can become integrated into the health care delivery system by supporting new educational opportunities, strengthening alliances through strategic partnerships with other health care providers and stakeholders and by advocating for the profession at the national level. Here in California those same strategies are mirrored by CDHA’s work for the dental hygiene profession at the state level. Your officers and CDHA’s legislative advocates, Aaron Reed and associates, monitor state legislation on a daily basis in order to expand access to care, advance our opportunities, and protect our profession. Through the Dental Hygiene Committee of California, we as a profession now regulate our licensure and practice, the first fully self-regulating licensing body for dental hygiene in the country.

These achievements would not be possible without your support. Whether you are a student, professional or retired member, each one of you count in our association – especially as we move the profession upward. As we work to transform the dental hygiene profession, we are also transforming our association to better meet the needs of all of our members. Whether you are looking to develop your leadership potential, expand your knowledge, network with new and old friends, or just be a silent partner in our shared future, CDHA has so much to offer. I can personally say that my 22 years of participation in roles from CDHA Delegate, president, and treasurer in the Valley Oaks component all the way to becoming CDHA President, have enriched my life both professionally and personally. I have dental hygiene friends and colleagues throughout our state and across the country. Our CDHA leaders of tomorrow are among us today. Consider enriching your professional life, be mentored by your peers and expand your experiences in a CDHA leadership position.

So, where will the next four years take the dental hygiene profession? The opportunities are limitless. One thing is certain – we are definitely better together as we hold the future in our hands!

Lygia Jolley, RDH, BA
CDHA President, 2015-16
Politics in Action
Lisa Okamoto, RDH
Maureen Titus, RDHAP, BS

Government Relations: Working on Behalf of our Profession

Regardless of whether you “hate” politics or embrace the challenge, politics is part of the fabric of our society and our profession. Some call it a necessary evil….with the key word being necessary. We, too, have been among those individuals with the traditional aversion to politics…but the reality is that without the California Dental Hygienists’ Association’s involvement in politics and the legislative process, the profession of dental hygiene would not have evolved to the level it is today. Each one of us contributes to this vital process by being members of CDHA and ADHA, and in reaching out to our local legislators. By working together, we have improved and safeguarded our profession.

In California, we are fortunate that our dental hygiene scope of practice is protected by law. Dental hygiene duties were placed into statute in 2002 through the determined efforts of your professional association and the legislators who value our profession. As a result of this legislation, only registered dental hygienists, registered dental hygienists in alternative practice, registered dental hygienists in extended functions and licensed dentists are legally permitted to perform dental hygiene duties, including probing and scaling in California. Of course the law could at some time be amended – but it would be a very difficult undertaking for any entity to convince the California legislature that such a change would be in the best interest of the public.

Dental hygienists in California are regulated by their own professional peers, the Dental Hygiene Committee of California (DHCC). Prior to its formation, California dental hygienists were represented by only one voice and vote on the dentist dominated Dental Board of California. As our profession grew and evolved, a separate regulatory agency under the Department of Consumer Affairs was deemed necessary in order to protect the best interests of the public. The DHCC is comprised of four dental hygienists (two RDH, one dental hygiene educator, one RDH in Extended Function or RDH in Alternative Practice), four public members and one dentist. The DHCC is responsible for dental hygiene licensure, regulation of dental hygiene practice and our education, and enforcement of the laws governing all dental hygienists in California.

Legislative Accomplishments for hygienists in California
2015 – RDHAP Corporations authorized
2014 – Community College baccalaureate pilot programs authorized, including dental hygiene
2014 – RDH/RDHAP scope of practice expansion: Interim Therapeutic Restoration placement with tele-health supervision
2012 – DHCC granted powers of approval for any new dental hygiene program in California
2010 and 2014 – License portability: regional exam boards accepted for initial licensure
2007 – First self-regulatory dental hygiene board in the nation authorized (effective 2009 with DHCC fully operational in 2010)
2002 – DH Scope of practice protected in statute: service provision limited to hygienists and dentists
2002 – No supervision required for RDHs in public health program settings
2002 – Practice advancement: use of any new technology/material within scope of practice is allowed with appropriate education
1997 – RDHAP, unsupervised category of DH licensure, is created

Continued on Page 8

Politics (noun)

a. the art or science of governing citizens
b. the art or science concerned with guiding or influencing government policy
c. the art or science concerned with winning and holding control over a government

Mirriam-Webster Dictionary
Yes, most of us still dislike politics. But isn’t it nice that ADHA and CDHA get in the ring on a regular basis for all of us.

Politics can be eminently frustrating when what we view as completely rational and beneficial to the public, as well as our profession, is vehemently opposed by others... especially by those with immense capitol power such as organized dentistry. Politics can also be an excruciatingly and frustratingly slow process. But it is through this deliberate process that progress is made. And the powerful do not always prevail.

Politics definitely requires perseverance, the patience to listen and understand opposing views, even when we cannot agree. Politics calls for finesse in the art of communication to present our view effectively and successfully, and the ability to compromise. Politics requires an understanding of the legislative process and an interest in learning about legislators’ priorities. Politics requires us to do the research required to support our views, while seeking out collaborative support from other stakeholders. Politics requires ongoing efforts to continuously educate others so that they may share our views and build our coalitions.

We are not alone on this journey nor can we make change happen alone! We must work together as a profession to improve oral health for the benefit of the community at large and to advance our profession. Love it or hate it, all of us play an important part in the political process. Together, with our colleagues, stakeholders, family, friends and our patients, we can all make a difference in our profession and the lives of the public we treat, through politics.

How you can help?
- Be a member of ADHA and CDHA!
- Meet and develop a relationship with your local legislators
- Support our political action committee, CalHyPac

About the Authors

Lisa Okamoto, RDH, AS graduated with honors from the Foothill College Dental Hygiene Program in Los Altos Hills. Her 36 year career in dental hygiene includes general and periodontal private practice, and clinical teaching at Foothill College. An ADHA member since graduation, Lisa has served in leadership positions at all three levels of association membership and is a past president of the California Dental Hygienists’ Association. She has been the ADHA Delegation Chair for California since 2012 and became co-chair of the CDHA Government Relations Council in 2013. In 2013 Lisa was honored for her leadership and service with the CDHA President’s Recognition Award.

Maureen Titus, RDHAP, BS has been practicing dental hygiene for 39 years. She received a bachelor’s degree in health sciences from Chapman University in 2000 and completed the requirements for her RDHAP license through the University of the Pacific, San Francisco. Maureen is a past president of the California Dental Hygienists’ Association and has been a member of the Government Relations Council since 2009 and currently serves as co-chair. Maureen has worked as an advocate for children’s oral health in San Luis Obispo County and also serves as a Court Appointed Special Advocate (CASA) for foster children.
CAMBRA: From Research to Practice

Learning Outcomes

• Explain the science behind the initiation and progression of the dental caries disease process
• List and discuss the various factors in the caries balance model
• Describe the principles of clinical intervention in the caries process
• Explain the team approach in integrating CAMBRA into an oral healthcare practice
• Describe motivational strategies to assist the entire dental team with understanding and embracing the CAMBRA protocol

Introduction

For most of the 20th century, dental caries and periodontal diseases were prevalent in the United States and many other countries worldwide. Our understanding of these diseases, their etiology and pathogenesis, was limited and dental practice consisted primarily of diagnosing and repairing the consequences of these diseases. Today, the level of knowledge regarding the process of dental disease has increased substantially. Additionally, medical and dental science now recommends that health care providers identify and treat patients based on their risk status, rather than administering the same treatment to all patients. As a result, the management of dental disease is transitioning from a surgical repair model to a wellness model of care.

Risk assessment is an estimation of the likelihood that a specific event will occur in the future. With respect to dental caries, management by risk assessment is based on the understanding that the disease is initiated by a complex biofilm, rather than any one pathogen, and that it may vary significantly from patient to patient. Moreover, this biofilm changes radically based on its environment and the local chemistry of the tooth site, pellicle, and saliva with which it comes into contact. Other important factors also require consideration. To help guide the clinician in assessing a patient’s risk for developing carious lesions, a variety of approaches have been developed for application in everyday dental practices. Featherstone and colleagues developed a risk assessment tool, caries management by risk assessment (CAMBRA), which includes the use of historical and environmental factors and employs technology to evaluate bacterial presence, salivary flow rate, and dietary patterns. This article describes the implementation of the risk assessment concept, specifically CAMBRA, into a standard dental practice for effective and efficient use.

Review of the Dental Caries Disease Process

Demineralization

Dental caries is a transmissible and multifactorial disease process.

The mechanism that initiates the caries process is microbial, the primary causative agents being mutans streptococci (which includes Streptococcus mutans and Streptococcus sobrinus) and lactobacilli, which live in the biofilm attached to teeth.1 These pathogens metabolize fermentable carbohydrates—sucrose, fructose, glucose, and cooked starch—to produce organic acids that rapidly change the environment of the biofilm or plaque from a typical (resting) neutral pH to an acidic one.2 The acids diffuse through the plaque into the enamel rods composed of crystals surrounded by pores and diffusion channels. These channels, filled with proteins, lipids and water, allow the passage of organic acids, ions, hydrogen, calcium, phosphate, and fluoride to flow within them.2,3 The acids then dissociate producing the hydrogen ions that begin to dissolve and remove minerals from the porous subsurface enamel and exposed dentin. Calcium and phosphate ions are forced out into solution, which in turn diffuses out of the tooth leading to demineralization.3

Remineralization

Remineralization can occur after the ingestion of fermentable carbohydrates stops and the pH gradually returns to neutral, usually taking about 30 to 60 minutes, provided adequate saliva is present. Saliva’s role is crucial. Its components neutralize acids and raise the pH, reversing the diffusion gradient for the calcium and phosphate ions and providing additional minerals for reconstruction. Saliva is naturally supersaturated with calcium and phosphate, necessary components
for remineralization. Diffusion drives these minerals back into the partially demineralized crystal remnants within the lesion. These remnants act as “nucleators” for new surfaces to form on the crystals. The proteins in saliva help maintain the super-saturation of calcium in the plaque fluid, while other proteins and salivary components form a protective pellicle on the tooth surface and still others have antibacterial and antifungal properties. Saliva also contains immunoglobulins, buffers and minerals including bicarbonate and naturally-occurring amounts of fluoride.

Whether an initial carious lesion progresses into a hole (or cavitation) or is able to remineralize depends on a number of factors. Importantly, there must be sufficient saliva containing the minerals necessary to repair, strengthen, and provide support for rebuilding the enamel and subsurface. If the salivary flow is low, hyposalivation, and the acidogenic bacterial load is high, or the frequency of fermentable carbohydrate ingestion is excessive, the repair process will be too great for naturally-occurring salivary remineralization. These conditions can initiate a carious lesion clinically known as a “white spot” which indicates a loss of calcium and phosphate minerals in the subsurface zone in the presence of an intact enamel surface. White spot lesions are partially reversible provided the surface remains intact and a topical fluoride agent is directly applied.

Fluoride can enhance or accelerate remineralization of the partially demineralized surfaces of crystal remnants inside a carious lesion by adsorbing to the affected crystal surface. The negatively charged fluoride ions (F-) attract calcium ions (Ca+), followed by phosphate ions (PO4-). This leads to formation of a new crystal surface, stronger and less soluble than the carbonated hydroxyapatite mineral first laid down during tooth development, which is softer and more susceptible to acid attack. The newly formed crystal surface excludes carbonate (CO3-) ions during construction and the result is a composition with solubility somewhere between that of hydroxyapatite and fluorapatite. This newly remineralized fluorapatite-like surface has very low solubility, and future acid attacks would have to be substantial and prolonged in order to have a damaging effect.

CAMBRA and the Caries Balance Scale

The fundamental concepts used in the CAMBRA method of risk assessment can be illustrated using a balance scale. The general indicators and factors assessed are identified and grouped in three risk-related categories: disease indicators, risk factors, and protective factors. The balance mechanism and the placement of the subcategories on the scale reflect the nature and relative weight of the factors. Simply stated, if the protective factors outweigh the risk factors and disease indicators, it can be generally concluded that the patient has a low risk for future caries and that the process of remineralization will outweigh the progression of disease. The opposite conclusion could be reached if the disease and risk factors either outweigh or are judged equivalent to the protective factors, revealing a patient who is at high risk for demineralization and carious lesions the future.

Disease Indicators

The caries disease indicators are four observations obtained from a clinical examination of the patient that provide information about the caries history and activity.

- Visible white spots on smooth enamel surfaces
- Restorations placed within the previous three years
- Approximal radiographic lesions confined to the enamel
- Teeth with frank cavitations or radiographic lesions showing penetration into the dentin.

These observations are indicators that there may be disease present or that disease has taken place recently. It is important to remember that these indicators provide no causative factors and offer no treatment options. Rather, they describe clinical observations which, when taken together, strongly suggest that unless a nonsurgical, chemical treatment occurs, the disease process will continue. A positive finding in any one of the four disease indicators places the patient in the high risk category unless chemical intervention is already underway. A bacterial culture is strongly recommended in these individuals.

Caries Risk Factors

Caries risk factors are biologic indicators contributing to the patient’s level of risk for developing carious lesions in the future and for the progression of existing lesions. They not only reveal what circumstances and conditions are out of balance but at the
same time, also indicate what areas need to be addressed to correct the situation. The three risk group factors are:

- **Bad Bacteria**
- **Absence of Saliva**
- **Destructive Lifestyle Habits**

These groups represent the presence of acidogenic bacteria in the biofilm, inadequate salivary flow, and the number or type of destructive personal habits of the patient, all of which are interrelated to the caries disease process as well as to each other.

The first risk factor, “bad bacteria,” represents the effusive acid producers that initiate demineralization as discussed earlier. Moreover, the metabolism of sucrose by mutans streptococci creates a sticky substance called glucan, which facilitates the adherence of additional pathogenic bacteria to tooth surfaces. Interestingly, glucan can be stored intracellularly by some bacteria to provide energy in times of sugar shortage. This allows continual acid production over extended periods of time and maintains a lowered pH in the plaque.

The second factor, “absence of saliva,” not only plays a crucial role in remineralization and protection of the dentition, but an adequate salivary flow is also necessary to cleanse tooth surfaces, facilitate clearance of food particles, and prevent retention of sticky carbohydrates on and around the teeth. It follows that the absence of saliva facilitates plaque buildup, and the salivary components that provide the various protective functions are not present in sufficient quantities to be effective.

The third factor, “destructive lifestyle habits,” includes poor diet, the amount and frequency of fermentable carbohydrates is a key issue, recreational drug use and, poor oral hygiene to name a few. In the absence of disease indicators, the patient’s caries risk status is determined by the balance between these pathologic risk factors and the protective factors discussed next.

### Caries Protective Factors

The caries protective factors are biologic and therapeutic measures or conditions that can collectively offset the challenges presented by the caries risk factors. As in the nature of a balance scale, the number of protective factors needed to outweigh the risk factors for demineralization and disease progression will depend on the number and severity of the risk factors. Increased protective factors should adjust the patient’s risk toward a positive balance leading to remineralization, and reversal of any existing caries process. Currently, there are eleven protective factors for reducing caries risk. An individual’s overall caries risk is calculated by comparing the number of risk factors to the protective factors.

#### The Key Role of Fluoride

Fluoride is the one of the most effective caries prevention agents currently available. In addition to preventing demineralization and promoting remineralization, fluoride also inhibits bacterial growth provided that there are sufficient F- ions present in the saliva. This can be achieved by using 5000 ppm toothpaste, applications of fluoride varnish, and/or use of trays and 5000 ppm fluoride gel. Fluoride’s bactericidal action takes place when the F- ions combine with the positive hydrogen (H+) ions that have been produced by the bacterial plaque. The formation of hydrofluoric acid (HF) takes place when the pH in the plaque decreases as the bacteria produce an acidic environment, or H+ ions. The HF acid is then able to rapidly diffuse through the cell wall. Once inside the cell, additional HF ions are drawn inwards. The intracellular HF then dissociates again into H+ and F-, acidifying the cell and...
releasing fluoride ions which interfere with essential intracellular enzyme activities and causes apoptosis or cell death.3,5,12

It is also important to differentiate between the topical and the systemic effect of fluoride on enamel solubility. Sound enamel, generally contains fluoride at levels of approximately 20-100 ppm, depending on the fluoride ingestion that occurred during tooth development. Children who have been exposed to fluoridated drinking water may have a fluoride content toward the high end of this range.5,12 Yet fluoride incorporated during tooth development at the average levels of 20-100 ppm does not measurably alter the acid solubility of the mineral. However, topical applications which add as little as 1 ppm of fluoride to the acidic solution surrounding the enamel crystals, reduces the dissolution rate to that of fluorapatite and additional increases in fluoride will decrease the solubility rate logarithmically. Still, sufficient fluoride must be present and incorporated into a new crystal surface at the time of the remineralization process to beneficially alter enamel solubility. If fluoride is present in the plaque fluid at the time the bacteria generate acids, it will not only lay the foundation for calcium and phosphate ions to begin remineralization but travel with the acid into the subsurface enamel and adsorb to the crystal, providing some protection from dissolution.8-9 Regular exposure to fluoride is needed for good oral health throughout the lifespan.

**Translating CAMBRA Science into Practice**

CAMBRA is essentially a philosophy of care that can be adopted by an individual dental practice as a value-added service with mutual benefits for patients as well as the practice. The science behind CAMBRA was first introduced in 2003. Following its introduction, a consensus statement from national experts was developed along with CAMBRA guidelines and a suggested caries risk assessment (CRA) form.14 See Table 1 for CAMBRA guidelines developed for patients 6 years and older.

**Commitment of the Dental Team to CAMBRA**

CAMBRA begins with the dentist’s willingness to make the paradigm shift from surgically treating teeth to incorporating a chemical mode of therapy into the patient’s treatment plan. Recent outcomes from the UCSF CAMBRA study revealed a 20% reduction in new caries over time when practitioners used CAMBRA protocols5,12,15. These study results, in conjunction with the American Dental Association’s (ADA) evidence-based dentistry recommendations, support the implementation of CAMBRA into mainstream clinical practice for the reduction of new carious lesions.16 Dental hygienists, most often considered to be the prevention specialists in dentistry, are ideally positioned to take a leading role in the implementation process.

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**Table 1: CAMBRA Clinical Guidelines for Patients 6 years and older**

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Radiographs</th>
<th>Caries Risk Evaluation</th>
<th>Saliva Tests (flow and culture)</th>
<th>Antibacterials Chlorhexidine Xylitol</th>
<th>Fluoride</th>
<th>pH Control</th>
<th>Calcium Phosphate Supplements</th>
<th>Sealants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Bite-wings every 24 -36 months</td>
<td>Re-evaluate every 6-12 months</td>
<td>Baseline reference for new patients</td>
<td>Per bacterial culture</td>
<td>OTC fluoride toothpaste 2x day</td>
<td>Not required</td>
<td>Not required</td>
<td>Optional or per ICDAS protocol*</td>
</tr>
<tr>
<td>Moderate</td>
<td>Bite-wings every 18-24 months</td>
<td>Re-evaluate every 6-12 months</td>
<td>Baseline reference for new patients or if a high bacterial challenge is suspected</td>
<td>Per bacterial culture Xylitol gum or candies (6 -10 grams/day)</td>
<td>OTC fluoride toothpaste 2x day .05% NaF OTC rinse daily NaF varnish</td>
<td>Not required</td>
<td>Not required</td>
<td>As per ICDAS protocol</td>
</tr>
<tr>
<td>High**</td>
<td>Bite-wings every 6-18 months until no new cavitated lesions present</td>
<td>Re-evaluate every 3-4 months</td>
<td>Flow and culture at initial exam and every caries risk evaluation</td>
<td>Chlorhexidine gluconate 0.12% rinse 10ml 1 minute/day for 1 week/month Xylitol gum or candies (6 -10 grams/day)</td>
<td>1.1% NaF Rx toothpaste .2% NaF Rx rinse Fluoride varnish every 3-4 months</td>
<td>Not required</td>
<td>Calcium phosphate paste used several times/day</td>
<td>As per ICDAS protocol</td>
</tr>
<tr>
<td>Extreme***</td>
<td>Bite-wings every 6 months until no new cavitated lesions present</td>
<td>Re-evaluate every 3-4 months</td>
<td>Flow and culture at initial exam and every caries risk evaluation</td>
<td>Chlorhexidine gluconate 0.12% rinse 10ml 1 minute/day for 1 week/month Xylitol gum or candies (6 -10 grams/day)</td>
<td>1.1% NaF prescription toothpaste .2% NaF rinse Fluoride varnish every 3-4 months</td>
<td>2 tsp baking soda per 8oz water after meals Baking soda gum as needed</td>
<td>Calcium phosphate paste used several times/day</td>
<td>As per ICDAS protocol</td>
</tr>
</tbody>
</table>

* International Caries Detection and Assessment System ** One or more cavitated lesions *** One or more cavitated lesions with xerostomia
Review of the Guidelines

The dentist(s) and hygienists(s) must first review the CAMBRA protocols or guidelines (Table 1) and select an appropriate CRA form. While there are many CRA forms available on the market, such as the one adapted by the school of dentistry at the University of California, San Francisco (UCSF) shown in Table 2, dental practices may choose to create their own CRA form to meet their unique practice needs. Increased knowledge of the scientific basis underlying the CAMBRA philosophy along with the real world clinical patient outcomes may lead to ongoing refinements of the chosen CRA form.

Increased knowledge of the science underlying the CAMBRA philosophy and/or the clinical outcomes of the patients may require development and customization of a caries risk assessment form to suit the specific needs of the practice. Refinements to the form and implementation process can be made once the practice initiates CAMBRA.

Incorporating CAMBRA into Clinical Practice

Once a framework for implementing CAMBRA has been established, the practice can begin using CRA and the selected form, to determine the patient’s caries risk. The dental hygiene process of care provides an excellent framework for implementation and evaluation of the CAMBRA protocol.

The Dental Hygiene Process of Care

- Assessments
- Diagnosis
- Planning
- Implementation
- Evaluation
- Documentation

Data required to complete the CRA form can be gathered during the initial dental examination or during a dental hygiene care appointment. For existing patients, the hygienist may transfer data from the patient’s chart to a caries risk assessment form when reviewing charts at the beginning of the day. Medications with known oral side effects or health conditions impacting the patient’s ability to perform effective home care can be noted in advance for discussion with the patient. Information concerning additional caries risk factors can be obtained by reviewing the patient’s periodontal chart to note areas of recession and review previous oral hygiene instructions. The clinician should also review the dental charting, radiographs and treatment notes for disease indicators.

Table 2: UCSF CRA form

<table>
<thead>
<tr>
<th>Disease Indicators (clinical observations indicating the presence of dental caries disease)</th>
<th>Yes = Circle</th>
<th>Yes = Circle</th>
<th>Yes = Circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cavities/radiograph to dentin</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximal enamel lesions (E1, E2) (by radiograph)</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White spots on smooth surfaces (Eo)</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restorations a) last 3 years for new patient</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) last 12 months for patient of record</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk Factors (Biological predisposing factors)</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS and LB both medium or high (by culture** or ATP test greater than 4,000 - record actual reading)</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visible heavy plaque on teeth</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequent snacking (&gt; 3x daily between meals)</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep pits and fissures</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational drug use</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate saliva flow by observation or measurement (If measured note the flow rate below)</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saliva reducing factors (medications/radiation/systemic)</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposed roots</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthodontic appliances</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protective Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lives/work/school fluoridated community</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluoride toothpaste at least once daily</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluoride toothpaste at least 2x daily</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000 ppm F fluoride toothpaste daily</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluoride mouthrinse (0.05% NaF) daily</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluoride varnish in last 6 months</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office F topical in last 6 months</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorhexidine prescribed/used one week each of last 6 months</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xylitol gum/lozenges 4x daily last 6 months</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium and phosphate paste during last 6 months</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate saliva flow (&gt; 1 ml/min stimulated)</td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>**Bacteria/Saliva Test Results: MS: 6 LB: or 5 ATP test: Saliva Flow Rate: 0.7-1.6 ml/min. Date:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**VISUALIZE CARIES BALANCE**

(Use circled indicators/factors above)

EXTREME RISK = HIGH RISK + SEVERE XEROSTOMIA

CARIES RISK ASSESSMENT (CIRCLE): EXTREME  HIGH  MODERATE  LOW

Doctor Signature/#: _________________________________   Date: ___________
The Patient Interview

CAMBRA protocols may be introduced during the health history interview as part of the general assessment process for health promotion and disease prevention. Information relating to diet, snack and beverage choices, and destructive social behaviors should be obtained at this time. Using open-ended questions allows the clinician to build trust and rapport while providing an opportunity to ascertain the patient’s interest in improving their oral health status.

Intraoral Examination

The intraoral examination provides opportunity for the clinician to gather data relevant to caries disease indicators and risk factors, and document their findings on the CRA form. This is also a good time to determine the salivary flow rate. The saliva sample may also be used to culture for *streptococcus mutans* and *lactobacillus*. Disclosing the teeth at the beginning of the dental hygiene care appointment is an excellent educational tool in addition to providing a visual confirmation of the plaque index. A photograph of the disclosed teeth is also valuable as a benchmark for future comparisons of the patient’s progress. Initial assessments should also include the location and severity of decalcified areas, as well as any potential carious lesions.

Diagnosis

Once the assessments are complete, the clinician should determine the patient’s caries risk level based on the evidence and their clinical judgement. Although the saliva culture results will not be available at the time of the initial exam, there should still be sufficient data to determine the caries risk level.

Planning and Implementation

Once the CRA form is complete and the caries risk level determined (as shown in Table 2), the various treatment recommendations can be presented. At this point, the clinician would refer back to the CAMBRA guidelines (as shown in Table 1) to establish the product regimen, continuing care interval, and radiograph frequency that best meets the needs of the patient. As the dental practice becomes more proficient using the CAMBRA protocols, they will become as integrated into the practice’s standard of care as taking a medical history or completing periodontal assessments. A sample treatment plan for a high caries risk patient is described in Table 3.

<table>
<thead>
<tr>
<th>Table 3: Treatment Plan for a High Risk Caries Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Oral hygiene instruction emphasizing mechanical biofilm displacement</td>
</tr>
<tr>
<td>• Rx fluoride toothpaste (5000ppm) 2x day</td>
</tr>
<tr>
<td>• Avoid rinsing following application for maximum benefit</td>
</tr>
<tr>
<td>• Chlorhexidine rinse for 1 minute daily for 1 week each month</td>
</tr>
<tr>
<td>• Separate rinsing and the application of Rx fluoride toothpaste by at least 60 minutes due to the positive charge of the chlorhexidine and the negative charge of the fluoride ions</td>
</tr>
<tr>
<td>• Monthly reminders for rinsing may be sent via text or email</td>
</tr>
<tr>
<td>• Gum or candies sweetened with xylitol (6-10 grams/day)</td>
</tr>
<tr>
<td>• Additional use of a calcium phosphate paste for enhanced re-mineralization and xerostomia relief</td>
</tr>
<tr>
<td>• 3–4 month dental hygiene care interval</td>
</tr>
<tr>
<td>• Fluoride varnish application at each dental hygiene care appointment</td>
</tr>
<tr>
<td>• Annual bite-wing radiographs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4: Continuing Care for the High Caries Risk Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Review health history; noting medications with oral side effects</td>
</tr>
<tr>
<td>• Review the caries risk level</td>
</tr>
<tr>
<td>• Re-score and compare plaque index scores</td>
</tr>
<tr>
<td>• Review oral hygiene instructions; note what works and what does not</td>
</tr>
<tr>
<td>• Record any changes in the sites being monitored</td>
</tr>
<tr>
<td>• Review use of dispensed products</td>
</tr>
<tr>
<td>• Rx fluoride toothpaste</td>
</tr>
<tr>
<td>• Chlorhexidine rinse 1x week/monthly</td>
</tr>
<tr>
<td>• Xylitol products</td>
</tr>
<tr>
<td>• Calcium phosphate paste</td>
</tr>
<tr>
<td>• Consider any needs for treatment modification, dental hygiene care interval, or frequency of radiographs</td>
</tr>
</tbody>
</table>
Evaluation

Re-evaluation of caries risk should take place at each successive dental hygiene care appointment. Similar to the periodontal evaluation, CAMBRA provides the dental hygienist with a formal framework for documenting and evaluating a patient’s dental caries risk and opens the door for positive reinforcement of oral hygiene habits and continuing patient education. It also provides an opportunity to evaluate and adjust the patient’s oral health care program. While many of these procedures are probably already in place as part of a dental hygiene care appointment, specifically including CAMBRA as part of the dental practice’s standard of care enables the hygienist to address caries risk in the overall framework of health promotion and disease prevention.

Documentation

Regardless of whether the practice uses paper or electronic charting, the risk assessment form documenting the patient’s caries risk, recommended treatment, sites to be monitored, and oral care products dispensed must be included in the patient’s record. Color coded forms are easily identified if paper charts are being used. Caries risk forms can be scanned into electronic charting systems or be included in the treatment notes section of the chart. Depending on the dental software used, electronic systems may have the ability to provide pop-up alerts to notify the clinician of the patient’s caries risk status. There are also a number of tools and applications to assist with patient compliance to CAMBRA recommendations. Consenting patients may be sent customized electronic reminders or voice mail messages with specific instructions based on their CAMBRA treatment recommendations.

Conclusion

CAMBRA is a philosophy of care that plays a key role in the transition of oral health care models from a surgical repair process to one that is based in health and wellness. The CAMBRA guidelines have been designed to assist oral health care providers better manage the caries disease process that is prevalent in every level of our society. Comprehensive risk assessment, as detailed in the CAMBRA protocols, plays a vital role in the development of effective, targeted disease prevention tools for providing excellent patient care. Because every dental practice is unique, interpreting and implementing CAMBRA will vary according to the unique needs of the individual practice population. There are many ways to create a CAMBRA program and the protocols are evolving continuously based on innovative scientific research and new preventive therapies. The authors hope that by providing information about CAMBRA and the underlying science, that they are able to initiate the conversations that will support the adoption of CAMBRA and lay the foundation for the dental practice of the future.

References available on page 36

About the Authors

Karan Bershaw has been a practicing dental hygienist since her graduation from Oregon Health Sciences University in 1998. She has worked in a variety of private practices, participated in a practice-based research network and continues to be involved in many CAMBRA associated endeavors. She received her Master of Science Degree in Dental Hygiene from the University of California, San Francisco. Karan currently works in a private practice in Berkeley, CA.

Cheryl Ann Davis is an assistant clinical professor in the Master of Science Program, Department of Preventive and Restorative Dental Sciences, University of California, San Francisco. She received a juris doctorate degree from University of Tennessee School of Law, Knoxville, and worked for three years as a judicial clerk for a judge sitting for the Tennessee Court of Criminal Appeals and is a licensed attorney in the state of California. She received a baccalaureate degree in environmental science from East Tennessee State University and has worked for fifteen years as a clinical dental hygienist in northern California. Her passions also include education, research, and her work as a volunteer in various local programs assisting underserved communities.
Home Study Correspondence Course

“CAMBRA: From Research to Practice”

2 CE Units – ADHA/CDHA Member $25, Non-member $35

Circle the correct answer for questions 1-10

1. CAMBRA is an acronym for ____________________.
   a. Caries and microbial risk assessment.
   c. Caries management by risk assessment.
   d. None of the above.

2. Which of the following is true about the white spot lesion?
   a. The surface enamel is intact
   b. It is a clinical sign of early caries
   c. It can be reversible
   d. all of the above

3. Which of the following are the primary causative agents necessary to initiate the caries process?
   a. Lactic and propionic organic acids
   b. Mutans streptococci and lactobacillus
   c. The red complex bacteria
   d. Lack of salivary flow and frequency of carbohydrates

4. The CAMBRA disease indicators include: white spot lesions, approximal radiographic enamel caries, frank caries, and restorations placed within__________.
   a. the previous three years.
   b. the previous five years.
   c. the previous seven years.
   d. the previous ten years.

5. Remineralized enamel crystals are__________________.
   a. more susceptible to acid attack and stronger.
   b. less susceptible to acid attack and weaker.
   c. more susceptible to acid attack and weaker.
   d. less susceptible to acid attack and stronger.

6. Use of fluoride in caries prevention strategies includes which of the following benefits?
   a. Inhibits demineralization
   b. Promotes remineralization
   c. Inhibits bacterial growth
   d. All of the above

7. CAMBRA caries risk factors include which of the following?
   a. Exposed root surfaces
   b. Recreational drug use
   c. Inadequate salivary flow
   d. Frequent carbohydrate snacks
   e. All of the above

8. CAMBRA caries protective factors include all of the following EXCEPT one?
   a. Use of fluoride toothpaste at least twice daily
   b. Daily use of dental floss
   c. Live, work or go to school in a fluoridated community
   d. Use of calcium and phosphate supplemental paste during the past 6 months

9. Saliva plays a vital role in remineralization by:
   a. Neutralizing the acids and raising the pH
   b. Neutralizing the acids and lowering the pH
   c. Providing a saturation of calcium and phosphate ions
   d. Both a and c

10. Evidence based studies research indicate that the use of CAMBRA protocols result in:
    a. A 10% reduction in new caries over time
    b. A 20% reduction in new caries over time
    c. A 30% reduction in new caries over time
    d. A 50% reduction in new caries over time

The following information is needed to process your CE certificate. Please allow 4 - 6 weeks to receive your certificate. Please print clearly:

ADHA Membership ID#: ________________________ Expiration:___________ ❑ I am not a member
Name: __________________________________________ License #: ______________________
Mailing Address: ______________________________________________________________________
Phone: ___________________________ Email: __________________________ Fax: ______________________
Signature: _____________________________________________________________________________

Please mail photocopy of completed Post-test and completed information with your check payable to CDHA:
1900 Point West Way, Suite 222, Sacramento, CA 95815-4706
Strategies and Products for Real World Applications of CAMBRA

Starting the Conversation

The key to successful implementation of CAMBRA is the commitment and collaboration of the entire dental team. Patients interact with numerous members of the office staff; therefore, all members of the dental team need to have a working knowledge of the science underlying CAMBRA, as well as the chemotherapeutic tools the practice has chosen to support the caries risk diagnosis. However, before the supporting staff members can be brought into the planning and implementation process, it is important that the dentist(s) and hygienist(s) are in agreement about the underlying CAMBRA science and the long-term benefits for the patients as well as the practice. Establishing a CAMBRA protocol will take an initial investment of time along with a dedicated team approach. A suggested plan for discussing and implementing CAMBRA in the dental practice is outlined in Table 1.

Time Constraints

Including all members of the dental team in CAMBRA can ease the time crunch clinicians cite as a barrier to implementation. Dental assistants may perform the salivary tests or apply fluoride varnish. Knowledgeable front office staff can answer questions about the products dispensed and the rationale supporting CAMBRA, and explain the cost benefits of the program.

CAMBRA Products

Once the dental practice team has decided to implement CAMBRA, it is helpful to have guidance on making selections from the various products offered and designed for use in the protocol. New products are constantly being developed. Oral health care providers need to stay abreast of the current products available and their mode of action in managing dental caries.

A Word about Office Dispensed Products and Self Care Agents

Research shows that more than two-thirds of the patients given a prescription for dental therapeutic agents do not fill their prescriptions.¹ To facilitate compliance with any proposed caries management treatment plan, the dental practice may consider dispensing the most frequently recommended items directly to the patient, e.g., 5000 ppm fluoride toothpaste and chlorhexidine rinse. Successful management of dental caries requires education and motivation on the part of the patient regarding use of the products recommended in the manner prescribed by the clinician. New products are constantly coming to the marketplace. Oral health care providers need to keep current on the various kinds of products available and their mode of action in the management of dental caries.

Recommended Self-Care Agents

Antibacterials

Chlorhexidine 0.12% Rinse is an antiseptic, antimicrobial oral rinse that provides protection against a wide range of bacteria by binding to the bacterial cell wall. At low concentrations this results in a bacteriostatic effect; at higher concentrations the membrane disruption results in cell death.

Xylitol, a sweetener used in gums or candies, is a 5-carbon sugar-alcohol that inhibits the growth of bacteria. Xylitol converts to xylitol phosphate inside a bacterial cell, which interferes with its metabolism and causes a reduction in acid production and an increase in intercellular toxicity, leading to the cell’s eventual starvation and death. Recommended dosage is 6-10 grams of Xylitol per day.

Table 1: CAMBRA Implementation Guidelines

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Topic</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dentist(s) and hygienist(s)</td>
<td>CAMBRA guidelines and supporting science; Caries risk assessment (CRA) form</td>
<td>Basic understanding of CAMBRA guidelines and supporting science; framework for implementation developed</td>
</tr>
<tr>
<td>2. Entire staff</td>
<td>Intro to CAMBRA guidelines, science and use of CRA form</td>
<td>Achieve working understanding of CAMBRA risk assessment principles and supporting science; implementation plan discussed/reviewed</td>
</tr>
<tr>
<td>3. Dentist(s) and hygienist(s)</td>
<td>Review CAMBRA implementation plan and procedures</td>
<td>Successes and challenges to the proposed implementation process identified; discussed feasible solutions to potential barriers using case scenarios</td>
</tr>
<tr>
<td>4. Entire staff</td>
<td>Review CAMBRA guidelines, science, and implementation plan</td>
<td>Successes and challenges to successful implementation process discussed; action plans with agreed upon solutions to identified barriers developed</td>
</tr>
<tr>
<td>5. Quarterly staff meetings</td>
<td>Review CAMBRA implementation process</td>
<td>Shared experiences with CAMBRA protocol and review of successes; suggestions for improvement noted and solutions discussed</td>
</tr>
</tbody>
</table>

Continued on Page 18
Dilute sodium hypochlorite solution inactivates crucial bacterial enzymatic activities and interferes with cellular metabolism. It can be prepared by combining 2 teaspoons of household bleach per 8 oz. of water and is used as a rinse in a water flosser, twice a week.

**Fluoride Products**

**5000 ppm Fluoride Toothpastes and Gels** (e.g., Prevident) are dental caries preventive products containing 1.1% sodium fluoride and are available by prescription. They are easily applied with a toothbrush are usually recommended for daily topical use, 1-2 times per day. Patients should be advised to spit out the excess product after brushing and not to rinse following the application.²

**0.2% Sodium Fluoride rinses** are available by prescription. Typically the patient is instructed to swish 10 ml (2 teaspoons) of product for one minute, once a week, and not to eat, drink, or brush their teeth for a minimum of 30 minutes afterward.

**0.05% Sodium Fluoride Over-the-Counter (OTC) rinses** contain 225 ppm of sodium fluoride and are useful to help teeth resist acid dissolution and to enhance remineralization. OTC rinses are not recommended for high caries risk patients.

**Other Topical Agents**

**Calcium Phosphate Paste**, also known as Minimal Intervention (MI) Paste is a water-based, sugar-free cream containing calcium and phosphate. It also contains RECALDENT™ a milk-derived phosphopeptide, which binds calcium and phosphate ions to the tooth surface, helping replace some of the minerals lost during demineralization. MI Paste™ comes in a tube and is also available as MI Paste Plus™, which contains 900 ppm fluoride.³

**Professionally Applied Chemotherapeutic Agents**

**Fluoride varnishes** have practical advantages over gels in ease of application, less offensive taste, and the need to use only small amounts. Varnishes are applied with a brush and set in seconds in a moist environment. While the concentration and form of fluoride can vary depending on the manufacturer, most fluoride varnishes contain 5% sodium fluoride.

**Silver Diamine Fluoride (SDF)** is similar to fluoride varnish in that it helps transform demineralized hydroxyapatite into fluorapatite, but the fluoride ions in 38% silver diamine fluoride contribute additional modes of action. Silver ions have a deleterious effect on multiple bacterial biological functions, including DNA replication, maintenance of cell wall integrity, and respiratory functions. Application of SDF to a carious lesion produces a darkening of the tooth structure, however, indicating arrest of the active caries process and is considered a primary disadvantage of its use. Sound enamel is not discolored, and use of SDF in the primary dentition is less of an esthetic issue.

**Fast Facts for Frequently Asked Questions**

Oral health care providers should be prepared to provide straightforward, quick answers to patient’s questions about the various products and recommendations that are part of the CAMBRA philosophy.

- Community water fluoride concentration ranges from 0.7 – 1.2 ppm (Approximately 1 mg fluoride per liter of water)⁴
- Over-the-counter (OTC) fluoride toothpastes contains 1,000 - 1,100 ppm sodium fluoride or stannous fluoride
- Prescription fluoride toothpastes contain 5,000 ppm sodium fluoride (a thin ribbon contains approximately 2.5mg fluoride)
- OTC fluoride rinses contain 0.05% or 230 ppm sodium fluoride
- Prescription fluoride rinses contain 0.20% or 920 ppm sodium fluoride
- 5% Fluoride varnish contains 22,800 ppm sodium fluoride
- Recommended amounts of OTC fluoride toothpaste for children:⁵
  - From the eruption of the first tooth to 3 years: a slight smear, the size of a grain of rice
  - 3 to 6 years: a pea sized amount of toothpaste

**References**

CAMBRA: Applications in Public Health

According to the World Health Organization (WHO), and the Center for Disease Control and Prevention (CDC), dental caries remains a major epidemic facing people of all ages and in all areas of the world. Over the last decade, the management of dental caries has evolved from simply surgically treating the decay cavity to the utilization of a clinically-based, Caries Management by Risk Assessment (CAMBRA) program. CAMBRA assesses patient risk factors, while also evaluating local and contributing factors. Once the patient assessment is completed, behavior modifications can be introduced and preventive products can be recommended to manage caries risk and enhance enamel remineralization. Through the integration of a CAMBRA protocol, the assessments performed by health care professionals can help meet the initiatives of the WHO and CDC by preventing tooth decay through applied science and health promotion strategies.

Dental Caries: A Public Health Issue

Despite advancements in science, dental caries is the most common oral disease seen in public health dentistry, and caries continues to be a worldwide health concern. According to the National Health and Nutrition Examination Survey, dental caries remains one of the most common oral diseases affecting the nation's children. Despite advancements in science, dental caries is the most common oral disease seen in public health dentistry, and caries continues to be a worldwide health concern.2

The National Maternal and Child Oral Health Resource Center (OHRC) supports health professionals, program administrators, educators, policymakers, and others with the goal of improving oral health services for infants, children, adolescents, and their families. The OHRC's most recent edition of “Bright Futures in Practice: Oral Health Pocket Guide” provides health professionals with an overview of preventive oral health supervision including information about risk assessments and resources.

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pre- and postpartum maternal strategies designed to reduce maternal MS and lactobacilli levels through lifestyle counseling and therapeutic interventions.10

**Caries Risk Assessment in the Pediatric Public Health Setting**

An individualized risk assessment of an infant or toddler for developing caries serves as the foundation for health care providers and parents/caregivers to identify and understand the child’s ECC (Early Childhood Caries) risk factors. The specific information gained from a systemic assessment of caries risk guides the practitioner in all aspects of the process of care for children already suffering from dental disease and those deemed at risk. For optimal outcomes, caries risk assessment should be done as early as possible and preferably, prior to the onset of the disease process.11

Risk factors are determined following an interview with the parent and a clinical assessment of the child. The assessment interview should explore any predisposing risk factors that contribute to the development or progression of caries. Examples of these risk factors include recently placed dental restorations or active caries in the mother, low health literacy of caregiver and frequent intake of fermentable carbohydrates by the infant or child.

Assessing each patient for disease indicators, risk and protective factors with the goal of determining current and future dental caries risks, is at the heart of the CAMBRA philosophy of care.12 Caries Risk Assessment (CRA) is a critical component of dental caries management and should be considered a standard of care as part of any dental screening in public health settings. The CRA provides the clinician with essential guidance for comprehensive patient care. Using CRA will lead to increased cost-effectiveness and greater success in treatment compared with the more traditional approach of providing identical treatments to all patients, independent of their risk.13

**Adopting CAMBRA in Public Health Settings**

Public health dentists have often indicated that many patients do not show any enthusiasm when CAMBRA protocols are introduced to them. This may be due to the realization that implementing risk reduction strategies may mean more frequent re-care visits with preventive therapies. Extra appointments may put undue stress on the limited resources of individuals and families at the highest risk.14

Looking outside of the traditional points of entry for dental care has created new opportunities for accessing populations at highest risk for dental caries. In 2007 as part of a Maternal and Child Health Bureau, Health Resources and Services Administration targeted oral health systems grant, the Center for Oral Health (COH) created a powerful solution to preventing dental disease in low income children. Working together with the United States Department of Agriculture’s Special Supplemental Nutrition Program for Women, Infants and Children (WIC), the COH developed the WIC: Early Entry into Dental Care program to provide dental care on site at WIC centers. By providing dental care on

Founded in 1985, the Center for Oral Health (COH) is a non-profit organization dedicated to promoting public oral health, with a focus on children and vulnerable populations, through innovation, education, research and advocacy. COH collaborates with national, state, and local partners to develop innovative community-based strategies for improving oral health outcomes. **WIC: Early Entry into Dental Care** is a guidebook for anyone interested in establishing a WIC dental program. [www.centerfororalhealth.org/publications/guidebooks.html](http://www.centerfororalhealth.org/publications/guidebooks.html)

On June 29, 2015 the First 5 Sonoma County Commission, Community Action Partnership (CAP) and Women, Infants, Children Supplemental Nutrition Program (WIC) celebrated 10,000 preventive dental visits at WIC clinics for children ages 0 to 5. The WIC Dental Days program has counseled over 2,000 parents annually on effective preventive behaviors for children including dental assessments, parent education, fluoride varnishes and on-site treatment coordination since its inception in 2009.

“The strong partnership between First 5, the Department of Health Services (DHS) WIC Program, and CAP demonstrates the clear success of a holistic approach to reducing health disparities in our community,” stated Sonoma County Supervisor Efren Carrillo. This collaborative effort is a simple yet powerful solution to the problem of preventing dental disease in children from low-income families.
site at WIC, health care providers are able to intervene at an age when dental disease can be effectively prevented. Collaboration with public health clinics, dental care providers and WIC staff also helps to ensure that oral health education and services are both culturally competent and language appropriate for the population served. This collaborative effort also supports the shared goal of promoting nutrition and feeding practices that contribute to both oral and systemic health. As a result of their experiences with this unique collaboration, the COH has developed a manual for organizations interested in establishing their own WIC dental programs.

Conclusion

Oral health care providers have a critical role in preventing and reducing the severity of early childhood caries. Therefore, embracing the concepts of CAMBRA, early establishment of a dental and medical home, and integrating the recommendations within the family home practices are essential. The “medical model,” where the etiologic disease-driving agents are balanced against protective factors, in combination with risk assessment, offers the possibility of patient-centered disease prevention and management. The implementation of CAMBRA in public health settings can help break the cycle of dental disease in high-risk families and reduce the burden of disease. Collaboration with our partners in health care will be key to the successful implementation of CAMBRA for the populations at highest risk for dental caries.

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About the Author

Ashlynn HaMy Le, RDH, MA, holds a bachelor’s degree in dental hygiene from the University of Southern California-Ostrow School of Dentistry and a Master’s degree in Health Care Administration from Ashford University. She became a member of the clinical faculty at USC following her graduation from the dental hygiene program in 2008. In 2010 Ashlynn joined the faculty at West Coast University where she now holds the title of Assistant Professor with teaching responsibilities that include dental embryology, histology and anatomy along with advanced topics in dental hygiene and community dental health.
Hypertension, tachycardia, poorly controlled diabetes, non-compliance with medications – these are all health conditions that dental hygienists encounter on a daily basis when delivering patient care. As dental hygiene students, we are taught how to thoroughly review the health history for all patients, particularly for individuals with complex medical conditions. With each patient in clinic, we question ourselves, “Is this patient’s health stable enough for elective dental care?” If the answer is no, the patient is simply given an explanation of the risks involved with treatment and dismissed. As students, we are obliged to follow the rules for patient care that have been clearly defined by our program faculty so it is fairly easy to make these types of black or white decisions. However, as registered dental hygienists out in the real world, dismissing patients who are considered to be at risk for a medical emergency, or altering a dental hygiene care plan, often presents an ethical dilemma.

Do we, as health care providers, focus our decision making process based on the needs of the patient or what is best for the business of the dental practice? In many situations the dentist or office manager will try to determine a patient’s care plan regardless of their specific medical condition or unique oral health needs. Faced with these situations, do we compromise our ethics and all that we have learned, just to keep our job?

Thinking about the ‘what ifs’ and making a plan for working through these ethical dilemmas will make it easier to face possible challenges in the near future. As new graduates, we will most likely be working in a variety of settings before we find the right match for our personal philosophy of practice. The challenges we may face will go far beyond the patient who needs to be re-scheduled for a medical consultation. Some practices may over treat a patient’s particular oral conditions based on what the insurance will pay. At the opposite end of the spectrum, a dentist may undertreat dental disease and insist on watching obvious areas of decay. What about the situation where the patient has been coming in for regular dental hygiene care and you discover ledges of sub-gingival calculus? Looking beyond direct patient care, what about the ethical behavior of our co-workers? Suppose everyone orders a beer with pizza for lunch? Will you join in, too?

If every situation were a case that could be read in a textbook, critical thinking and decision-making would not be so difficult. Our code of ethics would be easy to follow. However, in spite of the fact that the dentist/employer is the practice owner and bears the responsibility for the well-being of their patients, the hygienist is also held legally responsible for the care they deliver. Developing a method for ethical decision making is essential for every dental hygiene student preparing to enter the real world. The six-step model for ethical decision making described by dental hygiene educator and author, Phyllis L. Beemsterboer, RDH, MS, EdD, is a useful tool when facing difficult decisions no matter what the setting.

Consider the following scenario: A newly hired dental hygienist completes assessments on a patient who is new to the practice. The hygienist discovers that the patient has a number of 6 and 7mm pockets and detectable subgingival calculus. The hygienist treatment plans for quadrant scaling and root planing (SRP). However, the dentist calls the hygienist aside and informs her or him to just do a “prophy” since he does not want the patient to be in any pain, especially a new patient. What should the hygienist do now?

1. **Identify the Ethical Dilemma or Problem:** The dentist’s request presents an ethical challenge between informing the patient of their periodontal condition and offering the appropriate treatment options or providing a superficial treatment or “prophy”.

2. **Collect Information:** Gather facts from multiple sources, if necessary along with any additional information that is pertinent to the situation. In this example, the hygienist will need to review the findings of the patient assessments to confirm that the patient needs for SRP. The hygienist should also gather information about any other constraints that may prevent them from receiving the treatment that they need. The hygienists should also inquire about the practice’s periodontal therapy program or any office protocols.

3. **State the Options:** This is where possible solutions are discussed and different options are considered. This may involve opinions from all approaches. In this scenario, the hygienist has the option of offering the comprehensive SRP or following the dentist’s/employer’s request to just do a “prophy”.

4. **Apply Ethical Principles to the Options:** This step thoroughly reviews all of the options suggested, taking into consideration ethical principles such as autonomy, beneficence, nonmaleficence, and justice. Ethical values are also considered and ensure that no principles are violated. The American Dental Hygienists’ Association Code of Ethics, is a good guide...
to assist in this process. In the case of the SRP versus the prophy, the two courses of action are considered in regards to what action is in the best interest of the patient. It is important to also consider the ethical principles of patient autonomy in the decision making process in addition to nonmaleficence, or patient harm.

5. Make the Decision: After all areas of interest have been discussed, a decision can now be made. The clinician should always review the final decision, to ensure that it does not conflict with any ethical principles. In this scenario, a decision would need to be made between offering the hygienist’s comprehensive periodontal treatment plan and the dentist’s plan of a superficial prophy.

6. Implement the Decision: This is where the decision is executed. In this case regarding treatment planning, after weighing the options, the hygienist needs to execute the decision she or he has made in regards to presenting a comprehensive periodontal care plan.

Ethical conflicts can and will occur throughout our professional lives. As dental hygienists, and licensed health care providers, we have a responsibility to protect the best interests of the patients in our care. Learning how to use a decision making tool, such as the six-step model, can be helpful throughout our professional lives as we are faced with the ethical dilemmas and difficult decisions that can impact our careers and the patients entrusted in our care.

About the Author

Mira Khodor is a member of the class of 2016 at the University of the Pacific, Arthur A. Dugoni School of Dentistry in Stockton, California. She holds a bachelor of science degree in neuroscience from the University of California, Riverside (UCR). As an undergraduate, Mira was active in a number of community service organizations and was the co-founder of the UCR Dental Hygiene Program, an organization responsible for collecting and distributing oral hygiene supplies to children. Mira’s future plans include completing the RDHAP program and working with the underserved.

References


Members of the Foothill College Dental Hygiene Program’s class of 2016, traveled to Vietnam over the winter break in December, to provide dental care to underprivileged children living in the country’s orphanages. Inspired by the school’s annual Medical Brigades trip to Honduras, members of the class of 2016, under the leadership of student coordinator Diana Ngo and her mother Cindy Ngo, planned a trip to schools and orphanages on the outskirts of Ho Chi Minh City. The students spent months prior to their departure fundraising and collecting donated supplies for the trip.

Makeshift clinics, consisting of lawn chair recliners, wooden benches and plastic stools, were created at each of the four sites that the students visited. The students, along with program director, Phyllis Spragge, faculty member Dr. Ken Horowitz and Vietnamese dentists were able to provide dental hygiene services, fluoride varnish applications and emergency dental care for 1,140 children and their caregivers. Hot, humid weather did not deter the 16 student volunteers as they set up for each day’s group of children. The dental hygiene students were able to provide patient education about plaque, brushing and flossing on iPads with the instructional videos they made before the trip. Despite the language barriers, the children were able to understand the universal language of the caring smiles of the student hygienists as they received dental care, education and an over-riding sense of friendship. The overall experience of the trip left lasting impressions and memories on the student volunteers and improved the oral health of children who had never had any access to dental care.
Improving Oral Hygiene Compliance with a Smartphone App

Tools designed for enhanced patient education and communication have been evolving throughout the years. Commercially produced anatomic models for demonstrating oral disease processes and therapeutic interventions, the foundation of patient visual education aids, date back to the 1950’s or earlier. Currently, smartphones have great potential to enhance patient education and concurrently build rapport. Smartphone technology presents the modern health care professional with unlimited opportunities for integration of these tools into clinical practice. Health care providers, including dental hygienists, should be encouraged to use this new technology with their patients.

A smartphone is a fairly recent advance of the mobile phone, which has been used world-wide, for several decades. Smartphones offer standard services, such as voice and text communication, and also have the capability of performing many of the same functions of a computer, including internet access and mobile applications. An application, also known as an “app”, is typically a small, specialized program that can be downloaded onto a mobile device. In comparison to earlier mobile phones, newer smartphones generally have larger display screens, and feature high resolution graphics. It is safe to say, that the majority of the population owns some type of mobile communication device. These mobile phones are used multiple times, over a 24 hour period, for answering calls, sending and receiving text messages and emails, and last, but not least, navigating social media.

Smartphones and Oral Health Education

Patient compliance with a smartphone app is thought to be more convenient due to the fact that the individual is able to utilize the app directly from their smartphone therefore eliminating the need for separate device or system. Reminders and prompts for new behaviors or habits can be customized for the individual. However, it is important to keep in mind that multiple reminders delivered via a smartphone also run the risk of being ignored, which may impact long-term adherence.

Ultimately, the patient is responsible for compliance on a daily basis and adherence to the prompts or instructions is voluntary. Customized messages based on the patient’s previous habits and unique chairside instruction take-away points that can be programmed into the smartphone app, are being developed for the future. In general, the range of health apps has increased dramatically recently, demonstrating the consumer demand for more high quality apps, and supporting further research and development efforts. This growing interest in health apps can benefit both the professional and the consumer. In a recent study conducted by the University of Plymouth, researchers concluded that a dental hygiene app contributed to increased motivation for young people to care for their teeth more effectively, suggesting that dental apps have an enormous potential for delivering important health messages and information.

Time Constraints during Dental Hygiene Care Appointments

Oral hygiene education and instructions, key components in the prevention of tooth decay and periodontal disease, are essential features of the dental hygiene care appointment. However, these critical components are often the first things to be dropped from the care appointment due to time constraints and over scheduling. Short-changing the time needed for adequate self-care instructions presents the clinician with a number of challenges. Non-compliance can be due to a variety of reasons ranging from an overall lack of awareness of the role oral hygiene plays in general health to physical impairments. Any sort of change in compliance with daily oral hygiene habits requires an understanding of each patient’s unique needs and challenges and supervised instruction of the appropriate skills; tooth brushing, interdental cleaning, and adjunctive therapies.

From Research to Practice

In 2007 researchers’ found the following among the 179 dental hygienists who participated in an anonymous questionnaire regarding their routine oral hygiene instruction (OHI) methods:

- 55% provided OHI at every appointment
- 41% provided OHI at continuing care appointments
- 4.5% only provided OHI at the first appointment

The researchers went on to demonstrate that patients who received routine OHI had better plaque scores and reduced gingival inflammation, (no bleeding on probing) as compared to those who did not receive OHI.
Motivational Interviewing and Oral Health Education

Oral hygiene has been defined by Wilkins as “the personal maintenance, cleanliness and preservation of the oral cavity once professional instructions are given.” Oral hygiene was once professional instructions are presented, it is the responsibility of the patient and the professional to confirm mutual understanding; without mutual understanding, non-compliance can be inevitable.

For some individuals, instructions alone are adequate to maintain oral compliance; for others, the use of motivational interviewing (MI) can promote positive habit formation. MI has been effectively used to promote oral health behavior in dentistry. Previous models were based on the premise that if the individual knew why oral care was important such as, “If you don’t floss you will lose your teeth!”, they would follow the instructions. Principles of MI allow the individual to explore their need for health change. Asking systematic, open-ended questions as a means for determining the strength of an individual’s motivation for change provides an ideal role for the dental hygienist as a co-partner in the change process.

While motivational interviewing alone can be beneficial for initiating behavior change, adding the power of a smartphone app for ongoing education and feedback can dramatically influence oral hygiene compliance. According to the 2015 Plymouth University study, dental hygiene apps demonstrated a positive effect across four main themes: motivation, education, compliance and perceived benefits. Clinicians should consider recommending an appropriate dental hygiene smartphone app along with any other oral hygiene products as part of their comprehensive patient education program.

Smartphone Oral Hygiene Applications

The smartphone app market is constantly changing. We have chosen several products to highlight and encourage continuous review of new apps and their unique features as they become available in order to provide optimal patient care.

Brush DJ, a free app available for Google and iOS smartphones, works by allowing the user’s smartphone to be used as a personalized disc jockey. The toothbrush timer app plays 2 minutes of music taken from the user’s device to encourage brushing for an effective length of time. The app also allows users to set reminders to brush twice a day, floss, use a mouthrinse and when next to see their dentist or hygienist.

Oral B App, a free app available for Google and iOS smartphones, works in conjunction with Bluetooth compatible Oral B power toothbrushes. This app provides the user with a toothbrush timer to encourage the effective brushing time of two minutes. The user can program an oral hygiene routine; the app can then track, and chart the user’s progress and goals. The user can also be interactive within the app, while brushing, the app allows the user to check the weather, scan the news and check their calendar.

A kid-friendly app, Disney Magic Timer by Oral B, allows the user to become interactive with the app. Not only does it encourage the effective length of time for brushing, it also allows the user to brush away a hidden Disney image, and does not reveal the image until the two minutes of brushing has been completed. Children can collect stickers or rewards from favorite Disney characters and place them in a rewards album to track their progress. This product must be used with a Crest or Oral B Pro-Health Stages product, which encourages a fun experience for children while brushing.

Conclusion

Tools for patient education and health care provider/patient communication are definitely coming of age in the 21st century with new technologies. Smartphone apps provide clinicians and consumers powerful options for overcoming numerous obstacles for increased opportunities for high quality oral health education, improved self-care and ultimately better overall health.

Test out an app on your smartphone today!

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“Improving Oral-Hygiene Compliance with a Smartphone App” was first prepared as a student research poster for the California Dental Hygienist’s Association Spring Scientific Session and the American Dental Hygienists’ Association’s Center for Lifelong Learning (ADHA CLL) in 2015. The poster presentation was awarded second place at the ADHA CLL in Nashville. West Coast University Associate Professor, Aubréé M. Chismark, RDH, MS, was the faculty advisor for this research project.

About the Authors

Karen Erfe, RDH, BSDH is a 2015 graduate of West Coast University in Anaheim, CA. While at WCU, Karen gained a particular interest in the creative and artistic aspects of dentistry and is currently working towards her doctor of dental surgery degree. Karen now resides in San Francisco, CA.

Berenice Gaona, RDH, BSDH, graduated from West Coast University in 2015 and began practicing dental hygiene near her home town, Corona, CA. She has since relocated to Central California where she enjoys volunteering in the community. Berenice is a proud member of ADHA and her future plans include continuing her interest in dental hygiene research while pursuing her Master’s degree in dental hygiene.

Kim Jenkins, RDH, BSDH, graduated from West Coast University in 2015. As a student she received the Colgate Student Total Achievement Recognition award. She is currently practicing in Los Angeles, CA and is passionate about working with community health organizations such as Care Harbor Los Angeles and Regional Area Medical. Kim is a member of ADHA and CDHA San Gabriel Valley component.

Ingrid Mazariegos, RDH, BSDH, graduated from West Coast University in 2015 and is currently practicing clinical dental hygiene in Los Angeles, CA. Ingrid is passionate about educating patients on the link between oral health and systemic health. She is currently a member of ADHA and CDHA Los Angeles component.
Incorporating CAMBRA into the Dental Hygiene Curriculum

Caries risk assessment is a critical component of caries management and should be considered standard of care as part of the dental examination. Dental hygienists play a key role in incorporating CAMBRA into the clinical setting and in general, agree that determining a patient’s risk for caries can predict future disease. However, hygienists report that their practices either do not follow CAMBRA protocol or that they assess caries risk in ways that are not part of CAMBRA. While many dental hygienists reported that time and cost of products were not necessarily barriers to incorporating CAMBRA into their daily practice, they also stated that they were not aware of their dentist employer’s knowledge of the CAMBRA protocol, nor were they aware of their opinions on how to incorporate CAMBRA into practice. While dental schools across the country have adopted a variety of CAMBRA protocols into the clinical setting, it is not known whether this exposure during school is influencing implementation to practice after graduation. Studies discussing the impact of integrating CAMBRA into the dental hygiene curriculum have not yet been reported in the literature, however it seems reasonable to assume that by incorporating CAMBRA across the dental hygiene curriculum, dental hygienists will be well positioned to take a leadership role in promoting this treatment model.

Integration of CAMBRA into the Dental Hygiene Curriculum

Even though CAMBRA is not a dental hygiene curriculum requirement by the Commission on Dental Accreditation, teaching dental hygiene students CAMBRA and its principles should be integrated throughout their education. Dental hygiene students can be introduced to CAMBRA from the beginning of the curriculum in pre-clinical classes and labs. The entry level student can learn about the caries balance/imbalance concept, practice using the caries risk assessment tools such as Caries Risk Assessment (CRA) forms and discuss the various treatment interventions using the SAFER protocols designed for patients 6 years through adult, outlined in Table 1.

Table 1: SAFER Protocols for Patients 6 Years through Adult

<table>
<thead>
<tr>
<th>Caries Risk Level</th>
<th>S</th>
<th>A</th>
<th>F</th>
<th>E</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>Sealants</td>
<td>Saliva</td>
<td>Antibacterials</td>
<td>Fluoride (Topical)</td>
<td>Factors favorable for remineralization (pH, Ca²⁺ &amp; PO₄³⁻)</td>
</tr>
<tr>
<td></td>
<td>Not indicated</td>
<td>Optional baseline testing.</td>
<td>Not indicated</td>
<td>OTC fluoride toothpaste 2x/day</td>
<td>Areas of recession may indicate need for supplementation.</td>
</tr>
<tr>
<td>Moderate Risk</td>
<td>Measure resting and stimulated flow and pH.</td>
<td>Xyitol therapy at least 2-3 x/day.</td>
<td>OTC fluoride toothpaste 2x/day</td>
<td>OTC fluoride rinse 2x/day</td>
<td>Low resting pH, low salivary flow may indicate need for supplementation</td>
</tr>
<tr>
<td>High Risk</td>
<td>Effective caries prevention.</td>
<td>Measure acidogenic bacterial load via culturing or plaque ATP measurement.</td>
<td>OTC fluoride rinse 2x/day</td>
<td>5% fluoride varnish, applied 4 to 6 months</td>
<td>Supplement if topical fluoride is not effective (add a dividing line between high risk and extreme risk).</td>
</tr>
<tr>
<td>Extreme Risk</td>
<td>Every 6 months until no new carious lesions.</td>
<td>Every 6 months until no new carious lesions.</td>
<td>Re-test bacterial load after initial treatment and re-evaluate therapy.</td>
<td>Rx fluoride toothpaste (5,000ppm) nightly or 2x/day</td>
<td>Required with salivary analysis.</td>
</tr>
</tbody>
</table>

Continued on Page 28
As students progress through the junior year, an overview of the dental caries process can be presented with focus on etiology of dental caries (different plaque biofilm hypothesis can be highlighted here), description and progression of carious lesions, and bacterial testing. These topics can be integrated into oral health education and preventive counseling (biofilm formation), dental anatomy (mineralization-deminerelization process) and radiology interpretation courses (caries detection), and also be revisited later in the curriculum in dental materials course (cavitation). During pre-clinical labs, students can practice bacterial testing on themselves or on student partners. There are a number of bacterial testing systems available and the faculty should decide which system best meets the program’s needs.

Since dental caries is a pH mediated disease, a high emphasis should be placed in the dental hygiene curriculum on the role of the saliva in the process of caries. This topic can be introduced in the head and neck anatomy and the dental hygiene theory courses and labs. Class discussions should include salivary gland anatomy, the composition, function and qualities of healthy saliva, salivary analysis and conditions affecting salivary flow. Students can have their own saliva analyzed using a system, such as Saliva – Check BUFFER, from GC America.

While diagnosing dental caries is not within the dental hygiene scope of practice, the dental hygienist must still be able to detect and interpret lesions. Students can learn the difference between diagnosis and detection along with the various caries classification systems in radiology interpretation and dental materials courses. These topics can be also reviewed in pre-clinical and clinical dental hygiene theory courses where detection technologies such as the DIAGNodent® can be incorporated in lab and clinic.

Given the key role dental hygienists play in providing preventive services, CAMBRA protocols should be emphasized throughout the dental hygiene curriculum, particularly in the oral health education and preventive counseling, care and treatment of patients with special needs, and community oral health courses. Use of a treatment protocol, as found in the SAFER table, should help guide the student in planning the appropriate treatment interventions based on the patient’s caries risk. Treatment intervention discussions in the classroom should include information about mechanical and power brushes, interdental cleaning aids, types of sealants, fluoride, calcium phosphate systems and xylitol. In order to provide the most current information, manufacturer’s representatives can be invited to give lunch-n-learn sessions where students and faculty alike can learn about new products and technologies. Based on their knowledge of caries risk factors and interventions, students can be asked to prepare questions for the representatives regarding their products.
The ability to provide clear, patient-centered education is the paramount component in any behavior modification program focusing on caries risk reduction. Students need to have opportunities throughout the curriculum to develop good communication skills and learn motivational interviewing techniques that are tailored to each life stage. Role playing in the classroom is an ideal place to start to develop these skills prior to working with patients in clinic. For instance when practicing nutritional counseling, students will evaluate their student partner’s willingness to change their behavior, present them with the necessary information (relationship between diet and caries process) that will take them to the next level in changing their eating/drinking habits into healthy ones.

Applications in Clinical Settings

Caries risk is determined during the assessment phase of patient care. Once the patient’s caries risk has been determined by using a CRA form, the student must create a dental hygiene care plan specifically addressing the caries disease process. A caries management plan, such as the SAFER protocol for patients 6 years to adult, is used to develop the patient care plan. The patient’s caries risk is also integrated and recorded into the comprehensive dental hygiene care plan for each patient.

Students are given the opportunity to participate in a sealant rotation during both their junior and senior years in order to increase their knowledge and comfort level with sealant placement. Patients suspected of having overt carious lesions, identified during the intraoral examination, are referred to a local community dental clinic or dental school for further diagnosis and treatment. The patient’s caries risk factors are re-evaluated at every continuing care appointment. Modifications to the overall care plan are made based upon the findings. All faculty members are educated and calibrated in CAMBRA and reflect their commitment to this philosophy in all aspects of student and patient interaction.

Conclusion

CAMBRA manages and prevent caries development by looking at the risk indicators, risk factors, and protective factors for each individual patient. As the leaders in preventive oral care, dental hygienists have a unique opportunity to promote implementation of CAMBRA in a variety of settings. Dental hygiene educators need to work towards creating a more standard protocol for incorporating CAMBRA across the dental hygiene curriculum.

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CareerCorner

Inspiring student success through her life-changing journey in education

An interview with Carmen Dones, RDH, MS

Introduction

As a young girl of 10, Carmen already had her first job working a few hours after school in the neighborhood candy store. “What better job to have”, she thought as she enthusiastically put in her time every afternoon and brought home her pay – bags of candy! She couldn’t have been happier indulging in all the sweet “fruits of her labor”. Consequently, Carmen was very comfortable with her frequent visits to the dental office. She could even visualize herself working there! By age 17, she began her dental assisting career, trained by her dentist/employer. She went on to get her license as a Registered Dental Assistant in 1991 and later became a Certified Dental Assistant in 2010. With her passion for patient care, Carmen “absolutely loved dental assisting” but found that she wanted to know and do more. Her supportive dentist, who shared her values and passion for patient care, encouraged her to go back to school - preferably dental school. Instead, she was torn between dental hygiene and nursing, and ultimately decided to stay in the field she had grown up in. Once Carmen set her sights on the dental hygiene profession, there was no stopping her.

A Desire to Achieve More

Carmen Marie Dones, grew up in a predominantly Hispanic community in the San Fernando Valley neighborhood of Van Nuys; the middle daughter in a family of five children. Many of the women in her extended family were young parents, raising families on their own, with minimal education and few options. Growing up, experiencing her family’s struggles, meant she had responsibilities at a young age and it gave her an inner strength. It sparked a drive within her that continues today, persisting in all that she does. Carmen knew she wanted something different for herself, something more - an education. Carmen began her journey at Los Angeles Valley College, taking her prerequisites for entrance into dental hygiene. In 2002, she was accepted into the dental hygiene program at West Los Angeles College (WLAC).

Opportunities as a Student Leader

At WLAC, Carmen pursued leadership opportunities from the very beginning. She served as junior class secretary, represented her class at the CDHA Annual session and had the honor of being selected as one of the District XI student delegates for the ADHA Annual Session in New York. Carmen’s involvement as a student member of CDHA and ADHA continued into her second year. Her table clinic, “RDHAP: Access to Care”, was awarded first place at the CDHA Spring Scientific Session and she advanced to the national level to take her clinic to the ADHA Annual Session in Dallas.

“It was so exciting being among other students, hygienists, speakers and vendors. Everyone wanted the same thing, was eager for knowledge and information – immersed in the energy of the profession. My experiences as a student leader in CDHA and ADHA made a lasting impression on me and my career”. Nurtured by the many remarkable role models at all levels of the Association, Carmen became an active component board member immediately after graduation. She has held a variety of positions at the national, state and local level.

Increased Opportunities with Advanced Education

After graduating from WLAC in 2004, Carmen began working in private practice while continuing to enroll in classes at California State University, Los Angeles. She had already set her next goal: a bachelor’s degree in Health Science. While she enjoyed clinical dental hygiene, her days were mixed with rewards and challenges. Each day was a new learning experience, especially when her dentist acquired a number of patients from another practice. All the patient charts read: “No pockets. Good oral hygiene”, yet, the periodontal charting was non-existent and the documentation was far from the reality. Frustrated and exhausted, Carmen would leave the office wondering how she would overcome these challenges and still enjoy her profession. Fortunately around the time she completed her bachelor’s degree, Carmen was contacted by the director at WLAC to come back to campus and teach a class. It turned out to be a career changing opportunity. She began teaching pathology to WLAC dental hygiene students and periodontal instrumentation to dental students at UCLA. With her flexible schedule in private practice, Carmen was able to teach, continue her education and treat patients.
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True passion for learning has led Carmen to always want to take on new challenges. She had momentum going with her bachelor’s degree, then continued to complete her Master’s in Education in 2010 from California State University, East Bay, and was offered a full-time instructor position at WLAC the same year. She became the director of the dental hygiene program and the chair of the allied health division in 2011. On a personal note, in the midst of her academic demands and activities, Carmen became the mother of twin boys and seven years later welcomed a third son. She attributed her academic and professional accomplishments during those busy years to the support of her devoted husband, Robert.

After learning about Carmen’s career path from her early start in dentistry through the completion of her master’s degree and tenured position at WLAC, I asked her to share some memorable moments as an educator and her vision for the profession.

Highlights as an Educator

In my role as the dental hygiene program director, I attended many meetings for the college. One of those was a 2014 Los Angeles Community College District Board of Trustees meeting when they voted to support Senate Bill 850, which would allow California community colleges to offer a bachelor degree in selected programs. I knew it was fate that I was at the meeting. I went back to campus and with the support of the administration and faculty at WLAC, we worked diligently to submit our proposal for the bachelor degree pilot program. We were later selected by the Board of Governors as one of the 15 colleges to participate. We will accept our first cohort of bachelor’s degree dental hygiene students in the fall of 2016. I am excited to be able to follow up with the implementation of this new opportunity for students. My current position is the consulting instructor for the new bachelor degree program.

Another great high point in my career as an educator was having Vice-President Joe Biden visit our clinic in January 2015. As part of the Obama administration’s effort to focus on the key role community colleges play in higher education, Biden spent two hours touring our clinic and participating in a roundtable discussion on higher education and career opportunities for community college students. We even had one of our students selected for the round table discussion. The Vice-President’s visit came the same week as the Board of Governor’s announcement regarding the bachelor’s program so it was doubly special. As a follow-up to the Vice-President’s visit, our program received an invitation to visit the White House last July. It was truly an experience of a lifetime for our students and faculty.

Vision for the Future

My vision is to see the bachelor degree be the entry level degree for all community college dental hygiene programs in California. However, beyond seeing increased responsibilities and higher degrees, I want to see more diversity for the dental hygiene profession. I didn’t grow up in an affluent neighborhood; I was a first generation college student. My parents were young. My father worked three jobs to put food on the table and our family struggled to make ends meet. For me to consider a profession where I was “different” was frightening, especially since most of the hygienists I worked with in private practice fit a certain profile. As a student interested in the dental hygiene program at WLAC, I felt I needed to reach out to someone in the program who could relate to me and my background. I contacted the only faculty member with a Hispanic name in the directory to ask questions about the program. It was a comfort to know that there was someone with a similar cultural background who could give me advice.

The WLAC campus population is predominantly Hispanic and African American and historically our dental hygiene program has not reflected the population of the college. However, in the last few years, our program has become more diverse with 50% of the class Hispanic and 10% African American. Our faculty at West LA College has also become more diverse and I hope to see the trend continue to flourish.

Carmen’s next professional goal is to advance in the world of college administration, with the hope of building great programs and departments so all students can pursue their educational...
goals. Although she “doesn’t know where she will find the time”, Carmen would like to begin her studies towards a doctorate in educational leadership. Her favorite quote is from A.A. Milne, which should guide her along the way as she continues to achieve more.

“Promise me you’ll always remember: You’re braver than you believe, and stronger than you seem, and smarter than you think”. ~ A.A. Milne

About the Author:

Carol Lee received her Bachelor of Science in Dental Hygiene from the University of California, San Francisco and holds a Master’s degree in Health Science. Carol’s forty year career includes private practice, public health and dental hygiene education. She is particularly passionate about working with the underserved, has organized countless outreach programs and received ADHA’s first Community Outreach Award. A past President of the California Dental Hygienists’ Association, Carol currently serves on the CDHA Journal Advisory Board. Outside of dental hygiene, Carol practices Tai Chi, which she integrates into the ergonomic practice of dental hygiene.

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Why I belong?

Fred Thomas, RDH, BS
Adjunct faculty, Fresno City College
CDHA Member since 1999

I belong to CDHA because while I was a student my instructors routinely stressed the importance of our membership as a way to provide continuous support to our profession.

I belong to CDHA because as a hygiene instructor I love being a great example of what I constantly preach to my own students, “CDHA membership matters!”

I belong to CDHA because I have some awesome mentors who are CDHA members who are passionate and appreciative about our organization.

I belong to CDHA because I have always been a leader and CDHA has enhanced my leadership skills tremendously.

I belong to CDHA because I want to be on the front lines of change as our profession continues to advance and expand within the health care system!

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Elena Ortega, RDH, MS, was recently appointed the interim program director of the Master of Science in Dental Hygiene (MSDH) at the University of California, San Francisco (UCSF). Elena assumed her new role as program director upon the retirement and subsequent passing of Margaret (Peggy) Walsh, RDH, EdD. The UCSF Master of Science degree program in dental hygiene was first developed by Dr. Walsh in 2008 and later approved by the Office of the President and the University of California Board of Regents in 2010. Twelve graduate learners were enrolled in the summer of 2011, with Dr. Walsh serving as the program director. There have been thirty-eight graduates of the UCSF MSDH program since its inception.

Elena completed her Bachelor of Science degree in dental hygiene from UCSF in 1988 and was a member of UCSF’s inaugural MSDH class of 2012. She served as a volunteer faculty member at UCSF prior to receiving her clinical faculty appointment in 2014. She was mentored by Dr. Walsh on the various aspects of the program administration following her faculty appointment.

Outside of her work at UCSF, Elena has been an adjunct faculty member at Diablo Valley and Chabot Colleges in addition to being the author of several dental hygiene research articles and textbook chapters. Working in education, be it as a volunteer in a kindergarten classroom or as a clinical instructor in dental hygiene, has always been a passion for Elena. In her new role as program director, Elena states, “I hope to carry forward Dr. Walsh’s vision of graduate dental hygiene education with the goal of improved global health”.

CDHA members, Laurel Bleak, RDH, BS and Jeannette Diaz, RDHAP recently traveled to Chicago to participate in the American Dental Hygienists’ Association’s (ADHA) “Governance of Tomorrow” project. Originating from the “mega issue” discussions held at the ADHA Annual Session in 2015, a workgroup was formed to look at organizational and governance models that will be responsive to the evolving association and membership needs of the future. Jeannette Diaz was part of the initial workgroup formed in September of 2015, charged with planning the necessary strategies to carry these discussions forward. CDHA Vice-President of Administration and Public Relations, Laurel Bleak was invited to participate in the much larger two-day meeting in February 2016. The meeting brought clinicians, educators, public health and alternative practice hygienists, corporate consultants, social media experts and students from across the country together. Association management consultant Glenn Tecker provided cutting edge insight to the discussion process while ADHA staff members served as valuable resources to the groups as they brainstormed, assessed and created a vision for the association. Jeannette Diaz describes her experiences by sharing the following: “Being a part of “Governance of Tomorrow” was both motivational and transformational for me. The meeting was conducive to free thought and creativity and the exchange of ideas was very powerful. I felt equal to all of my colleagues, regardless of their experience, education or age. We all brought unique gifts to the conversation in a positive and engaging environment. I left knowing that each one of us can make a difference in shaping our future association and that we now have the opportunity to create an exceptional outcome”. ADHA members should look for more news from the “Governance of Tomorrow” project throughout the coming year.

Darlene J. Swigart, RDH, BS, was recently recognized by Dimensions of Dental Hygiene as “One of 6 Dental Hygienists You Want to Know”. Darlene, a full-time clinical dental hygienist in Oceanside, California, is working towards her Master of Science in Dental Hygiene (MSDH) degree from Idaho State University (ISU) in Pocatello. After 30 years of working clinically in dentistry, Darlene decided to pursue her dream of becoming an educator through the ISU MSDH program. Her graduate research on the implementation of the dental hygiene diagnosis into practice led to Darlene’s recent appointment on the American Dental Hygienists’ Association’s Dental Hygiene Diagnosis Task Force. Passionate about head and neck cancer prevention and early diagnosis, Darlene is currently working on an application for head and neck cancer prevention with the support of the graduate faculty at ISU and an app designer. Her goal is to develop an app that would include a video of the head and neck self-exam for patients to follow and a reminder notice for the monthly head and neck cancer self-exam. Darlene joins CDHA Immediate Past President Karine Strickland as a member of the Dimensions of Dental Hygiene interactive online mentoring program for dental hygienists. Sponsored through an educational grant from P&G Professional Oral Health, the program enables users to easily access a dental hygienist mentor.

Continued on Page 34
CDHA volunteer hygienists from components throughout southern California along with students from Cerritos, West Los Angeles, Moreno Valley Colleges and West Coast University, participated in delivering clinical services and prevention education efforts at the 7th annual Care Harbor free health care event held at the Los Angeles Sports Arena in October 2015.

Dental care has historically been the service most in demand and the October event was no exception. Along with the services offered on site by volunteer dentists, hygienists, and assistants, a preventive dentistry resource was created to serve all patients. This area was staffed by hygienists and dental hygiene students to provide patients with oral health education, a one-on-one oral hygiene consultation, a fluoride varnish treatment, and a take-home oral hygiene kit. Fluoroscopic oral cancer screenings were made available to all attendees. A total of 3,112 patients were admitted to the free clinic with 1,685 receiving dental services provided by the 572 dental volunteers. Dental hygiene was well represented with 145 RDHs participating in the 3 day event. Local community clinic representatives were onsite to make follow-up appointments for patients for continuing care. All patients were given a current guide for low cost dental resources in their geographic region. Access to quality oral health care services remains a priority as the healthcare landscape continues to change. The dental community and the dental hygiene profession will need to evolve in order to transform the free clinic model of episodic emergency treatment to sustainable care models that will have a lasting impact on the lives of those served.

Karine Strickland, RDHAP, BS, CDHA Immediate Past President was recently invited by Jayanth Kumar, DDS, California State Dental Director, to participate on the Oral Health Plan Advisory Committee. The committee is comprised of representatives from non-profit organizations, public health entities, the California Dental Association, Federally Qualified Health Care Centers and others. The group has been charged to generate a proposal for a State Oral Health Plan. Taking into consideration that the majority of Californians with the poorest oral health are not receiving any dental services, such a plan is desperately needed. As a member of the access work group, Karine has participated in round table discussions identifying goals and objectives addressing successful strategies for increasing access to care. Some of the high priority services being discussed include oral health education, fluoride varnish applications for pregnant women and young children along with strategies for increasing the number of school age children receiving dental care. At the recent January 2016 meeting, Karine had the opportunity to present the various public health outreach programs sponsored by CDHA components throughout the state. Future committee activities will address feasibility, impact and metrics as the groups work toward strategies for better oral health outcomes in California.

CDHA leaders Ursula Tumath, RDH, MS, Danette Ocegueda, RDH, MS and Lygia Jolley, RDH, BA were among the forty participants selected to attend ADHA’s Unleashing Your Potential (UYP) program in Chicago last November. Constituent representatives from across the country came together to network and participate in discussions regarding the responsibilities and challenges within their respective states. ADHA officers and staff also shared their unique leadership paths and provided encouragement and support to all participants. Ursula Tumath summarizes her experiences with, “I was honored to be chosen for UYP. It was a wonderful weekend filled with team-building, motivational speakers in a collaborative atmosphere. At first I wasn’t sure I belonged with so many state presidents in the group. After all, I am only the San Francisco Component President! However, it didn’t take me long to find out that we all belonged to this group of future leaders. It was inspiring to know that ADHA recognizes that our association needs to be constantly evolving to meet the needs of all of our multi-generational members in order to guarantee the future of the profession.” Hygienists interested in developing their leadership skills, should definitely apply for this dynamic program.
“Brush Your Teeth, Read a Book, Go to Bed!” was the theme of the 8th Annual Give Kids a Smile Day at San Francisco General Hospital (SFGH). The event was co-sponsored by the SF Department of Public Health, (Maternal Child and Adolescent Health Section) and the SF component. Approximately 100 of the children enrolled in the Women, Infants and Children (WIC) and the Family and Children’s Health Centers on the SFGH campus received dental screenings, fluoride varnish, a book, toy and fun home care products. All participants visited a series of educational tables with interactive activities to help promote preventive home care habits and regular dental visits. Screeners found that 34% of the children had visible decay, 9 of which had moderate to severe caries. All children will be case managed by the event co-coordinators, AmeriCorps, to ensure they are linked to local dental homes. Over 50 volunteers from the greater bay area participated in the program held during the 75th anniversary of National Children’s Dental Health Month. One of the many goals of the day was to educate the next generation of medical providers about the importance of oral health to overall heath. In addition to dental hygienists, led by SF component members Michael Long, Lauren Umetani, Mecedes Keeney and Michael Laflamme, the volunteers included a pediatric dentist, students from the SF State University (SFSU) School of Nursing, AmeriCorps, and SFSU pre-dental students. The event also provided an opportunity for professional development. The volunteer hygienists received didactic training prior to the clinic while the nursing students received 3 hours of education and training prior to the event. At the end of the day, one of the nursing students shared her thoughts, “I will never again look at another patient without also examining the health of their teeth.” It was truly a successful event for everyone involved!

Now in its third year, the University of Southern California, Herman Ostrow School of Dentistry Masters of Science in Dental Hygiene (USC MSDH) program is moving forward to create a strong educational foundation for hygienists who want to take their careers to the next level. The MSDH curriculum is designed to allow students to continue working while completing the full-time graduate program. The 30- unit program offers three different student-selected areas of emphasis: Education, Geriatric Dentistry, and Pediatric Dentistry. Classes are held on the USC campus twice a week and can be completed in 16 months.

Current MSDH students recently presented their research posters at the 2016 USC Research Day on March 4th at USC. Topics this year focused on increasing the need for interdisciplinary education between oral health and pharmacy professionals as well as technology related decision-making options for clinicians while working chairside.

Hygienists interested in pursuing an advanced degree or considering a career change should explore their options and learn how a MSDH degree can provide the critical thinking and leadership skills required in today’s evolving health care system. To learn more about the USC MSDH program visit http://dentistry.usc.edu/programs/dental-hygiene/msdh/ or send an email to MSDH_USC@usc.edu
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April 8 or 9 | San Diego, CA
May 27 or 28 | Anaheim, CA
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