

# Research Poster Abstracts

The following posters were presented during the American Dental Hygienists' Association Annual Conference held in Louisville, Kentucky, June 20 – 23, 2019.

## Oral Health of Long-term Care Residents

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**Problem:** Data is lacking in Utah to demonstrate to stakeholders and legislators the dental need of long-term care residents. Residents of these facilities experience barriers to accessing and receiving oral health care including financial, the priorities of caregivers, reduced access to professional dental providers, and even resistance from the residents themselves.

**Purpose:** The purpose of this study was to conduct a surveillance of the oral health status of long-term care residents receiving oral health care. IRB approval was obtained from Dixie State University.

**Methods:** A cross-sectional surveillance study was designed to determine the oral health needs of residents in long-term care. The study consisted of a convenience sample (n = 218) from a potential of 300 residents who qualified and requested oral health care through the grant. Recommended oral health indicators from the Association of State and Territory Dental Directors were utilized to collect the residents' oral health data and assessment of patient reported needs. Descriptive statistics were utilized to describe the findings. For consistency in data collection, all dental professionals involved in the project were trained and calibrated through an online training module.

**Results:** During the year of 2018, a total of 218 residents living in 13 certified nursing homes participated in the surveillance. 128 were females and 90 were males. The average age of the resident was 66.9 years with the youngest resident 25 years-of-age and the oldest resident 99 years-of-age. 98% of the sample reported an annual income of less than \$20,000. Among the residents examined, 31% reported it had been more than 2 years since their last dental visit, 26% reported sensitive teeth, and 47% reported current dental pain or discomfort. Dental indicators included 44% with substantial oral debris, 34% with severe gingival inflammation, 52% with untreated tooth decay, 29% with root fragments, and 72% were in need of periodontal care.

**Conclusion:** This study demonstrates oral health needs for long-term care residents living along the Wasatch Front in Utah. Providing access to professional oral health providers and curbing barriers to care must be addressed for a population that has limited resources and mobility to seek care. Collaborative practice dental hygienists with direct Medicaid reimbursement could be an avenue to deliver preventive care needed for this vulnerable population. Residents participating in the surveillance were provided dental hygiene and restorative services. Funding furnished by a grant from Civil Money Penalty Funds.

## Re-evaluation Outcomes Following Nonsurgical Periodontal Therapy: A retrospective analysis

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**Problem:** Literature showing the integration of reevaluation procedures and stabilization phases of nonsurgical periodontal therapy (NSPT) is scarce. Reevaluation is considered a critical step following NSPT to determine patient response to treatment, but is often an overlooked aspect of individualized care. Research indicates therapeutic endpoints should be used as guidelines to determine control of disease activity, prognosis, recare intervals, and associated referrals.

**Purpose:** The purpose of this retrospective record review was to evaluate clinical outcomes measured at initial assessment and at reevaluation following NSPT. Specifically, the aim was to assess bleeding on probing (BOP) and clinical attachment levels (CAL) following NSPT as a means to direct prospective studies that may further define therapeutic outcomes and reevaluation procedures that enhance supportive periodontal care.

**Methods:** A secondary analysis of electronic dental records was conducted for patients who received NSPT followed by reevaluation at a university dental hygiene clinic from January through December 2018. For inclusion in the study, records specified a minimum of one quadrant of NSPT (indicated by CDT codes D4341/D4342) and post-therapy reevaluation.

Clinical outcomes were evaluated using frequency distributions and univariate analysis to identify changes in BOP and CAL at baseline assessment and again at reevaluation four to eight weeks post-therapy.

**Results:** A retrospective cohort of patient records were selected using student data from documented reevaluation appointments. From identified records (N=105), 61% (n=64) met inclusion criteria. Demographic data indicated 66% of patients were male (n=42), with 69% age 60 or younger (n=44). The majority of clinical reevaluations occurred at four weeks following NSPT (n=26; 41%). The majority of patients did not report smoking (n=57; 89%) or diabetes (n=55; 86%). Overall, results from pre and post treatment showed a 53% reduction in bleeding sites (N=2204; n=1031). A combined 60% of sites with 4-5mm CAL (N=2230; n=1840) and 6+mm CAL (N=633; n=387) showed a decrease in CAL. Sites with 1-3mm CAL showed a 17% increase (N=5293; n=6185) from pre and post treatment.

**Conclusion:** Consistent with the literature, findings indicate reductions in bleeding and CAL following NSPT. Due to limitations of the records review process, there was no means to assure calibration for recording CAL. Increases in 1-3mm CAL at reevaluation may be attributed to the reductions in 4-5mm and 6+mm CAL resulting in transition to the 1-3mm CAL range. Findings suggest integrating formalized reevaluation is an integral phase of NSPT. Further clinical research regarding reevaluation procedures, data collection methods, and clinical and therapeutic outcomes are needed.

### Dental Hygiene and Nursing Students' Perceptions of the Significance of an Interprofessional Collaboration Experience

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**Problem:** The benefits of interprofessional collaboration include improved patient-centered outcomes, fewer preventable errors, improved relationships with other disciplines, and reduced healthcare costs, for not only nurses, but also for other healthcare professionals and ultimately, the consumers.

**Purpose:** The purpose of this program was to ascertain the dental hygiene and nursing students' perceptions of the significance of interprofessional collaboration (IPC). The data from this program will be used to make any necessary revisions for future IPC experiences with other College of Health programs and/or university departments.

**Methods:** The IPC experience of the Clayton State University dental hygiene program occurred during the 2018 fall semester when the undergraduate nursing students visited the dental hygiene clinic to instruct the dental hygiene students on taking patients' vitals (blood pressure, pulse, respiration and temperature). This IPC experience occurred on a Tuesday with 13 dental hygiene students and 11 nursing students and again on the following Thursday with 14 dental hygiene students and 5 nursing students. Due to scheduling limitations, the dental hygiene students were unable to provide oral healthcare instructions for the nursing students.

A 16 item closed-ended questionnaire was developed and pilot tested by two faculty. IRB approval was not necessary as this was an educational experience (descriptive education IPC). After each IPC experience, the questionnaire was distributed to dental hygiene and nursing students and faculty. Based on the responses received by the convenience sample, the data will be used to prepare for future IPC experiences with other programs in the College of Health and/or across the campus.

**Results:** When asked if they thought IPC "contributes to integrating dental hygiene and nursing into the interprofessional care team", the response "agree/strongly agree" was 90.6% and 81.3% respectively. In regard to IPC "improving patient care for dental hygiene patients", 90.4% of the students indicated "agreed/strongly agree". However, in reference to IPC "improving patient care for nursing patients", only 60.5% indicated "agree/strongly agree". Finally, the responses for IPC "will improve the profile of dental hygiene as a member of the health care team" 95% of the responses indicated "agree/strongly agree".

**Conclusion:** During informal conversations, at the conclusion of the IPC experiences, students from both College of Health programs expressed their pleasure in participating in the IPC experience and felt it was a mutually professional learning experience. However, to better evaluate the process, this pilot program should be replicated because the dental hygiene students did not have time to teach oral health care to the nursing students.

## Dental Hygiene Students' Preferences of Ultrasonic Instruments

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**Problem:** Previous research shows magnetostrictive ultrasonic instrumentation is widely used in dental hygiene education and is more prevalent than the piezoelectric ultrasonic instrumentation. However, there is no research study that shows dental hygiene students' preferences of ultrasonic instrumentation when presented with both options to use magnetostrictive and piezoelectric for treatment following didactic and clinical education.

**Purpose:** The objective of this study was to evaluate dental hygiene students' preferences of ultrasonic scaling instruments to include magnetostrictive or piezoelectric following didactic and clinical education.

**Methods:** A convenience sample of second year dental hygiene students from Central Community College (n=14) was used for the study. Both the magnetostrictive and piezoelectric ultrasonic instrumentation are taught in the dental hygiene curriculum didactically and clinically. In addition, students purchase both ultrasonic units. A cohort study collected data from August 2017 to December 2017 from the course, DENH 2250 Clinical Dental Hygiene II, which is taught the first semester of the second year of the curriculum. The total number of patients (n=1,022) were treated by the fourteen second year dental hygiene students. A clinical electronic evaluation form allowed clinical faculty to "click" on the electronic form if ultrasonic instrumentation was used as well as the type of ultrasonic instrumentation

**Results:** Descriptive statistics indicated of the total number of patients (n=1,022), an ultrasonic instrument was used 4.98% (n=205) following didactic and clinical instruction in the dental hygiene curriculum. The magnetostrictive ultrasonic was used 51% (n=105) and the piezoelectric ultrasonic was used 48.8% (n=100) in the cohort study.

**Conclusion:** Results indicate that dental hygiene students have no preferences between the magnetostrictive and piezoelectric ultrasonic instruments.

## The Advanced Dental Hygiene Practitioner: An Exploration of the Patient Perspective of a Mid-level Dental Provider.

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**Problem:** Although Advanced Dental Hygiene Practitioners (ADHPs) are adequately educated and possess the skills to provide competent care, they cannot improve access to care unless patients are willing to take advantage of their services. The significance of this study is to provide information about the willingness among two diverse groups to receive services provided by an ADHP.

**Purpose:** The purpose of this study was to examine patient attitudes and opinions regarding the utilization of an ADHP.

**Methods:** This quantitative, non-experimental, cross-sectional study employed a descriptive group-comparison design by analyzing the differences between those with and without access to dental care and evaluated differences among respondents based upon their socioeconomic and demographic attributes. Convenience sampling was used to select participants. Data were collected from patients treated at an upscale family and cosmetic dental practice (n=40) in a large metropolitan area and at an inner-city safety net clinic (n=40) using a 17-item questionnaire. Differences between the two groups were evaluated based on their socioeconomic and demographic attributes. Independent samples *t*-tests, one-way ANOVA tests, and Chi-Square tests were used to analyze the data at a confidence interval of 95% ( $\alpha=.05$ ). IRB approval was obtained through East Tennessee State University, approval number c0815.6e.

**Results:** An independent samples *t*-test determined no significant differences in perceptions regarding responsibilities and skills of an ADHP between genders ( $p=0.219$  to  $0.956$ ). One-way ANOVA tests determined no significant difference in perceptions based upon each of the following: ethnicity ( $p=0.239$  to  $0.820$ ), education level ( $p=0.054$  to  $0.612$ ), and income level ( $p=0.140$  to  $0.658$ ). No significant differences were found between patients with access to dental care and those without when asked if they would be willing to receive restorative care from an ADHP based on an independent samples *t*-test ( $p=.307$ ). Further, a Chi Squared value was computed from a cross tabulation analysis of these two variables (overall willingness to receive care and willingness to receive restorative care) and no significant difference was found ( $p=.643$ ). Despite diverse demographics, the data indicated overall positive support of the ADHP. Nearly 95

percent (94.9%) of the respondents indicated they would be willing to receive care from an ADHP if legislation permitted.

**Conclusion:** This research demonstrates a high level of support among potential patients from two diverse samples adding greater confidence in the future expansion and application of this role and its ability to impact the lives of those in need.

### Dental Hygiene Program Directors' Knowledge and Implementation of Objective Structured Clinical Examination (OSCE) Testing

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**Problem:** The Objective Structured Clinical Examination (OSCE) is universally recognized as the gold standard for the evaluation of clinical competence, often serving as a substitute for live patient examinations (LPE). Due to its proven reliability, the American Dental Association Board of Trustees voted to develop and adopt the Dental Licensure Objective Structured Clinical Examination (DLOSCE) in 2017, to replace LPE for dental licensure.

While the utilization of OSCE has been widely recognized in dental schools for nearly three-decades, there is a significant gap in literature specifically regarding the use of OSCE in dental hygiene programs. Additionally, little is known about the potential impact the DLOSCE might have on dental hygiene licensure examinations.

**Purpose:** The objectives of this study were to assess dental hygiene program directors' awareness of and attitudes about a DLOSCE, whether their curricula included OSCE assessments, and perceived barriers to utilizing OSCE assessments.

**Methods:** A cross-sectional study of 332 United States dental hygiene program directors obtained from the American Dental Hygienists' Association (ADHA) Entry-Level Dental Hygiene Program Directory was conducted. A 20-question, electronic survey was developed, analyzed by the University of Michigan Survey Research Center, and pilot tested. Descriptive statistics and chi square tests were employed to provide data. Significance was set at  $p < 0.05$ . The study was determined exempt by the UM Institutional Review Board (HUM00147564).

**Results:** A response rate of 36% ( $n=121$ ) was achieved. Nearly 30% of respondents were unaware of the Task Force on Assessment of Readiness to Practice recommendations to develop an alternative to the single-encounter, live patient licensure exam; 80% were in favor of the decision. Nearly 75% considered OSCE assessments to be valid and reliable methods

to assess clinical competence. More than half of respondents reported not currently utilizing OSCE assessments in their curricula. Time (22%), perceived lack of best practices (21%), and lack of resources (18%) were reported as significant barriers. Program directors who currently implemented OSCEs in their curricula were more likely to agree that OSCEs were both valid and reliable assessments ( $p=0.05$ ).

**Conclusion:** The majority of Dental Hygiene program directors were in favor of eliminating the single-encounter, live patient examination in favor of an OSCE. However, more than half do not currently utilize OSCEs. Further studies should explore implementation of OSCEs in dental hygiene education, and how the DLOSCE might impact the current educational curricula and licensure of dental hygienists in the United States.

### New York State Dental Hygienist Perceptions of an Interdisciplinary Model of Care for Patients with Diabetes who have Periodontal Disease

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**Problem:** Dental hygienists (DHs) are well-positioned to work collaboratively with other healthcare providers in the early detection of diabetes, however, DHs' perception of their role working in the interdisciplinary model of care (IDMC) is not well-documented.

**Purpose:** The purpose of this study was to examine how New York State (NYS) DHs perceive their role in an IDMC. This study focused on how NYS DHs perceive the relationship between periodontal disease and overall health of patients with diabetes. In addition, this study explored NYS DHs' perception of including a diabetes risk assessment (DRA) in their dental hygiene process of care (DHPC).

**Methods:** Two instruments were used to collect data in this mixed-methods study. Quantitative data were collected through an anonymous 21-item original survey consisting of a 5-point Likert-type scale and demographic questions. Invitations were distributed via email to a cluster sample of 750 dental hygienist members of the New York Dental Hygienists' Association (NYDHA) LISTSERV. The Shapiro-Wilk test indicated the sample was not normally distributed; therefore, non-parametric tests were used. A Kruskal-Wallis test was used to measure the association between perception and the independent variables: age, years of experience, and primary practice settings. A Mann Whitney test was used to measure perception and the variable: including a DRA

with regard to personal experience with diabetes. Qualitative data were collected through face-to-face interviews using a convenience sample of three DH colleagues. All interviews were audio-recorded and transcribed. An inductive approach was used to code data and inform theme development.

**Results:** A total of 153 DHs completed the survey, a response rate of 19.6%. No statistically significant difference was found between age of DHs ( $p=0.115$ ), number of years practicing as a DH ( $p=0.077$ ), or a close relationship with someone with diabetes ( $p=0.794$ ) and perceptions toward an IDMC for patients with diabetes. No statistically significant difference ( $p=0.179$ ) was found between type of work setting and inclusion of a DRA as part of the patient assessment protocol. Analysis of the three face-to-face interviews revealed the following themes and sub themes: knowledge, roles (educator), and IDMC (support, qualities, and barriers).

**Conclusion:** Quantitative results were not statistically significant. However, qualitative results revealed DHs perceive their role as an educational resource for patients regarding the bidirectional relationship between periodontitis and diabetes. Given the positive views expressed by participants in this study toward an IDMC, it is likely DHs would include a DRA in their DHPC, given the time and support from their dentist-employer.

### Implementing Inter-Professional Education: Dental Hygiene and Physician Assistant Activity

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**Problem:** Current Commission on Dental Accreditation (CODA) standards for dental hygiene graduates include emphasis on the ability to communicate and collaborate with other health care team members in the provision of safe and effective oral health services.

**Purpose:** This project was designed to assess the knowledge of dental hygiene (DH) and physician assistant (PA) students about one another's professions, education and training and to improve the students' knowledge in oral pathology and the head-and-neck (intra- and extra-oral) portion of a physical exam.

**Methods:** Pre- and post-activity surveys of Likert-type scale questions were administered to the participants using Survey Monkey® to determine changes in their knowledge of the opposite profession and confidence in performing examinations. On the day of the activity, faculty from both disciplines presented an overview of their professions

and shared information on systemic conditions with oral manifestations. Students were randomly assigned to groups which included both PA and DH students. The groups were given 2 case patient simulations to role play. The cases included both medical history information and physical signs. After completing the patient history and demonstrating their discipline's method of patient head-and-neck examination, the students were instructed to determine differential diagnoses for each case.

**Results:** The review of survey results was limited to the participants who completed both pre-and post-activity surveys (19 of 28 DH and 38 of 41 PA). Comparison of the surveys revealed an increase in knowledge about both professions' education and training. Additionally, each group reported increased confidence in engaging the opposite profession in the management of patients. PA students reported an increase in confidence in exam techniques when evaluating the oropharynx. DH student results, however, showed no change in this area. Both groups reported an increase in identifying the lesions commonly found in HIV positive patients. In the pre-activity survey, only 50% of PA students agreed with the question "I know when and who to refer my patients to when faced with different oral pathology." Post activity, 100% of these students reported they agreed/strongly agreed with this statement.

**Conclusion:** This activity showed inter-professional activities are an effective means of educating health care students about others' professions and roles in the health care team. IPE activities can be utilized to enhance student learning in common subject areas and to facilitate communication and collaboration between various professional disciplines.

### Do Licensed Dental Hygienists Routinely Take Blood Pressure on Patients?

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**Problem:** In the United States over 103 million people have high blood (BP) pressure. The high prevalence of the disease among the American population is concerning and must be considered when treating dental patients. Dental practitioners can often be on the frontlines of prevention of hypertension by evaluating preoperative blood pressure readings, performing risk assessments, and knowing when to consider medical consultation of a hypertensive patient in a dental setting. Patients see their dental professional more frequently than their medical professional. Routine blood pressure screening in the dental practice could help identify patients at risk for

stroke and coronary artery disease.

**Purpose:** The purpose of this study was to assess the knowledge and practices of licensed dental hygienists in performing routine blood pressures (BP) screenings and pre/post BP when administering local anesthesia on their patients.

**Methods:** This cross-sectional study utilized a purposive sample of dental hygienists recruited through social media sites and RDH's attending the Massachusetts (MA) Dental Hygienists' Association Annual Conference (6772 RDH's in MA). The validated survey included 9 quantitative questions and 2 open-ended questions related to blood pressure practices and 7 demographic questions was electronically distributed through QualtricsXM™. Inferential statistics, using the Chi-square, were utilized for data analysis. Descriptive statistics were used for demographic questions. IRB approval, non-exempt status, was granted from MCPHS University.

**Results:** Of the 344 participants who completed the survey, 53.3% (n=187) of the participants reported routinely taking BP while 48.7% (n=158) do not. Statistical significance, with a high correlation, ( $\chi^2(1, 264)=95.49, p<.001, \phi=.60$ ), was shown when comparing taking routine BP and taking preoperative BP when administering local anesthesia. Statistical significance, with a moderate correlation, ( $\chi^2(1, 263)=22.92, p<.001, \phi=.30$ ) was shown on the following three criteria, when comparing taking a preoperative BP when administering local anesthesia and taking a postoperative BP when administering local anesthesia; the dentist taking BP at every visit and taking a preoperative BP when administering local anesthesia; and the relationship between the number of hygienists taking and not taking blood pressure with those that are or are not aware of the new blood pressure guidelines. Qualitatively, the two most common response for not taking BP were the dentist did not require it and not enough time.

**Conclusion:** Educational opportunities emphasizing the importance of routinely taking blood pressure and increasing dentist's awareness of the importance of routine BP could result in RDH's performing BP screenings more routinely.

### Oral Health Education and Promotion Activities in Early Head Start: A systematic review

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**Problem:** Early head start (EHS) programs offer complete child development services and support to low-income children <3 years and their families. The promotion of healthy oral hygiene habits for children and their families is critical

during this time. Therefore, EHS programs should utilize oral health standards provided by the U.S. Department of Health and Human Services, Office of Head Start to promote oral health education and activities. Documentation in the literature of oral health education and promotion activities within EHS programs are scarce. Therefore, a systematic review was used to answer the question of, "What are the oral health education and promotion activities performed in EHS programs for staff, children, and caregivers?"

**Purpose:** The purpose of this study was to investigate oral health education and promotion activities performed in EHS programs for staff, children, and caregivers in the U.S.

**Methods:** A systematic review approach utilizing relevant databases such as CINAHL, PubMed, and Google Scholar with key terms: oral health, education, promotion, activities, early head start, and early childhood caries was performed. Inclusion criteria was peer-reviewed quantitative studies related to EHS oral health education and promotion activities from 2000 to 2018. Studies were assessed for eligibility using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram (PRISMA). Two researchers independently evaluated the quality of studies using the Quality Assessment Tool for Quantitative Studies of Effective Public Health Practice Project. The tool evaluates selection bias, research design, intervention integrity, and data analyses of each article.

**Results:** The initial search yielded 363 total articles screened for eligibility. Five studies (n=2 observational and n=3 quasi-experimental designs) remained after the screening process and received the following ratings: strong (1), moderate (3), and weak (1). Participants in these studies were EHS staff and parents. Main outcome measures were oral health knowledge, attitudes and behaviors, oral health promotion, and oral health activities. A majority of the studies investigated the effectiveness of oral health education and promotion interventions among EHS staff members and parents. Two studies examined oral health activities guided by EHS teachers for children and parents. These activities included oral health education, toothbrushing instructions, toothpaste use, dietary education, and assessment of dental health status.

**Conclusion:** Among the five studies evaluated, the interventions focused on increasing pediatric oral health knowledge and practice behaviors among EHS staff members and parents. Ongoing studies are needed to evaluate and document children-focused oral health activities within the EHS programs.

## A Study of Color-Blind Racial Attitudes in Dental Hygiene Students

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**Problem:** The percentage of racial minorities in America is projected to increase to approximately 50% of the population by the year 2050. Many healthcare professionals may be unaware of their own racist attitudes or stereotyping. Color-blind racial attitudes and biases have been linked to racial prejudice which has the potential to affect dental hygiene care to diverse patients.

**Purpose:** The purpose of this cross-sectional pilot study was to determine the color-blind racial attitudes of dental hygiene students in an entry-level baccalaureate program.

**Methods:** After IRB approval, the 20-item, Color-Blind Racial Attitudes Scale (CoBRAS) survey was sent to a convenience sample of all dental hygiene students (n=71), 41 first-year and 30 second-year. Four demographic questions: age, gender, race, and year in program, were also included. The CoBRAS instrument measures contemporary racial attitudes and stereotyping in three subcategories: Unawareness of Racial Privilege, Institutional Discrimination, and Blatant Racial Issues. Participants used a 6-point Likert scale ranging from strongly disagree (1) to strongly agree (6), to determine level of agreement or disagreement with the statements. Total scores on CoBRAS range from 20-120. Higher scores indicate higher levels of denial of racism.

**Results:** Of the 71 students invited to participate, 70 completed the survey for a 98.6% response rate. Demographic data revealed most respondents were women (98%), aged 18-29 (90%) and White (70%). Results revealed an overall average score of 64.89 on the questionnaire. T-tests were used to compare first and second-year student groups (overall score, "racial privilege," "institutional discrimination," "blatant racial issues", age, race, gender), with no statistically significant findings for overall scores ( $p>0.05$ ), or any other subscale. The average score among both years of students in the category unawareness of White racial privilege was 28.86. For the construct related to institutional discrimination the average score was 21.51. Finally, blatant racial issues had a score of 14.5.

**Conclusion:** The average CoBRAS scores indicate most participants possess moderate levels of color-blind racial attitudes, suggesting most participants rejected the idea of racism. As color-blindness comes from a lack of awareness of White privilege, training in this area may foster improved interactions with diverse patient populations.

## Implications of cement-retained and screw-retained prostheses in dental implants and peri-implant disease: A systematic review

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**Problem:** In order to provide primary prevention of peri-implant diseases, it is imperative for the dental hygienist to understand the potential risk introduced by prosthetic type.

**Purpose:** The objective of this systematic review was to evaluate whether implant prosthetic type is a risk factor for peri-implant diseases.

**Methods:** MEDLINE (PubMed), COCHRANE and EMBASE were used to identify studies that assessed the impact on the role of cement-retained and screw-retained prostheses on peri-implant diseases. Key terms included cement-retained crowns, screw-retained crowns, peri-implant mucositis, peri-implantitis, and residual cement. Search limitations included human studies, comparison of the effects of cement-retained prostheses versus screw-retained prostheses, and articles published in the English language between 2011 and 2018. Exclusion criteria included study participants who had cardiovascular diseases, diabetes, or were smokers. Authors of studies that were unclear regarding the inclusion of participants with these conditions were contacted via e-mail for clarification. Duplicates were removed and 526 titles and abstracts were independently screened by three reviewers. Differences between the reviewers were discussed, and decisions were made to include or exclude the disputed articles. Articles with abstracts not relevant to the topic were removed.

**Results:** Sixty-three articles were identified; five were included in the analysis. A meta-analysis could not be performed due to the heterogeneity of the studies. Included studies focused on peri-implant diseases in relation to cement-retained prostheses versus screw-retained prostheses. Four articles suggested that there is no significant difference between cement-retained and screw-retained prosthesis for dental implants and their effect on the peri-implant tissues. One article suggested a slight correlation between cement-retained prosthesis and peri-implant disease.

**Conclusion:** Limited evidence exists that compares cement-retained prostheses and screw-retained prostheses as contributing risk factors to the etiology of peri-implant diseases. The studies included in this review suggested that cement-retained prostheses are not a significant contributing factor for peri-implant disease when compared to screw-retained prostheses. Further clinical studies are necessary to explore the impact of prosthetic type on peri-implant diseases.

## Associations Between Dental Visit and Intake of Sugar-Sweetened Beverage and Plain Water Among United States High School Students

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**Problem:** Sugar-sweetened beverages (SSB), such as regular soda, fruit-flavored drinks, sweetened coffee/tea drinks, sports drinks, and energy drinks, are the leading sources of added sugars in the diet of U.S. youth. Frequent SSB intake is linked to adverse health consequences including dental caries, obesity, and type 2 diabetes. Drinking plain water (i.e., without caloric sweeteners) may improve diet and oral health and prevent weight gain, specifically when it is substituted for SSB. There is limited information on whether beverage intake is related to dental visit among U.S. adolescents.

**Purpose:** This cross-sectional study examined associations of SSB and plain water intake with dental visit among a nationally representative sample of U.S. high school students.

**Methods:** The 2017 national Youth Risk Behavior Survey data of 10,551 students (grades 9–12) were used. The outcome variable was dental visit during the past 12 months (seeing a dentist for a check-up, exam, teeth cleaning, or other work). Exposure variables were frequency of SSB (i.e., regular soda and sports drink) and plain water intake during the past 7 days. Covariates were age, sex, race/ethnicity, and smoking cigarettes/cigars or using smokeless tobacco/electronic cigarettes. Chi-square tests were used to test unadjusted associations between dental visit and beverage intakes (significant at  $P < 0.05$ ). We used multivariable logistic regression model to estimate adjusted odds ratios (aOR) and 95% confidence interval (CI) for not seeing a dentist by SSB and plain water intake status after controlling for covariates.

**Results:** Overall, 23% of high school students reported not seeing a dentist for a check-up, exam, teeth cleaning, or other works during the past 12 months. Overall, 38% of students reported drinking SSB  $\geq 1$  time/day, and 18% drank SSB  $\geq 2$  times/day. About 25% of students reported drinking plain water  $< 1$  time/day. Based on chi-square tests, intakes of SSB and plain water were significantly associated with dental visit ( $p < 0.0001$ ). Based on multivariable logistic regression model,

odds of not seeing a dentist were significantly greater among students who drank SSB  $\geq 2$  times/day (aOR=1.43, 95% CI=1.17, 1.75) compared to non-SSB consumers, and among students who drank plain water  $< 1$  time/day (aOR=1.64, 95% CI=1.38, 1.94) compared to those who drank plain water  $\geq 4$  times/day after controlling for covariates.

**Conclusions:** In the present study, higher SSB intake and lower plain water intake were associated with not seeing a dentist. These findings can inform adolescent-intervention efforts to decrease SSB intake and increase water intake to improve oral health and promote healthy lifestyles.

Project funding was provided by the Centers for Disease Control and Prevention.

## Self-Assessment of Ergonomics Among Dentists and Dental Hygienists Utilizing Photography

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**Problem:** Due to the postural demands and manipulative precision required of dental professionals, oral health clinicians are at higher risk for developing work-related musculoskeletal disorders (WMSDs). Interventions to improve ergonomics have been suggested to help reduce the prevalence of WMSDs. Dental clinicians' awareness of their postures and the clinical application of ergonomic recommendations remains unsatisfactory. However, training that involved self-assessment using photography was shown to be effective with dental and dental hygiene students.

**Purpose:** The purpose of this study was to determine whether training utilizing self-assessment and photography would improve ergonomic scores and the accuracy of ergonomic self-assessments among dentists and dental hygienists.

**Methods:** Upon approval from The Ohio State University Institutional Review Board (#2018H0157), this study used a randomized control design and utilized a sample of 30 dentists and 20 dental hygienists. Participants were randomly assigned into one of two groups (control or training). A validated modified-dental operator posture assessment instrument (M-DOPAI) with 12 components was utilized for self-assessments and rater evaluations. At week-1 and week-4, all participants independently completed ergonomic self-assessments and were photographed. At week-2 and week-3, participants in the training group were photographed and used those photographs to complete an ergonomic self-assessment with the principal investigator. At week-2 and week-3, participants in the control group independently

completed ergonomic self-assessments. Four calibrated raters independently evaluated the week-1 and week-4 photographs. Mixed-design ANOVA was used to evaluate changes in ergonomic scores and the accuracy of ergonomic self-assessments from week-1 to week-4.

**Results:** The training involving self-assessment and photographs resulted in significant improvements in ergonomic scores for the dentists ( $F(1)=6.295$ ,  $p<.05$ ) and dental hygienists ( $F(1)=8.535$ ,  $p<.01$ ) and significant improvements in the accuracy of ergonomic self-assessments for the dental hygienists ( $F(1)=4.806$ ,  $p<.05$ ).

**Conclusion:** The continual use of self-assessment and photography may help increase awareness, lead to corrections in posture, and reduce the risk for WMSDs.

### Interdisciplinary Collaboration Between Dental Hygienists and Cancer Treatment Facilities in Rural Illinois

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**Problem:** Access to care in rural Illinois is limited due to many constraints including a majority of the population that fall below the Federal Poverty Level (FPL). This is a concern due to the many oral complications that can arise during radiation treatment. These complications can ultimately affect the proposed course of treatment. Moreover, if the cancer treatment facility does not have a dentist or dental hygienist on staff, this can be a barrier to care. In the southernmost sixteen counties of Illinois, the population is 344,594 and covers 6,038 square miles. Currently, there is only one radiation oncologist providing treatment.

**Purpose:** The purpose of this project is to investigate how dental hygienists can be utilized in rural Illinois cancer care treatment facilities. The goal of this project is to determine if radiation oncologists currently collaborate with dental hygienists or if they feel the future partnership would be valuable to their patients. Current review of the literature does not show any connection between the two specialties in rural areas in Illinois.

**Proposal:** Theoretically, dental hygienists are involved prior to cancer treatment and are responsible for developing the most suitable oral environment for radiation treatment. After gathering data, it will be determined if radiation oncologists desire the need for collaboration between the two professions. The current disparity and high population

of individuals positioned in the lower 50<sup>th</sup> percentile shows a vast need for an alliance in rural Illinois. Preventing and controlling the potential complications will be vital for a successful partnership. Once the potential partnership forms, dental hygiene students would be able to utilize externship opportunities at cancer treatment facilities. This partnership will allow them to create “individualized treatment plans”, proper self-care and education for the patient and their families. In addition, the dental hygienist can provide referral sources or information to dentists or any specialists the patient would need to contact before, during or after treatment.

**Evaluation Plan:** Surveys will be administered to radiation oncologists (via Survey Monkey) who are on staff of cancer treatment facilities in rural Illinois (south of Interstate 74). Qualitative and quantitative data will be gathered to determine radiation oncologists’ attitudes about how dental hygienists can be utilized in cancer treatment facilities. Questions will be included to address collaborative treatment before, during and after radiation therapy.

### The Additive Effects of Mobile Phone Use and Dental Hygiene Practice on Finger Strength: A pilot study

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**Problem:** Developing cumulative trauma disorders is an occupational risk factor for dental hygienists and can be attributed to repetitive motions. In the last 20 years, cell phone use has also been identified to cause strain due to repetitive motions with use. This study looked at additive effects of the repetitive motions of dental hygiene practice and cell phone use on the strength of muscles associated with instrumentation.

**Purpose:** The purpose of this pilot study was to determine muscular strength of muscles involved in scaling by dental hygienists and the additive effects of cell phone usage, as indicated by muscular force generation.

**Methods:** A convenience sample of 16 dental hygienists (experimental group) and 16 people that did not use tools repetitively for work (control group) participated in this experimental pilot study. Participants completed a modified Cell Phone Usage Questionnaire to determine cell phone use. Upon completion, participants’ force production was measured using a hand-held dynamometer.

**Results:** There were statistically significant differences between the experimental and control group for the abductor

pollicis longus ( $p=0.045$ ) with the control group generating greater muscle force. There were significant differences found when comparing the differences between low cell phone users in experimental group and control group for the flexor pollicis brevis ( $p=0.031$ ), abductor pollicis longus ( $p=0.031$ ), and flexor digitorum ( $p=0.006$ ). For all of these, the control group had higher muscle force generation. Finally, there was a significant effect of years in practice and cell phone use on muscular force generation for the flexor pollicis brevis ( $F=3.645$ ,  $df=3$ ,  $p=0.020$ ) and flexor digitorum ( $F=3.560$ ,  $df=3$ ,  $p=0.022$ ) with those who have practiced the longest producing the least amount of muscle force.

**Conclusion:** This study indicated no significant additive effects of cell phone use and dental hygiene practice on finger muscles used for both. However, results did indicate that dental hygiene practice had significant effects on muscular strength when compared to people who do not use tools repetitively for work. Future research should include type of cell phones, exact duration of use, and ways to reduce risk for developing musculoskeletal disorders. Future research may also want to evaluate the additive effects on forearm and wrist muscles because these have been indicated for repetitive motions in dental hygiene practice and may also be used repetitively with cell phone use.

### Identifying Leadership Development Needs of Dental Hygienists Using an Online Delphi

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**Problem:** The roles of the dental hygienist as a part of an interdisciplinary team require a dental hygienist to have leadership skills to collaborate and carry the profession forward in a time when healthcare systems are transforming. A review of the literature strongly supports that there is a need to generate consensus on the leadership skills that dental hygienists should develop. Understanding the leadership needs of dental hygienists and preferences of how leadership skill should be developed, allows for the development of a leadership model/ framework for dental hygiene.

**Purpose:** The purpose of this online Delphi was to investigate the opinions of dental hygienists to understand leadership needs of dental hygienists and preference of how the leadership skills should be developed.

**Methods:** This qualitative study was conducted via an online Delphi using a crowdsourcing platform. There were 8-10 experts chosen from each of the seven areas of dental

hygiene ( $n=54$ ). There were two rounds of Delphi questions in this study. Two questions were simultaneously presented in Round 1 for each of the seven break out groups: 1.) What are the most critical leadership skills needed by dental hygienists? and, 2.) How would dental hygienists prefer to develop leadership skills? Questions in Round 2 included ideas receiving more than 50% of the support from the separate seven crowds in Round 1. In Round 2, participants were all in one group, were not separated by occupational category, and users were presented with pairs of versions of ideas to assess ideas that were answered in Round 1. As votes were received, the versions receiving the most votes were ranked.

**Results:** Critical leadership skills identified by dental hygienists is the ability to work with other professionals at all levels including speaking, writing, listening, and also being able to compromise when necessary for the overall good. Dental hygienists preferred leadership development via a multi-prong approach including effective training modules, seminars, books/videos and collaboration with mentors, coaches, and role models while catering to an individual's learning style. The identification of leadership skills and development preferences is a starting point to address leadership, however developing sustainable leadership solutions should be a point of focus to intentionally plan leadership succession, improve leadership, and manage the process over time.

**Conclusion:** Sustainable leadership positions the dental hygiene profession within the hub of healthcare providers which creates interdependence of the profession. Pathways to operationalize sustainable leadership within dental hygiene are prioritized and proposed within this study.

## Sexual Harassment: A study of Virginia dental hygienists

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**Problem:** The #MeToo movement has increased awareness of systemic sexism and sexual harassment in the workplace. Dental hygienists' job retention and career satisfaction along with quality of patient outcomes can all be effected by sexual harassment. In order for dental hygienists to effectively recognize and manage this type of illegal behavior they must first recognize that it is occurring.

**Purpose:** The purpose of this study was to determine if dental hygienists in Virginia (VA) experience sexual harassment while employed in the oral health care setting.

**Methods:** A cross-sectional research design was used to generate information regarding the extent to which VA dental hygienists perceived experiencing workplace sexual harassment. The revised Sexual Experiences Questionnaire (SEQ-W), was used to survey a convenience sample of 230 VA dental hygienists attending a Continuing Education (CE) event in Virginia. Total registration for the event was 270. The SEQ-W survey is comprised of 17 items measuring 3 constructs: sexual coercion, unwanted sexual attention and gender harassment. The online survey was made available for the three days of the CE course. Descriptive statistics (frequencies and percentages) were used to analyze the data.

**Results:** An overall response rate of 70% was obtained. Most respondents were employed in a solo dental practice (44%) followed by a group practice at 33%. Data reveal 21% of those surveyed reported at least one experience of sexual harassment as measured by the SEQ-W in the past 24 months. Of the three constructs measured 25% of participants experienced gender harassment, 12% unwanted sexual attention and 4% sexual coercion. The most commonly reported items were being told offensive sexual jokes or stories (20%) and hearing someone make crude and offensive sexual remarks (16%). At the end of the survey, a definition of sexual harassment was provided and participants were asked "are you experiencing work-place sexual harassment" of which 10% indicated yes. These results suggest some participants were being sexually harassed at work but were unaware the behaviors experienced constituted sexual harassment.

**Conclusions:** Results from this study suggest 1 out of 5 Virginia dental hygienists responding to this survey experience workplace sexual harassment. Education to ensure identification

of sexual harassment may be helpful in promoting awareness, prevention strategies and a healthier work environment leading to enhanced job satisfaction. However, more research is needed using a national sample of dental hygienists to determine the prevalence of workplace sexual harassment on a larger scale.