

# 2021 Virtual Conference Poster Abstracts

The following posters were available for viewing during the American Dental Hygienists' Association Virtual Annual Conference held on June 28 -29, 2021.

## Knowledge, Attitudes, and Perceptions of Dental Hygiene Students Regarding Medical-Dental Integration

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**Purpose:** Medical-dental integration provides a viable option for dental professionals to improve health outcomes, access to care, and lower overall health care costs to underserved populations, specifically children. The purpose of this study was to examine dental hygiene student knowledge, attitudes, and perceptions of an externship involving medical-dental integration during their senior year in the curriculum.

**Methods:** Second year dental hygiene students at a state university in the Midwest provided dental care to children consisting of screenings, radiographs, prophylaxis, sealants, fluoride varnish, and oral health education at the time of their well child visit at a community medical clinic. A ten item survey was administered to the participants before and after the completion of the six-month externship. A 5-point Likert scale was used to assess current knowledge of medical-dental integration, attitudes regarding its efficacy, and beliefs regarding making a difference in the overall health of children. Descriptive statistics and Wilcoxon signed-rank tests were used to analyze the data.

**Results:** A total of 19 dental hygiene students completed the survey (n=19). Post-survey agreement levels were significantly different from pre-survey levels in eight items ( $p < 0.002$ ). Participants reported higher beliefs that medical-dental integration can improve access to care ( $p < 0.001$ ), and increased knowledge of how to make a difference in access to care ( $p < 0.001$ ) following the externship and more students were in agreement that they want to make a difference in the issue of access to care ( $p = 0.002$ ).

**Conclusion:** Results from this pilot study indicate that dental hygiene students increased their knowledge regarding the

benefits of medical-dental integration and were positively impacted by their experiences of providing dental care to children during well child visits. Beliefs that oral health impacts the total cost of medical care and overall health also increased. These findings support continued implementation of medical-dental integration externships in dental hygiene curricula.

## The Profession of Dental Hygiene: Pathways to Career Choice and Influences on Professional Identity

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**Purpose:** The purpose of this study was to ascertain factors which influenced dental hygienists to choose the profession and identify ADHA resources which promote and sustain members' professional identity.

**Methods:** This was a quantitative, cross-sectional, non-experimental study. A 48-item web-based survey was designed and pilot tested. Multiple choice, Likert-scale, and open-ended questions regarding demographics (10), career choice (4), and professional identity (34) were used. The survey was disseminated by the American Dental Hygienists' Association to student and professional members. Descriptive and inferential statistics were used to analyze data.

**Results:** A total of 1,983 surveys (n=1,983) were returned, response rate of 6.3%. The majority (n=1,699, 86%) of respondents were professional members. Most participants were female (n=1,940, 98%), White (n=1,668, 84%), and 55+ years of age (n=727, 37%). Both student and professional members rated a desire to work in a health field as the most influential reason for entering the profession (n=59, 21% and n=468, 28%, respectively). Both groups identified continuing education and evidence-based research resources as positively affecting their professional identity (4.11.0 and

4.11.0,  $p=0.41$ , respectively) and (4.11.0 and 4.01.0,  $p=0.13$ , respectively). Advocacy efforts, Journal of Dental Hygiene, and Access Magazine had a significantly greater positive influence on Professional Members' professional identity ( $p=0.001$ ,  $p=0.028$ , and  $p=0.001$ , respectively). Student members reported greater influence on their professional identity in the areas of patient care resources ( $p=0.01$ ) and support of their career ( $p<0.001$ ).

**Conclusion:** The desire to have a career in a health field was the most influential factor for career choice. Continuing education and evidence-based research resources most positively affects all members' professional identity.

### US Virgin Islands' Caregiver Oral Health Knowledge and Feeding Practices of Children in Their Care

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**Problem:** Children with low socio-economic status have been identified as being at risk for early childhood caries. In the USVI, 32% of families live at or below the poverty level. However, the oral health knowledge and practices of USVI caregivers, and risk for early childhood caries in USVI children, has not been investigated since the 1990s.

**Purpose:** The objective of this study was to understand US Virgin Islands (USVI) caregivers' oral health knowledge regarding risk factors for developing early childhood caries, and the feeding practices of the children in their care.

**Methods:** A cross-sectional qualitative study was conducted with three focus groups, using semi-structured open-ended questions to collect data from participants ( $n=16$ ). A non-probability purposive sampling technique was employed to recruit USVI caregivers (18 years of age and older) from a resource center that provides family assistance and resources for children aged 6 years and under. The ten (10) questions used to collect data centered on children's feeding habits and participants' knowledge of risk factors for dental caries. Participants' responses were audio recorded and transcribed using an online transcription software platform. Triangulation was employed in the thematic analysis with two investigators independently identifying emerging themes.

**Results:** Demographic data revealed the majority of participants were single (69%), female (87%), 20 to 30 years of age (44%), with a high school education or less (63%). The thematic analysis performed on the data identified three

major themes; limited knowledge of etiology of dental caries, lack of understanding of influence of feeding practices on poor oral health, and lack of recognition regarding consequences of dental caries on well-being. Although participants expressed an understanding of the relationship between diet and dental caries, the majority ( $n=15/93\%$ ) reported that sodas and juices were the beverages most frequently given to their children. All of the participants ( $n=16/100\%$ ) identified snacks comprised of fermentable carbohydrates as the first choice served to their children.

**Conclusion:** Study results suggest caregivers from low socio-economic status backgrounds in the USVI should be educated on the risk factors for early childhood caries, and offered nutritional guidance on how to reduce the frequency of cariogenic foods and beverages for children in their care.

### Tobacco Cessation Counseling Training for Medicaid Dental Providers

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**Problem:** There is a higher level of tobacco use among Medicaid beneficiaries than in the general population. The aim of this project was to reduce tobacco use among Medicaid beneficiaries by supporting dental professionals to initiate and promote tobacco cessation in their practices.

**Purpose:** The purpose of this program was to develop open access, continuing education-based Tobacco Cessation (TC) training modules for dental professionals. Through statewide promotion of the website resources, target dental providers who treat Ohio Medicaid beneficiary patients.

**Key Features:** The Ohio Department of Medicaid (MedTAPP) funded a two-year grant between The Ohio State University College of Dentistry and Case Western Reserve University

School of Dental Medicine to create and distribute online modules, patient scenario videos and resources on tobacco related harm and tobacco cessation methods. Contributors included professionals from dentistry, dental hygiene, public health, social work, medicine and pharmacy. A website was created to host fourteen 30-minute modules, patient scenario videos, literature references and resources for TC referrals. Module topics included foundational knowledge on tobacco harm, skills for behavioral modification, pharmacological treatment approaches and TC in special populations. To receive continuing education credits, participants register, view the module presentations and satisfactorily complete module tests. Live virtual continuing education webinars, highlighting a selection of the modules and videos, were also presented in the spring and summer of 2020, at no charge, to dental professionals and community health centers. The completed modules and website resources went live October, 2019 and are available at: <https://www.ohpenup.com/tobacco-cessation.html>. The project connected with Community Health Clinics and Federally Qualified Health Centers throughout Ohio. Additional partners included the Ohio Dental Association, the Ohio Dental Hygienists' Association, the Ohio Association of Community Health Centers and the Oral Health Improvement Through Outreach (OHIO) Project.

**Evaluation Plan/Results:** As of January, 2021, 301 individuals had registered on the website; 91 registrants completed continuing education modules, with an average of 7 modules viewed. Registrants represented 6 dental professional organizations and 12 educational institutions in Ohio, along with private practitioners. Among registrants, approximately 68% were dental hygienists, 20% dentists, 6% dental assistants and 6% others. Over 40% of registrants reported serving a population of greater than 30% Medicaid beneficiaries. A nearly equal number of participants received continuing education credits through attendance at the live virtual webinars. This project encouraged dental professionals to increase their knowledge of oral and systemic harm caused by tobacco use and to expand their skills in tobacco cessation methods.

### Medical Emergency Management Training Utilizing High-fidelity Simulation: Faculty Confidence Levels and Perceptions

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**Problem:** Dental offices are seeing a growing number of geriatric and medically compromised patients in their practices that may increase the likelihood of medical emergencies. According to the Centers for Disease Control and Prevention (CDC), 80% of the older population have one chronic disease and 50% have two or more chronic diseases. Research has indicated a lack of confidence among dental professionals when dealing with medical emergencies.

**Purpose:** The purpose of this study was to determine faculty confidence in managing medical emergencies in the dental clinic utilizing high-fidelity simulation and assess their perceptions on utilizing this type of training within the dental hygiene curriculum.

**Methods:** This descriptive quantitative pilot study used a convenience sample of dental hygiene faculty observing student medical emergency simulation training at a small Midwest university. Prior to simulations, a pre-survey designed by the researchers was given to supervising faculty (n=11). This survey contained 12 statements regarding confidence when performing various medical emergency skills. A 5-point Likert scale was used to assess confidence. A post survey containing the same questions plus 5 additional questions regarding student engagement, learning, and future recommendations was distributed immediately following. Research data were analyzed using Wilcoxon signed-rank tests.

**Results:** For 11 of the 12 statements, an increase in confidence was reflected in the faculty's mean scores. A significant increase of confidence was identified for 1) administering emergency oxygen ( $p=0.038$ ), 2) administering emergency medications ( $p=0.001$ ), 3) obtaining accurate blood pressure readings ( $p=0.025$ ), 4) initiating and implementing "Code Blue" emergency protocols ( $p=0.012$ ), 5) managing a medical emergency ( $p=0.011$ ), and 6) communicating with the patient during a medical emergency ( $p=0.026$ ). All faculty stated the medical emergency simulation engaged the students, enhanced their learning, and would help them remember emergency procedures better. Furthermore, faculty recommended additional emergency simulation experiences and continued implementation of this type of training to teach future dental hygiene students.

**Conclusion:** High-fidelity simulation provides an opportunity for students to experience real-life medical emergencies without risk to patients. This type of training may be an effective tool to enhance learning and increase confidence in medical emergency management not only for the students but also for faculty in their own dental practice.

### The Relationship Between Workload and Burnout in Dental Hygiene Program Directors

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**Problem:** Workplace burnout is a complex interplay of work stressors that cause physical, emotional, and mental exhaustion and is associated with job negativity, decreased work efficiency, and adverse health effects. The multiple demands of academic program administrators may place them at increased risk for burnout. The purpose of this study was to determine if prevalence of burnout among entry-level dental hygiene program directors was affected by workload.

**Methods:** A descriptive design was used to generate information regarding workload and the extent to which entry-level dental hygiene program directors in the United States experience workplace burnout. The Copenhagen Burnout Inventory (CBI) survey, a valid and realizable measure of burnout, was distributed electronically to a convenience sample of 325 dental hygiene program directors. Scored on a five-point Likert scale, the CBI measures overall, personal (6 questions), work-related (7 questions), and client/student-related (6 questions) burnout. Additionally, five demographic and three open-ended questions related to burnout were also included in the survey. Descriptive statistics and ANOVA were used to analyze data.

**Results:** The response rate was 39.1% (n=127). On the work-related burnout scale, more than half (52%, n=65) of participants indicated moderate to severe burnout. ANOVA revealed no statistically significant findings for overall CBI mean scores or any subscale based on administrative or research/scholarly activity workloads. However, ANOVA revealed statistically significant differences when comparing teaching workloads for program directors on the work-related burnout subscale ( $F(6, 126)=2.942, p=0.010$ ). Tukey post hoc tests revealed program directors with teaching workloads of 51-60% indicated significantly lower burnout on the work-

related burnout subscale when compared to program directors with teaching workloads of 31-40% ( $x=29.76, x=55.36$ , respectively;  $p=0.045$ ) and greater than 60% ( $x=29.76, x=55.71$ , respectively;  $p=0.028$ ).

**Conclusion:** Results suggest workload impacts burnout. Program directors with higher teaching loads may have fewer administrative and research/scholarly activities contributing to lower work-related burnout levels. Regardless, one out of two dental hygiene program directors experience some type of burnout with the highest prevalence in the personal burnout subscale. Participants with the lowest workload allocations for administrative duties had higher overall burnout scores. More research is needed to identify stressors that cause burnout as well as mitigation strategies and education to alleviate burnout whether personal, work-related, and/or client/student related.

### Knowledge of HPV among Dental Hygiene Students in Illinois

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**Problem:** Human papillomavirus (HPV) is becoming more prevalent among individuals and manifestations can be identified in the oral cavity at routine dental visits. HPV can go undiagnosed, although patients may have symptoms present in the oral cavity. A lack of understanding exists between HPV related lesions and other intraoral conditions. Furthermore, dental hygienists must feel confident in providing education on HPV.

**Purpose:** The purpose of this research is to assess the knowledge of HPV and confidence in providing patient education on HPV among associate and baccalaureate dental hygiene students in the state of Illinois. Differences between seniors and non-seniors were also examined.

**Methods:** This IRB approved, quantitative, cross-sectional study evaluated the students' knowledge and confidence in providing patient education on HPV. A 43-item electronic survey was developed to compile data collection that consisted of demographic and polar questions. The survey was emailed to eight program directors throughout the state to forward to their students (n=69, 26% response rate). A value of 1 was assigned for each correct answer on the composite knowledge score. The highest possible composite knowledge score was 41. Composite knowledge scores and confidence questions were



compared between senior students and non-seniors using an independent t-test and Mann-Whitney U test, respectively. The chi-square goodness of fit test was used to assess students' knowledge of oral manifestations of HPV. The study was approved by the SIUC's IRB (20230).

**Results:** The internal consistency ( $\alpha$ ) for the knowledge subscale and confidence subscale of the survey was 0.76 and 0.95, respectively, indicating adequate internal consistency for both sub-scales. There were no statistically significant differences between senior students and non-seniors for the composite knowledge scores or the confidence questions. The average confidence score for providing patient education was 3.28. Chi-square was statistically significant ( $p < 0.001$ ) for focal epithelial hyperplasia, oral squamous papilla, and condyloma acuminatum, indicating that students identified these intraoral manifestations less frequently than expected.

**Conclusions:** The results indicate more education regarding HPV is indicated through the dental hygiene curriculum based on the low knowledge score and low levels of confidence in providing patient education. Dental hygiene students did not feel confident discussing HPV with their patients but felt it was important to do so. Limitations included social desirability bias and small sample size.

### Implementation of the Objective Structured Clinical Examination (OSCE) in the Assessment of in Dental Materials

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**Problem:** Workplace burnout is a complex interplay of work stressors that cause physical, emotional, and mental exhaustion and is associated with job negativity, decreased work efficiency, and adverse health effects. The multiple demands of academic program administrators may place them at increased risk for burnout.

**Purpose:** The purpose of this study was to determine if prevalence of burnout among entry-level dental hygiene program directors was affected by workload.

**Key Features:** The learning structure uses a “tell, show, do” approach. Students attend lecture followed by positive reinforcement with a demonstration and hands on laboratory experience. The student then collects material and verbalizes the procedure and rationale to the “mock” patient. During the procedure, the student orally presents each step describing

the manipulation properly and delivery of the material. The student makes the commitment to the OSCE and challenged with questions directed with temperature change and setting times appropriate to the materials. Each OSCE is built on detailed rubrics describing a step-by-step process in the manipulation and delivery of material based on a case study. Expected outcomes include patient evaluation, rationale for material use, armamentarium, patient safety, manipulation, delivery and patient post-operative instructions.

**Evaluation Plan:** Four cohorts of students (2017-2020) participated in the investigation comparing outcomes in dental materials. The first group (n=90, 2017 and 2018) used a traditional practicum framework. The second group (n=91, 2019-2020) used the OSCE method. Evaluation of student performance of both groups was determined through identical quizzes, and exams. The OSCE group scores reflected consistently higher performance rates, whereas the scores for groups performing practicums revealed larger difference in student understanding. Those performing OSCE's scored higher, demonstrating a significant benefit to student learning with the implementation of the OSCE.

### Dental Hygiene Faculty and Student Knowledge, Psychological Health and Vaccination Behaviors Regarding COVID-19: A pilot study

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**Problem:** The COVID-19 pandemic has been characterized by extreme uncertainty, stress, and anxiety. Mitigating risk of contracting and transmitting COVID-19 while remaining current with the ever-changing information and guidelines has been challenging. Dental hygienists need accurate knowledge about COVID-19 in order to protect themselves and their patients. Lack of knowledge and psychological health may impact behaviors including vaccination.

**Purpose:** This pilot study aimed to gain insights on dental hygiene faculty and student COVID-19 knowledge, psychological health during the pandemic, and vaccination behaviors.

**Methods:** This descriptive quantitative pilot study used a 26-item online survey to examine the impact of COVID-19 on psychological health (10 items), decision to receive vaccination (2 items), and knowledge of COVID-19 (10 items). The validated Patient Health Questionnaire 4 (PHQ-

4) screened participants for depression and anxiety. Data collected between February 26 to March 1 were analyzed using descriptive statistical methods and t-tests.

**Results:** The 52 participants in this convenience sample were knowledgeable about COVID-19; the faculty mean knowledge score of 8.78 out of 10 was significantly higher than students at 7.79 ( $p=0.021$ ). Of the ten items, 69.2% of participants did not know if the Food and Drug Administration had approved any drugs to treat COVID-19, and 42.3% did not know if ultraviolet light could be used to disinfect surfaces. The PHQ-4 identified 38.5% of participants with elevated anxiety scores and 21.2% with elevated depression scores. The mean PHQ-4 scores of students (2.57) were higher than faculty (0.89) at a significant level ( $p=0.023$ ). Participants were significantly more anxious about contracting ( $p=0.037$ ) and unknowingly transmitting ( $p=0.002$ ) COVID-19 to others during normal daily activities than during clinical treatment. Of the students, 19 (46.3%) had received at least one dose of the vaccine, 13 (31.7%) intended to vaccinate in the future, and 9 (21.4%) did not plan to be vaccinated. One (11.1%) of the eight faculty did not plan to be vaccinated. Participants who did not plan to be vaccinated listed concerns about limited research regarding adverse effects.

**Conclusion:** In this pilot study, the majority of dental hygiene faculty and students were knowledgeable about COVID-19 and willing to be vaccinated, regardless of psychological health. It is essential for faculty to know the latest information and guidelines about COVID-19, and to educate students and patients. Further research with a larger sample is needed to determine if correlations exist between knowledge scores, vaccination behaviors, and/or psychological health.

### Effectiveness of Adjunct Laser Therapy on Periodontal Pathogens: A systematic review

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**Problem:** Dental hygienists need to offer patients the most effective treatments possible within their scope of practice. In 2015, a systematic review and meta-analysis was published in the Journal of the American Dental Association indicating the use of photodynamic therapy with diode lasers as beneficial adjuncts to NSPT. However, the use of lasers within the dental hygiene scope of practice, including as an adjunct to

non-surgical periodontal therapy (NSPT) continues to be a contentious subject.

**Purpose:** The objective of this systematic review was to evaluate if adjunct laser treatment was more effective than traditional NSPT alone in the reduction of periodontal pathogens.

**Methods:** To answer the question, “what is the efficacy of the adjunct use of dental lasers (including diode, NdYAG, ErYAG, and CO2) on microbiological parameters/indices,” PubMed, Google Scholar, CINAHL, and Web of Science databases were searched for literature pertaining to the effects of laser therapy on periodontal microbes. The primary outcome was the reduction of periodontal pathogens. Inclusion criteria were randomized clinical trials, human studies, and published in English between January 2015 and December 2020. Keywords included “nonsurgical periodontal therapy”, “periodontal disease”, “laser therapy”, and “pathogens.” These terms were combined in various ways with “AND” and “OR” commands to obtain the most narrowly defined and relevant articles. A total of 1662 records were found, and after screening titles and abstracts, 187 articles were included. After full texts of the remaining studies were screened, another 174 publications were excluded. All screening was performed by three investigators. Thirteen, relevant full-text articles were read and evaluated independently. A meta-analysis was not performed because of the heterogeneity of the study designs.

**Results:** Overall, seven of the studies in this systematic review reported better treatment outcomes than SRP alone while six studies reported that the outcomes were comparable to SRP alone. All studies were assessed using a Cochrane review. Nine of the articles showed low risk of bias while four of the studies showed moderate risk of bias due to lack of information regarding some of the domains.

**Conclusion:** Within the limitations of the studies included in this systematic review, certain types of laser treatment in conjunction with NSPT are more effective at reducing the number of periodontal pathogens than SRP alone. The adjunct use of combined Nd:YAG + Er:YAG and diode lasers, including their use in photodynamic and low-level laser therapy, resulted in more improvement of microbiological parameters than SRP alone.

## **Integrating Case Management into the Dental Hygienist's Role: Improving Access to and Utilization of Oral Health Care for Pregnant Women**

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**Problem:** In Maryland, Medicaid provides dental coverage for pregnant women yet only 28 percent of enrollees had a dental visit in 2018. Medicaid-enrolled pregnant women experience barriers to accessing dental care, which can negatively impact maternal and child health. This innovative program aims to decrease barriers to oral health care for an underserved community while providing experience for future dental hygienists in treating patients whose health outcomes are impacted by social determinants.

**Purpose:** In partnership with the University of Maryland Women's Health Center (UMWHC), the University of Maryland School of Dentistry's (UMSOD) Dental Hygiene program developed a case management protocol for low-income pregnant women to increase utilization of oral health care services. This program was designed to expand access to oral health care by integrating dental hygiene faculty and students into the prenatal healthcare protocol at a university-based women's health center.

**Key Features:** Key features of the program include (1) frequent dialogue between the UMWHC prenatal providers and the UMSOD to manage dental referrals and address patient concerns and 2) a streamlined, multistep process at the UMSOD to schedule, register, and coordinate oral health care that builds patient trust and addresses patients' dental needs. Information regarding prenatal oral health care safety, importance, and coverage by Medicaid, is disseminated to pregnant women through Zoom presentations during UMWHC "baby shower" events and case management services (via text or phone). These services are integral to increasing oral health equity for vulnerable pregnant women and expands the scope of dental hygiene practice.

**Plan Evaluation:** Data has been collected monthly by the program coordinator since program initiation in 2018, to evaluate effectiveness. Measures include: 1) number of pregnant women referred to the UMSOD from the UMWHC, 2) number of pregnant women who report for dental appointments at the UMSOD, 3) number of pregnant women who do not show for dental appointments at the UMSOD, and 4) number of pregnant women who complete comprehensive dental hygiene care. Current program data

collected through case management of all UMWHC referrals indicates that partnering with the UMWHC and providing case management services has: 1) increased referrals from 5 to 30 per month, 2) increased the number of pregnant women who have dental appointments from 3 to 12 per month, 3) decreased the percentage of pregnant women who do not show for appointments from 75% to 31%, and 4) increased the percentage of pregnant women who completed dental hygiene care from 47% to 62%.

## **The Correlation between Periodontal Disease and Systemic Health in Rural Southern Illinois**

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**Problem:** Patients who are treated in the dental practice often do not associate oral health with systemic health. Incomplete health history self-reporting confirms the lack of knowledge of current or existing health conditions. Periodontal disease can affect all individuals, although there is a higher prevalence among those living below the federal poverty level. In the southern Illinois region, approximately 1/3 of the population is covered under the medical assistance program.

**Purpose:** The purpose of this study was to identify the correlation between systemic health issues and periodontal disease and determine if consistencies exist with data from southern Illinois and national trends.

**Methods:** A convenience sample of current patients in the advanced periodontics clinic at Southern Illinois University Carbondale (SIUC) agreed to participate in this IRB approved study. An Excel data sheet was used to gather demographic information in addition to health issues and dental concerns from June 2019 to February 2020. Medical information included conditions that affect the nervous system, respiratory system, endocrine system, bone/muscle disorders, digestive system, urinary system, heart/blood vessel disorders and 'other' conditions. Patients received a periodontal screening to determine calculus deposit levels and the overall periodontal condition. Chi-square test of independence was calculated to test the relationship between systemic health issues and periodontal disease.

**Results:** High blood pressure was the most reported systemic health issue among all patients and among those ages 50 and older. Statistically significant relationships were found between periodontal disease and high blood pressure, joint

pain, and arthritis among all patients (n=927). No statistically significant relationships ( $p < 0.05$ ) were identified among those age 50 and older (n=348) however, not all patients completed all portions of the health history.

**Conclusion:** Oral-systemic relationships between perio-dontal disease, hypertension and joint conditions were identified from the data collected at the dental hygiene clinic at SIUC, an access point for patients who lack health care in the region. The dental hygiene clinic is the access point for patients who lack healthcare in the region. Future research should focus on educating this vulnerable population on oral-systemic health and overall risk reduction.

### Impacts of Instrument Handle Design on Muscle Activity Production in Dental Hygienists

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**Problem:** Dental Hygienists are at an increased risk for developing musculoskeletal disorders due to the repetitive practice of instrumentation. Ergonomic instrument designs need to be identified to reduce muscle activity production and decrease the risk of musculoskeletal disorders in practitioners.

**Purpose:** The purpose of this study was to compare the effects of commercially available instrument handle designs on forearm muscle activity during scaling by dental hygienists in a simulated oral environment.

**Methods:** A convenience sample of 25 registered dental hygienists were recruited for this IRB-approved study. Ten commercially available instruments were categorized into four groups based on their weights and diameters: large diameter/lightweight, small diameter/lightweight, large diameter/heavy weight, and small diameter/heavy weight. Participants were randomized to four instruments with one from each group. Participants scaled with each instrument in a simulated oral environment while muscle activity was collected using surface electromyography. Muscle activity was compared among the four instrument group types.

**Results:** Muscle activity of the flexor digitorum superficialis was not significantly influenced by instrument weight ( $p = .60$ ) or diameter ( $p = .15$ ). Flexor pollicis longus muscle activity was not significantly influenced by instrument weight ( $p = .81$ ); diameter had a significant effect ( $p = .001$ ) with smaller diameter instruments producing more muscle activity. For the extensor digitorum communis and extensor carpi radialis

brevis, instrument weight did not significantly affect muscle activity ( $p = .64$ ,  $p = .43$ ), while diameter narrowly failed to reach significance for both muscles ( $p = .08$ ,  $p = .08$ ); muscle activity for both muscles increased with smaller diameter instruments.

**Conclusion:** Results from this study indicate instrument diameter is more influential than weight on muscle activity production; small diameter instruments increased muscle activity generation when compared to large diameter instruments. Future research in real-world settings is needed to determine the clinical impact of these findings.