

DENTSPLY Posters

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Dental Hygiene Student Knowledge of Genetics in Dentistry: Baseline Measures

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Problem: Current information about dental hygiene students' knowledge of genetics in dentistry is unavailable. This study provides a baseline assessment of dental hygiene students' knowledge prior to implementation of formal instruction related to genetics and oral health.

Methods: An instrument to test students' knowledge of genetics was developed in consultation with a geneticist and pilot tested with dental students. The instrument included case scenarios with genetic components and definitions of genetic terms. Data were collected from entering dental hygiene (DH) students on the first day of class and senior DH students in their final semester. Responses were entered into SPSS 16.0 and comparisons were made between the two levels of students using independent sample T-tests.

Results: Senior DH students averaged a higher total score (54%) than entering DH students (48%). This difference was not statistically significant. Entering students did slightly better than seniors on the definition section of the exam with scores of 45% and 42% respectively. Seniors did significantly better than entering students on the case scenarios section of the test ($p=.013$) with scores of 63% and 51% respectively. Senior students scored significantly higher than entering students on case scenarios relating to periodontal disease, ectodermal dysplasia and Down syndrome.

Conclusion: Both entering and graduating dental hygiene students scored low, less than a 55% on an exam, in a program with no formalized genetics content. A genetic curriculum using Web-based case simulations will be implemented in the fall of 2008 at the University of Michigan with dental hygiene students. Ongoing assessment will be conducted.

Bactericidal Effects of Low Temperature Atmospheric Pressure Plasma on Porphyromonas Gingivalis

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Purpose: The biomedical application of low temperature atmospheric pressure plasma (LTAPP) is a collaborative interest for engineering, medical, dental and biological researchers. This laboratory study tested whether LTAPP can limit growth of Porphyromonas gingivalis, a periodontal pathogen strongly associated with periodontal disease, disease progression, and refractory periodontitis.

Methods: After extensive pilot trials, the study consisted of

24 agar plate samples of P. gingivalis- 20 samples were exposed to LTAPP at 5, 7, 9 and 10 minutes and 4 control samples were exposed to helium gas only. Immediately after exposures, the samples were incubated anaerobically for 72 hour at 37°C. After 72 hours, zones of inhibition were measured.

Results: After 5, 7, 9, and 11 minutes of exposure times, results reveal a statistically significant difference in the bactericidal effect of the LTAPP on P. gingivalis compared to control bacteria not exposed, as measured by zone of inhibition (cm) ($p<0.0001$). Differences in the bactericidal effects were significant for each pair of consecutive time points: 5 minutes verses 7 minutes, 7 minutes verses 9 minutes, and 9 minutes verses 11 minutes ($p= 0.0360$, $p= 0.0009$, and $p<0.0001$, respectively).

Conclusions: LTAPP has a significant dose related bactericidal effect on P. gingivalis, as measured by zone of inhibition [here]

Professional Association Membership: Factors Affecting the Dental Hygienist's Decision to Join and the Value of Membership Benefits

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Dental hygienists throughout the nation are represented by professional associations that support and promote their interest. Benefits provided by membership within a professional association were assessed to determine if a direct relationship existed between what is deemed valuable to members and if non members also placed value on similar items. The social exchange theory was the theoretical framework used to understand value placed on membership within a professional association.

The purpose was to identifying if the value placed on membership benefits directly relate to the decision to join a professional association. This study utilized a Professional Membership Questionnaire (PAMQ) which was used for similar questions in the nursing profession. Using a Likert-type scale, it assigned value to 29 different membership benefits related to affiliation with a professional association, as well as collected demographic information. Open ended questions were included to assess benefits with highest value, past membership status and reasons for never joining or not renewing membership. Participants were selected from a list of licensed dental hygienists from four different states, Nebraska, Texas, Vermont, and Washington, with a sample size totaling 415. PAMQ surveys were mailed to random addresses on file with each state licensing body.

The results have not yet been analyzed. The statistical analysis will be completed using chi squared tests to determine differences between members and nonmembers in the value placed on the 29 benefits related to professional association membership. This will identify the necessary p-value to determine a statistically significant difference between the two groups.

Analysis of Periodontal Maintenance Care: An Exploratory Study

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Abstract: Periodontal Maintenance (PM) is comprised of the preventive, diagnostic, and therapeutic procedures needed for sustaining periodontal health. For PM to be effective, sufficient time must be allotted in accordance with the needs of the individual patient.

The purpose of this study was to assess the relative contribution of patient-level factors such as, oral health status, past compliance with maintenance, and medical condition/history, and time required for effective PM. 100 consecutive patients receiving PM were observed at a single time-point and components of PM timed in minutes/seconds. Descriptive statistics showed the average time for each component (in minutes) was: greeting 2:57, medical history 3:50, radiology 6:04, oral history 3:23, periodontal examination 14:23, assessments 3:22, treatment phase 29:34, treatment plan 5:25, dismissal time 6:21, OSHA 8:00 and total time 1 hour, 24 minutes. Bivariate analyses indicate that bleeding on probing, depth of pockets, gender, number of teeth, and oral hygiene are predictors that affect PM time.

Results from multiple linear regression showed BOP and subgingival calculus are significant predictors of total treatment ($p < .05$, $R^2 = .28$). The current standard of care for a PM appointment of 50–60 minutes appears to be insufficient with the average 1 hour, 24 minutes to achieve the goals of PM. BOP and subgingival calculus appear to be the greatest predictors of time when other variables are in the model. This data may influence the professional's view of the standard of care and be useful in planning appropriate time allotment for PM and advancements in treatment care management.

Training the Trainer: Disabilities and Dental Hygiene

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This study was intended to measure knowledge change of direct care staff upon administration of an oral health education completed by lecture materials and/or hands on training. The study was an experimental design which included 30 participants from a local agency dedicated to serve people with disabilities. The sample consisted originally of two groups of 15 participants each. However, the actual number of subjects was 14 in the experimental group and 10 in the control group. Each group was randomly assigned to either a control or an experimental group. The experimental group received a lecture and hands on training for a total of one hour and forty five minutes. The control group received a discussion. Both the experimental and control groups received a pre- test and a post test.

Considering all subjects together as a single group, $n=24$, the two sample t-test gave an estimated score difference of 0.05 which was significantly larger than zero (p -value=0.005), $t=2.168$, $df=23$, p -value= 0.005. Overall learning increased between tests. Considering the two groups independently, using a paired t-test to examine the data, the experimental group, $n=14$ had an estimated score difference of 0.0607 (p -value=0.01), $t=$

2.645, $df=13$, p -value= 0.01, which was a significant improvement. The control group $n=10$, had an estimated score difference of 0.035 (p -value=0.14), $t=1.172$, $df=9$, p -value= 0.135, which was not a significant improvement.

This study is beneficial in showing the influence of oral hygiene training for direct care staff who work with people with disabilities.

Current Status of Degree Completion Programs in Dental Hygiene Education

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Purpose: Dental hygiene baccalaureate degree completion programs are essential stepping stones between associate degree entry-level programs and graduate education. The purpose of this descriptive study was to assess student learning outcomes, learning experiences, assessment methods, and baccalaureate partnerships for degree completion programs, since a minimal amount of literature currently exists.

Methods: An online survey was used to collect data from 42 program directors whose degree completion programs met the inclusion criteria. Reliability and validity of the self-designed survey instrument was established by a panel of experts and pilot tested with three program directors whose programs did not meet the inclusion criteria. Program directors were either contacted to introduce the study protocol. The participants were provided a direct link to the survey and three e-mail messages were sent as reminders.

Results: A 62% ($n=26$) response rate was obtained. Results indicated that student learning outcomes were articulated for professional development, ethics, communication, critical thinking, evidence-based practice, career roles, leadership, community oral health, health promotion/disease prevention, dental hygiene clinical care, interprofessional collaboration, dental hygiene education, and preparation for graduate studies. Learning experiences included dental hygiene courses such as research (88.5%), educational methodology (65.4%), and practicum, internship, or externship (65.4%). Assessment methods included grade point averages (69.2%), capstone projects (65.4%), alumni surveys (65.4%), graduate exit interviews (50%), and portfolios (34.6%). Baccalaureate partnerships reported were articulation (87.5%), community college baccalaureate (8.3%), and university extension (4.2%) models.

Conclusions: Degree completion programs increase educational levels of associate degree graduates by providing opportunities for professional and career development.

Incorporating Oral-Systemic Evidence into Patient Care: Practice Behaviors and Barriers of North Carolina Dental Hygienists

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NDHRA focus area: Clinical Dental Hygiene Care

Problem: Current research has reported associations between periodontal and systemic health, however there are little

data regarding how dental hygienists (DH) are incorporating this evidence into practice.

The purpose of this study was to determine what practice behaviors are prevalent among North Carolina (NC) DH regarding the incorporation of oral-systemic evidence (OSE) into practice as well as perceived barriers to implementation.

Hypothesis: NC DH are not incorporating OSE into practice. **Methods:** A questionnaire was developed, pilot tested, revised and mailed to 1,665 licensed DH in NC. The response rate was 62% with 52% (N=859) of respondents meeting inclusion criteria. Survey data were analyzed using descriptive statistics and Chi-square analysis.

Results: Respondents were female (99%), with a two-year degree (84%). While a minority of DH (20%) reported measuring blood pressure (BP) routinely on all patients, a majority (62%) measure BP in select patients. Eighty-nine percent perform oral cancer screenings. Eight percent record blood sugar levels, but only 3% record HbA1c values. Fifty percent of DH are extremely likely to refer patients to a medical provider for follow up assessments. Conditions DH are likely to discuss with patients include tobacco use (89%), pregnancy (84%), and genetics (79%). Significant barriers to implementing OSE include lack of time (52%), concern over legal risks (44%), and lack of education (27%).

Conclusions: NC DH are implementing some aspects of OSE into practice but could take a more active role if they had more allotted time, education and training.

The Use of Guided Imagery in the Instruction of Periodontal Instrumentation Skills: A Pilot Study

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Purpose: Guided imagery (GI) is a process that allows a person to use their own imagination to connect their body and mind to achieve a desirable outcome such as the learning of a complex, perceptual-motor skill. Preparing students to perform clinical skills at a level that indicates achievement of accepted evaluation criteria may be facilitated by GI. The purpose of this study was to incorporate the use of GI into preclinical periodontal instrumentation training and evaluation by comparing a group of students who received GI in their instruction to a group who did not.

Objective: Compare the clinical evaluation of instrumentation skills for students who underwent GI vs. those who did not.

Methods: 21 students in the preclinical dental hygiene course were randomly assigned to two groups: GI or no GI. Pre/post test Vividness of Visual Imagery Questionnaire (VVIQ) was administered.

Results: There was no evidence that change in mean VVIQ scores were different between the groups ($p=0.616$). There was no evidence that mean instrument scores were different between the groups ($p=0.113 - 0.847$). A random intercept model was used to compare total scores between instruments and groups. The two groups were not different ($p=0.204$), but statistically significant differences ($p<0.0001$) in total scores were found.

Conclusions: Although the results of this study did not support the hypothesis that there would be improved performance of instrumentation skills for subjects who received GI vs. those subjects who did not, the follow-up questionnaire did indicate that the subjects who received GI were more relaxed.

Looking Ahead: Genes Linked to Periodontal Health and Tissue Regeneration

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NDHRA focus area: This research relates to the NDHRA focus area about how dental hygienists involve emerging science in diagnostic aspects of the dental hygiene process of care.

Problem: Genetic susceptibility is among the key risk factors for periodontal disease, with an estimated 30% of the population genetically susceptible. Diagnosis of periodontal risk genes may guide preventive hygiene measures and help at-risk individuals keep their teeth.

The purpose of this study was to investigate factors influencing periodontal development, including ankylosis protein (ANK) and ectonucleotide pyrophosphatase/phosphodiesterase 1 (ENPP1). Mouse models where either ANK or ENPP1 function was genetically knocked out (KO) were compared/contrasted.

Hypothesis: Based on similar functions of ANK and ENPP1, we hypothesized that ENPP1 KO mice would exhibit thick cementum comparable to previous data from ANK KO teeth.

Methods: Coronal sections of mouse first mandibular molars were examined at 26 days old, when tooth root was complete. Histomorphometry was used to measure cervical cementum, periodontal ligament, and bone in $n=3$ mice for KO and controls. ANOVA was used for intergroup statistical analysis.

Results: ANK and ENPP1 KO models exhibited cementum up to 12-fold thicker than controls, with ANK KO cementum thicker than ENPP1 KO. Periodontal ligament width was maintained in both KO mouse models despite cementum expansion.

Conclusions: Results supported our hypothesis that ENPP1 KO cementum would resemble ANK KO hypercementosis. Both factors are implicated to be critical in periodontal development/maintenance. Because their loss promotes cementogenesis, these factors may be good targets for therapies to promote cementum regeneration. (248)

The Effects of Social Promotion on the Validity and Predictability of Dental Hygiene Selection Criteria

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Dental hygiene education is rich in transformative, experiential learning that is integrated with classroom learning, in essence, the non-cognitive combined with the cognitive learning in order to transform the knowledge base into the clinical application. The increasing demand of knowledge base and clinical skills required of dental hygiene students creates a dilemma not only for student success but also for dental hygiene educators when students enter the program with less than the required aptitude and skills. If students are ill-prepared, it becomes a

daunting task to reach a level of competency for both the student and the educator. What is the cause of this discrepancy in the level of readiness for academic success? Traditionally, dental hygiene programs have relied on GPA and standardized test scores as the main selection criteria in their admissions process. Although these means may provide a picture of the applicant's cognitive abilities, they do nothing towards providing a picture of the non-cognitive abilities and the students' ultimate ability to succeed. Social promotion and its associated grade inflation may be a critical factor in why grade point average (GPA) is not an accurate indicator of a student's academic abilities. Realization of this discrepancy and the need for a solution to better predict student success was the impetus for this research project. The purpose of this study was to investigate the effects of social promotion on the validity and predictability of dental hygiene admissions selection criteria as it relates to student success in the program.

The Ethics of Live Patient Use in Dental Hygiene Clinical Licensure Examinations: A National Survey of Recently Licensed Dental Hygienists

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A national survey was conducted that explored the ethical issues involved with using live patients for dental hygiene clinical licensure examinations. The survey collected data regarding demographics, additional costs to candidates beyond the examination fees, delays in dental hygiene treatment, unethical candidate and/or patient behaviors and the provision of appropriate follow-up care. Survey questions addressed the ethical practices of respondents and included attitudinal questions which mirrored the same concepts. Respondents were also asked if they felt their clinical licensure examination was an accurate reflection of their clinical skills. The survey was mailed to 500 registered dental hygienists, from two states in each of the five licensure examination regions, with a response rate of 40.6% (n=203). The data was analyzed using descriptive statistics.

Results indicated that the majority of respondents spent additional money on examination related expenses (70.3%). Approximately 61% of respondents reported paying their patient, although only half felt that it was acceptable to do so. Over half of the respondents (53.1%) believed that it was appropriate to delay treatment in order to have a patient sit for the ex-

amination; however, only 16.4% reported delaying treatment. Informed consent was obtained by 94.9% of respondents. The majority of respondents (86.6%) made arrangements for dental hygiene follow-up care. When asked if they felt the examination was an accurate assessment of their clinical skills, 78.7% of respondents agreed.

The results indicated that the majority of respondents upheld the ethical standards of the dental hygiene profession and complied with examination rules.

Clinical Faculty Attitudes and Perceived Value of Magnification in Dental Hygiene Education

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Purpose: The purpose of this study was to appraise the perceived benefits of magnification loupes by clinical dental hygiene faculty, to assess the degree to which loupes were being utilized in educational settings, which factors were a deterrent to using magnification loupes in teaching and clinical practice and whether faculty were willing to endorse magnification loupes with students.

Methods: A 40-question electronic survey was completed by 249 clinical instructors from 37 states. This instrument assessed perceived advantages and disadvantages of loupes, the level of agreement with value statements regarding loupes, and reasons for avoidance.

Results: Chi-square analyses were used to compare user (n = 158) to non-user (n = 91) groups and found very highly significant differences (p = <0.001) for the advantage factors of "enhanced vision," "radiographic interpretation," and "soft tissue evaluation," and significant differences (p = <0.05) for "ergonomics/posture" and "caries detection," with magnification users rating the advantages more favorably. Significant differences were generally not found in assessment of disadvantages. Mean scores for agreement by users with value statements regarding loupes were high (>4.0 out of 5.0), and both groups agreed loupes should be at least optional in dental hygiene school. Half of the non-user group stated they did not use loupes because they were "too expensive."

Conclusion: This study shows support for magnification loupes to be at least optional in the dental hygiene curriculum. Although more than one-third of respondents did not personally use loupes, most appreciate that magnification offers significant benefits to dental hygiene clinicians.