

FACULTY CALIBRATION WITH INSTRUCTIONAL VIDEOS FOR HEAD AND
NECK EXAMINATIONS

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A thesis submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Science in Dental Hygiene Education in the Department of Dental Ecology in the School of Dentistry.

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ABSTRACT

Brandie BiLove Carter: Faculty Calibration with Instructional Videos for Head and Neck Examinations
(Under the direction of Jennifer Brame)

The primary objective of this pilot study was to evaluate the effect of an online head and neck examination instructional video for dental hygiene (DH) faculty knowledge. It was hypothesized that the use of such a video would increase knowledge and enhance calibration. Of 24 DH clinical faculty invited to participate, (N=18) completed an online pre-test, instructional video, immediate post-test, and four month follow up retention-test. Results showed a mean pre-test score of 68%, post-test score of 76%, and retention-test score of 80%. Scores increased 15.7% from pre-test to post-test, decreasing 2.8% from post-test to retention. There was a statistically significant difference between years of teaching experience and lower pre-test scores ($P=.012$). The knowledge increase was retained over four months and neither faculty position nor years of clinical or teaching experience affected test scores. The instructional video increased the knowledge level of DH clinical faculty for head and neck examinations.

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

CDC	Centers for Disease Control
CODA	Commission on Dental Accreditation
DH	Dental Hygiene
FT	Full time faculty
GTA	Graduate Teaching Assistant
HNOE	Head, Neck, and Oral Cancer Examination
IRB	Institutional Review Board
NC	North Carolina
PT	Part-time faculty
SPSS	Statistical Package for the Social Sciences
UNC	University of North Carolina at Chapel Hill

INTRODUCTION

Faculty calibration is most often seen as the level of agreement among multiple faculty members that occurs while assessing student performance.¹ Having a calibrated faculty should create an environment that initially promotes agreement by allowing a homogenous presentation of information to the student. Investigators emphasize that when faculty are calibrated, there is an increase in teaching and grading agreement which creates uniformity in learning for students.^{2,3} Research also provides us with insight to the detrimental effects of uncalibrated faculty. This includes inhibition of student learning, creating confusion and frustration among students, alteration of students' clinical performance to satisfy a particular instructor's grading style, and eventually impacting the quality of patient care.²⁻⁵ Students who are well prepared to provide quality patient care are then well prepared for their role as a dental hygienist.

Dental hygienists have an integral part in oral health prevention, treatment, and management. Dental hygienists fulfill their role by providing patient assessment, clinical treatment, and patient education. Included in the intra-oral patient assessment is the performance of the head, neck, and oral-cancer screening examination (HNOE). There are roughly 8,000 deaths annually from oral cancer with an 80% survival rate when diagnosed at stage one, supporting the striking survival rate difference for early detection.^{6,7} The HNOE may also identify manifestations of diseases such HIV, diabetes, GERD, osteoporosis, Crohn's disease, and leukemia that may be used in early diagnosis. Clinical signs of nutritional deficiencies and eating disorders may also appear during a head and neck exam. Due to these potentially life-saving findings, it is critical that this process be taught sequentially and methodically by each member of a calibrated team. Then arises the question of how to efficiently create a well calibrated team.

Although the literature shows the benefits of calibration and the disadvantages of the lack thereof, there is a need for research identifying the effectiveness of the various methods of calibration. The use of online self-instructional videos may facilitate calibration of faculty to ensure more effective and consistent instruction of the performance of head and neck examinations. This study aims to examine the

effectiveness of instructional technique videos for the purpose of increasing faculty knowledge on the performance of the HNOE. It also seeks to determine if the number of years of experience whether clinical or teaching will affect the outcome of participant test scores.

REVIEW OF THE LITERATURE

Dental Hygiene Education

Similar to many professional programs, clinical education in dental hygiene requires multiple faculty to provide individualized instruction to students. This requirement is mandated in the Commission on Dental Accreditation (CODA) Standards and states that there must be a ratio of one faculty member for six dental hygiene students in the clinical setting.⁸ According to the 2012 Dental Hygiene Program Director survey most dental hygiene programs have a maximum enrollment cap in place with an average of 81 applicants to 31 being admitted each year.⁹ To support the student learning environment and meet accreditation requirements, dental hygiene programs employ part-time, adjunct, and full-time faculty members in clinical education settings. On average the entry level dental hygiene curriculum contains 659 clocked hours of supervised clinical dental hygiene instruction.¹⁰ Twenty-nine percent of all programs use extended clinical facilities beyond their campus and 82% require students to perform a clinical rotation in a community or public health setting.⁹ Adding to the demand for clinical coverage, 34% of the programs include summer study.⁹ To meet the needs of these requirements, faculty are often hired with more clinical experience than teaching experience.^{11,12} Calibrating faculty for clinical teaching is essential to providing a quality education that can be reproduced for each student.

The Role of the Dental Hygienist

Dental hygienists provide educational, preventive, and therapeutic treatments to their patients.¹³ Dental hygienists play an integral role in the health care system and work closely with patients to monitor their oral health and overall health. Educating patients on the systemic relationship and discussing oral health is an important aspect in the patient-clinician relationship. Oral health is a state of being free from chronic mouth and facial pain, oral and throat cancer, oral sores, birth defects such as cleft lip and palate, periodontal disease, tooth decay, tooth loss, and other disease and disorders that affect the oral cavity.¹⁴ Dental hygienists develop a dental hygiene care plan individualized for each patient that includes assessment, diagnosis, planning, implementation and evaluation.¹³

The dental hygiene process of care contributes to the framework for overall health, which according to the World Health Organization is defined as a state of complete physical, mental, social well-being and not merely the absence of disease or infirmity.¹⁴ Developing a care plan involves gathering information from a patient's health history, oral hygiene and health habits, and combining them with what is seen clinically to determine immediate and future oral health needs. The information required for an accurate care plan is gathered during the patient assessment. The assessment covers a very broad scope of duties requiring an in-depth knowledge of radiology, pharmacology, anatomy and physiology as well as oral pathology. Dental hygienists must be competent in performing skills in the assessment and also critically assessing a patient's complete status of health. One example of this need for knowledge is our population's increase in prescription and over-the-counter medication use. According to the CDC from 2009-2012, the percentage of persons using at least one prescription drug in the last 30 days is 48.7%.¹⁵ Eight of the ten most frequently prescribed medications are for chronic conditions and can cause oral side effects.¹⁵ Today's dental hygienists must be prepared to provide a thorough assessment and counseling to their patients on a variety of conditions, clinical signs and symptoms.

The Head, Neck, and Oral Cancer Examination

Dental hygienists also play a key role in the detection of orofacial abnormalities through completion of an extra-oral and intraoral head and neck examination (HNOE). The HNOE is a vital component of the dental hygiene process of care, and it is during this examination that the clinician is evaluating for normal and abnormal findings. The HNOE includes examination of hard and soft tissues of the oral cavity, palpation of the thyroid, salivary glands, lymph nodes of the head and neck, and observation of the face, lips, ears, and neck for discoloration and evidence of asymmetry. The HNOE should be performed by the dental hygienist at each appointment and by the dentist at each clinical recall exam.

Many systemic diseases, deficiencies, and disorders may demonstrate oral manifestations. Diabetes, Crohn's disease, and lupus are a few that present with oral manifestations. Patients with systemic diseases and disorders may present with signs and symptoms including oral candidiasis, ulcerations and changes in mucosal integrity, prolonged wound healing, and even specific colorations and patterns such as Wickham striae.¹⁶ Even some vitamin deficiencies present themselves with oral side

effects such as prolonged bleeding from a Vitamin K deficiency.¹⁷ Other conditions such as bulimia may present with erosion and enlarged parotid glands. Additionally, oral and oropharyngeal cancer and other types of cancer may present in the oral cavity. These signs and symptoms appear clinically and may be noted during the HNOE.

Head and Neck Cancer Facts and Statistics

According to the Center for Disease Control (CDC) and American Cancer Society (ACS), there are approximately 30,000 newly documented cases of oral and oropharyngeal cancer each year with 8,000 deaths accounting for roughly 3% of all cancer diagnoses each year.^{6,18} Statistics show between 2009 and 2013 oral cancer rates were diagnosed at eleven out of every 100,000 people.⁶ Over the last ten years oral cancer rates have continued to rise at a rate of 0.6% each year, and there has not been a significant change in the death rates from 2004-2013.⁷ This trend of increase in diagnosis indicates the likelihood of a dental hygienist finding an oral cancer lesion during a routine examination.

Treatment for oral and oropharyngeal cancer can be exhaustive and expensive, often leaving the patient disfigured. Oral cancer has a five year, 50% survival rate making early detection the key to increasing survival rates.^{7,18} Risk factors include both behavioral and non-behavioral elements. Behavioral risks include tobacco use, alcohol consumption, excessive sun exposure, and human papillomavirus exposure. Non-behavioral risks include familial history.^{6,7,18,19} These risk factors can be identified during a medical history evaluation and HNOE by a dental hygienist. Additionally, the dental hygienist may discuss risk factors and prevention with patients during care. Due to the sensitivity of diagnosis timing and its impact on the prognosis, accuracy of the HNOE is vital to the patient's health and survival rates. This further emphasizes the relationship between oral and systemic health and the need for oral health care professionals to examine beyond the oral cavity.

Faculty Calibration

The HNOE is paramount in the detection of potentially life-threatening abnormal findings including systemic diseases, oral, and oropharyngeal cancer and is an essential component of the dental hygienist's care for each patient. The clinical relevance of this exam dictates the need for thorough training of dental hygienists in its performance, so as to enable them to detect any abnormalities in the head and neck region. Because of its significance, it is imperative that dental hygienists are taught from

the novice level how to correctly and accurately complete this examination. This overarching need for equal training places a great amount of responsibility on dental hygiene faculty. If this instruction is poor and fails expectations, then the students will not gain a strong foundation in this technique. In order to ensure the complete and thorough discovery and documentation of clinical findings a logical sequence should be followed when performing the exam. Students must first learn the anatomical structures, followed with a technique-specific method to ensure that all aspects have been evaluated. If a step in this process is overlooked or performed incorrectly it could have potentially fatal consequences to the patient. This process must be taught in a sequential and thorough manner which requires the calibration of all clinical faculty. Inconsistencies may arise in the formative and summative feedback when a mix of FT and/or PT faculty members are involved. This can inhibit student learning, create confusion and frustration among students, altering of students' clinical performance to satisfy a particular instructor's grading style, and eventually impact the quality of patient care.⁴A well calibrated faculty creates an educational experience that can be reproduced. Calibration creates an alignment of the information being taught, how the information is presented and terminology used. This creates a constructive learning environment and can enhance student satisfaction.³While calibration of faculty has been shown to create a positive student learning environment, there are various factors that inhibit successful calibration.² Some of the difficulties associated with faculty calibration include the number of adjunct (PT) faculty, the number of years of clinical experience of the educator, and the number of years of clinical education experience of the educator.^{4,20-22}

Lack of faculty calibration has been a chronic issue in dental hygiene education. Poorly calibrated faculty often result in inconsistent teaching.²³ This inconsistency leads to frustrated and often ill-equipped students that may lead to substandard patient care. Faculty calibrated towards achieving a gold standard creates a positive and productive learning environment for students that can be replicated. Distance learning, PT faculty, and faculty experience can all affect calibration. As many institutions employ part-time and full-time instructors to teach in the clinical setting, it can be difficult to find common times for all of these individual to meet for calibration. Additionally, those who are PT or work at distance education sites may not be able to attend calibration meetings only offered at specific times and locations. Use of online tools such as webinars, learning management systems, and instructional videos provide flexible

options for calibration of faculty. By providing a solid educational foundation for the skill of performing the head and neck exam, students will be in the best position to learn, adapt to expectations, and perfect this skill as part of their practice, thereby improving patient care and patient outcomes. Considering the need to utilize multiple faculty in dental hygiene clinical educational settings, calibration of knowledge may be difficult. Use of online self-instructional videos may be helpful to calibrate faculty to ensure more effective and consistent instruction of this procedure. Online calibration of the head and neck exam is an attempt to overcome these previously identified obstacles.

Instructional Technology

The incorporation of technology into dental education has increased despite much of the reluctance to implementation from faculty members.¹¹ Some of the reasons cited by faculty include technical difficulties, limited knowledge of how to use technology and misuse of technology by students during class time.¹¹ Beebe and colleagues found a variety of technology currently being used in dental hygiene programs in the United States. Content management systems such as Blackboard, Angel, and Moodle were reported by faculty in 80% of programs with primary usage in the areas of knowledge and reflection.¹¹ Podcasts, clickers, games, simulations, wikis, and blogs were reportedly being used for all types of didactic learning.¹¹ Videos, which were reported primarily as being used for clinical learning were seen as the most effective method by students.¹¹ Although some faculty may see this as a hindrance, studies show that both faculty and students have reported the use of technology as advantageous and even encourage active learning.^{11,24,25} Instructional technology has also been suggested as a potential solution for faculty shortages.²⁵ With technology being embraced more by each generation of student, and its effectiveness being cited in the literature, it is only logical that this method of instruction be tested as a possible vehicle for faculty calibration.

Purpose of This Study

Focusing on the need for creative and consistent faculty calibration, objectives of this study were to evaluate the effect of using an online instructional technique video on DH faculty test performance with respect to the HNOE technique. Additional aims were to identify whether the effect can be sustained over a four-month period, and to compare test performance among variants including years of clinical experience, years of teaching experience, and type of faculty appointment.

INTRODUCTION AND REVIEW OF THE LITERATURE

Faculty calibration is most often seen as the level of agreement among multiple faculty members that occurs while assessing student performance.¹ Having a calibrated faculty should create an environment that initially promotes agreement by allowing a homogenous presentation of information to the student. Investigators emphasize that when faculty are calibrated, there is an increase in teaching and grading agreement which creates uniformity in learning for students.^{2,3} Research also provides us with insight to the detrimental effects of uncalibrated faculty. This includes inhibition of student learning, creating confusion and frustration among students, alteration of students' clinical performance to satisfy a particular instructor's grading style, and eventually impacting the quality of patient care.²⁻⁵ Students who are well prepared to provide quality patient care are then well prepared for their role as a dental hygienist.

Dental hygienists have an integral part in oral health prevention, treatment, and management. Dental hygienists fulfill their role by providing patient assessment, clinical treatment, and patient education. Included in the intra-oral patient assessment is the performance of the head, neck, and oral-cancer screening examination (HNOE).

The HNOE may identify manifestations of oral and systemic diseases such as oropharyngeal cancer, HIV, diabetes, GERD, osteoporosis, Crohn's disease, and leukemia that may be used in early diagnosis. Clinical signs of nutritional deficiencies and eating disorders may also appear during a head and neck exam. The detection of oropharyngeal cancers resulting from the HNOE may have significant impacts on the patient's prognosis and survival rate. There are roughly 8,000 deaths annually from oral cancer with an 80% survival rate when diagnosed at stage one, supporting the striking survival rate difference for early detection.^{6,7} Due to these potentially life-saving findings, it is critical that this process be taught sequentially and methodically by each member of a calibrated team.

Although the literature shows the benefits of calibration and the disadvantages of the lack thereof, there is a need for research identifying the effectiveness of the various methods of calibration. One such means for faculty calibration is the implementation and use of technology. The incorporation of

technology into dental education has increased despite much of the reluctance to implementation from faculty members.¹¹ Some of the reasons cited by faculty include technical difficulties, limited knowledge of how to use technology and misuse of technology by students during class time.¹¹ Although some faculty may see technology as a hindrance, studies show that both faculty and students have reported its use as advantageous and even encouraging active learning.^{11,23,25} Videos, which were reported primarily as being used for clinical learning were seen as the most effective method by students.¹¹ The use of online self-instructional videos may facilitate calibration of faculty to ensure effective and consistent instruction of the performance of head and neck examinations.

Focusing on the need for creative and consistent faculty calibration, objectives of this study were to evaluate the effect of using an online instructional technique video on DH faculty test performance with respect to the HNOE technique. Additional aims were to identify whether the effect can be sustained over a four-month period, and to compare test performance among variants including years of clinical experience, years of teaching experience, and type of faculty appointment.

MATERIALS AND METHODS

This pilot study was developed to assess the level of knowledge of dental hygiene (DH) clinical faculty on the performance of the head and neck examination and to measure any change in knowledge over time. Approval for the study was obtained from the University of North Carolina at Chapel Hill (UNC) Institutional Review Board (IRB) (16-1734).

Participants for this study included all DH clinical faculty UNC School of Dentistry, DH Program. A list of twenty-four DH clinical faculty at UNC DH Program was gathered from an online university faculty directory and confirmed by the DH clinic director. The clinical faculty members included seven full-time (FT), six part-time (PT), and six graduate teaching assistants (GTA).

A survey and instructional video was used for this project. The instructional technique video used for this project was produced by the Office of Information Technologies and Digital Media, Nova Southeastern University and is a MedEd PORTAL publication.²⁶ The video is forty-five minutes in length and reviews importance and technique of the HNOE for health care professionals. A survey was developed and included twenty multiple choice questions that were developed based on the information presented in the technique video. Survey questions were pilot tested by two UNC DH faculty members who were not included in the study. Using a repeated measures design, the study was conducted after revisions were made to the questions based on the pilot testing.

Following pilot testing and revision to the survey, questions were uploaded into Qualtrics™, a web based survey software. The Qualtrics™ mailer system was used for distribution to all potential survey participants. An initial email was sent to all twenty-four faculty and informed recipients of the purpose and participation requirements of the study which included an online pre-test, review of an online instructional technique video, an online immediate post-test, and completion of an online four month retention test. A link in the Qualtrics™ email sent to faculty members served as implication of consent when they proceeded to use the link prompting them to the pre-test.

Baseline knowledge of the performance of the HNOE was established using the pre-test which also contained five demographic questions including their faculty position at UNC, number of years teaching experience, number of years clinical dental hygiene experience, if they felt calibration was necessary and if so, their preferred method of faculty calibration. DH faculty members were provided four weeks from initial contact to complete the online pre-test. The survey format allowed for participant completion without time restrictions but only allowed one submission of the survey.

A second Qualtrics™ generated email was then sent to the DH faculty members containing separate links to both the online technique video and the immediate post-test. The video was housed on Sakai, a password protected Learning Management System utilized at UNC. The secure site was only made available for participants of this research study with the link in the Qualtrics™ immediate post-test email. Faculty were given one week to watch the video and complete the immediate post-test. The immediate post-test consisted of the questions from the pre-test rearranged in random order and it followed the same submission format.

At the beginning of the spring semester, four months following the initial viewing of the instructional technique video and completing the immediate post-test, a Qualtrics™ generated email was sent to the DH faculty members containing a link to the retention test. The retention test once again consisted of the same questions in a randomized order.

Data was downloaded from the Qualtrics™ server into an Excel spreadsheet with the identities of the participants masked and exported from the Qualtrics™ server into a Statistical Package for the Social Sciences, (SPSS) program for statistical analysis. Descriptive statistics were generated for all study variables. T-tests were used to calculate and compare pre-test, immediate post-test, and retention test scores. Associations between the percentage of change in correct responses during pre-test, immediate post-test, retention test and the number of years teaching along with clinical experience were assessed using the Spearman's correlation coefficient. The alpha level of significance was set at .05. Participants who did not complete all parts of the study were omitted from data analysis that compared pre to post-test performance.

RESULTS

From the twenty-four UNC clinical DH faculty that were initially identified as eligible participants, nineteen completed the pre-test for an initial response rate of 79%. The immediate post-test was completed by 94% of the initial respondents (N=18). All of those who completed the immediate post-test completed the four month retention test.

Of the eighteen who responded, 38% were FT faculty, 27% were PT faculty, and 33% were GTAs. The majority of participants had less than five years of clinical dental hygiene experience at 38% and less than five years of clinical dental hygiene teaching experience. This data is shown in Table 1.

When asked if they felt faculty calibration of the performance of the head and neck examination was necessary, all of the participants agreed. Participants were asked to identify their preferred method of calibration, which varied among the group. Of the methods offered as choices for calibration, 33% preferred face-to-face instruction, 33% online lecture, 28% online self-instructional module, and 6% preferred a webinar. There was no correlation with test score and calibration method preference.

Baseline knowledge of the performance of the HNOE was demonstrated in the pre-test results with scores ranging from 50-85%. The immediate post-test scores ranged from 60-90 % with a final retention test scores continued to rise ranging from 65-95% with a mean score of 80% (Table 2). The overall mean test score improvement was seven points from pre-test score to immediate post-test score, continuing with an additional mean increase of five points from post-test to retention test.

The paired differences shown a percentage of score change from pre-test to post-test to be a knowledge increase of 12.4%. The percentage of change from pre-test to retention test was a knowledge increase of 15.7%. From post-test to retention test was a percentage change decrease of 2.8% indicating no significant change or knowledge lost over the four-month period (Table 3).

There was no statistical significance with regards to faculty position and test scores (Figure 1). Neither was there correlation between the numbers of years of clinical DH experience and pre post-test scores. A statistical significance was noted in the number of years of clinical teaching experience and pre-

test scores. Participants with greater years of clinical teaching experience were shown to have lower pre-test scores ($P=.012$), see Figure 2.

On the retention test, participants were asked the number of times they had previously viewed the technique video. Most (77.7%) of the participants chose once, 16.7% chose twice and 5.6% viewed it more than twice. The number of views also had statistically significant correlation with neither the post-test nor retention test scores.

DISCUSSION

With varying methods of calibration, this pilot study aimed to determine the effectiveness of an instructional technique video on faculty knowledge for the purpose of faculty calibration. Baseline data indicated most of the participants' pre-test scores increased following participation in the instructional technique video with an average increase in score of 12.4% or roughly seven points after watching the instructional technique video. This increase in knowledge scores suggests that technique videos may be an effective means in increasing subject knowledge including the introduction of verbiage and technique performance.

While one goal of faculty calibration may work toward increasing consistency in evaluation, it also must aim at consistency in use of terminology and sequencing during instruction. Teaching using a task analysis approach with uniformity of words used and instructions to the learner, may result with the most beneficial results for students and educators alike. The instruments used for calibration should be accurate and simple, increasing the correct information that is distributed and taught. Other studies that have examined calibration found that it should occur toward achievement of a gold standard.^{5,20} A gold standard includes criterion necessary to have ideal performance of the task at hand. The gold standard for this study was the technique performed in the calibrated instructional video.

Calibration among faculty may be difficult to determine without use of a knowledge-based feedback system. As Garland suggests, examiner scores should be compared before and after any training programs.² This ensures that calibration was successful at increasing information. Obtaining baseline data and comparative information occurred in this study by scores from three time points for reference including an initial pre-test, post-test, and four month retention test. This allowed the progressive increase of knowledge and overall retention of information to be observed.

Results from this study showed that there was a non-significant decrease in scores from the post-test to the four month retention test. This lack of significance in the decrease indicates with less than a 3% change, the knowledge gained was maintained by participations. Positive score retention could

indicate the faculty remained calibrated for the duration of an entire semester. This would help to ensure students would be accurately taught and evaluated on this performance technique from the time it was introduced through the end of the term.

While participants disagreed on their preferred method of calibration, initial knowledge and retention scores did not reflect correlation, and there was no statistical significance between scores. Our results also demonstrated no significant difference in scores between years of clinical or teaching experience, or type of faculty position. The increase in knowledge from all groups indicates that the online instructional technique video may be a viable option for all types of diverse faculty teams, even those who prefer other methods for calibration.

DH programs must adhere to certain standards set forth by CODA in order to achieve and maintain their accreditation status. Employment of PT faculty for clinical sessions becomes a necessity to maintain the required student to faculty ratios.⁸ Dental and allied dental programs also use extended campus facilities and faculty to support the clinical and educational curriculum. Having faculty that are not on-site with the program may also increase difficulties with calibration of education, assessment, and equipment used. Additionally, the literature has also documented current and future faculty shortages, especially with minorities, in both dental and allied dental programs.^{25,27,28} These shortages may lead to additional hiring of clinicians from private practice rather than educators to support the clinical educational settings. While clinicians may have excelled in their treatment of patients, they may not have the skills or training to be calibrated with other educators. Moreover, clinical teaching faculty may not participate in the didactic sessions of the dental hygiene curriculum making it difficult to ensure that the information given to students is consistent with the subject matter presented in class. These circumstances create the situation of having faculty in direct contact with and grading the students that realistically have concept concerning the original presentation of material to the students. The only way to ensure consistent feedback from faculty with a high level of reliability is to have effective methods of calibration that can be administered on a regular basis.

Considering the utilization of new and inexperienced PT and FT faculty in dental and allied dental education, easily accessible and flexible calibration options may be most conducive for programs when working to increase their faculty consistency in teaching and evaluation. Use of technology and online

calibration would allow for calibration without all faculty being present at the same time and would allow for repetition of the content according to the needs of the faculty member.

Beebe and colleagues evaluated the current use of technology existing in dental hygiene programs and the obstacles of increased implementation.¹¹ They found most often students preferred podcasts and videos possibly due to the convenience of viewing via personal device usage.¹¹ Likewise this study accommodated the participants by offering the ability to view the technique video and even complete the survey from their smart phones. If implemented this could allow faculty access to review the video immediately prior to each clinic session if necessary. Obstacles from faculty and students included the belief that the technology is ineffective however, it was argued this belief was grounded in the lack of its usage.¹¹ It is unlikely faculty will attempt to implement learning strategies for students which they feel unprepared to handle. This could include a lack of institutional technology support for any issues that may occur. Responsibly embracing technology occurs with proper institutional and faculty preparation including opportunities for exposure through varying methods such as faculty calibration. Gonzalez found the use of Twitter, blogging and even Pinterest was not only accepted by students in a Maxillofacial Radiology course but was also found to be effective in promoting student engagement.²⁵

While it may be perceived that increased clinical and teaching experiences equate to better educators with more knowledge, this is not an accurate assumption. Results from this study showed that participants with increased years of clinical teaching experience had lower pre-test scores. This could have been due to those with more teaching experience failing to refresh themselves periodically in the techniques of clinical procedures. Also there were no questions in the survey pertaining to any additional training of head and examinations post-graduation, therefore continuing education courses were not taken into consideration and could be considered a limiting factor.

A limitation to this study was the participant restriction to one institution and one subset of faculty. Future studies should include a larger sample size from multiple institutions that offer a variety of degrees including entry level. This could be facilitated with some type of incentive or mandate for participation. There could also be a method of validating all participants had actually received the invitation through email. There was no component that allowed participants to acknowledge receipt and decline participation. Faculty must also verify that instructional technique videos meet the standards and align

with the philosophy of their institutions. The quality and clarity of the information presented in the video attributed to its effectiveness in increasing knowledge.

As a continuation of this study, there could be a follow up to measure the calibration level of clinical implementation of the performance of the HNOE. Clinical observation of both faculty and students would broaden the knowledge base as to the effectiveness of this method of calibration. This technique has the possibility to be incorporated into other areas of dental hygiene education. There are such opportunities in reviewing health histories, the performance of vocal sedation for patients with anxieties, or even something as routine as flossing an implant.

The literature supports a need for faculty calibration to enhance student learning.^{2,3,4} There is a need for more research regarding types and frequency of faculty calibration to enhance student learning and educator consistency. Implications from this data may assist professional programs with their decision regarding type of faculty calibration. Additional studies should be performed to measure the need for frequent and repeated calibration, in addition to exploring other types of technology that can be utilized for faculty calibration.

CONCLUSIONS

Findings from this study indicate there was a significant increase in knowledge after viewing the instructional technique video that was able to be sustained after four months. Outlying factors such as calibration method preference, experience level and faculty position did not affect the participants' ability to gain and retain knowledge from the video.

TABLES

Table 1

	0-5	6-10	11-15	16-20	>20	Total
Years of Clinical Dental Hygiene Experience	38.9% (N=7)	22.2% (N=4)	5.6% (N=1)	0	33.3% (N=6)	100% (N=18)
Years of Clinical Dental Hygiene Teaching Experience	50% (N=9)	27.8% (N=5)	5.6% (N=1)	5.6% (N=1)	11.1% (N=2)	

PARITICIPANT DEMOGRAPHICS BASED ON YEARS OF EXPERIENCE

TABLE 2

	Highest	Lowest	Mean
Pretest	80	50	68
Posttest	90	60	75
Retention Test	95	65	80

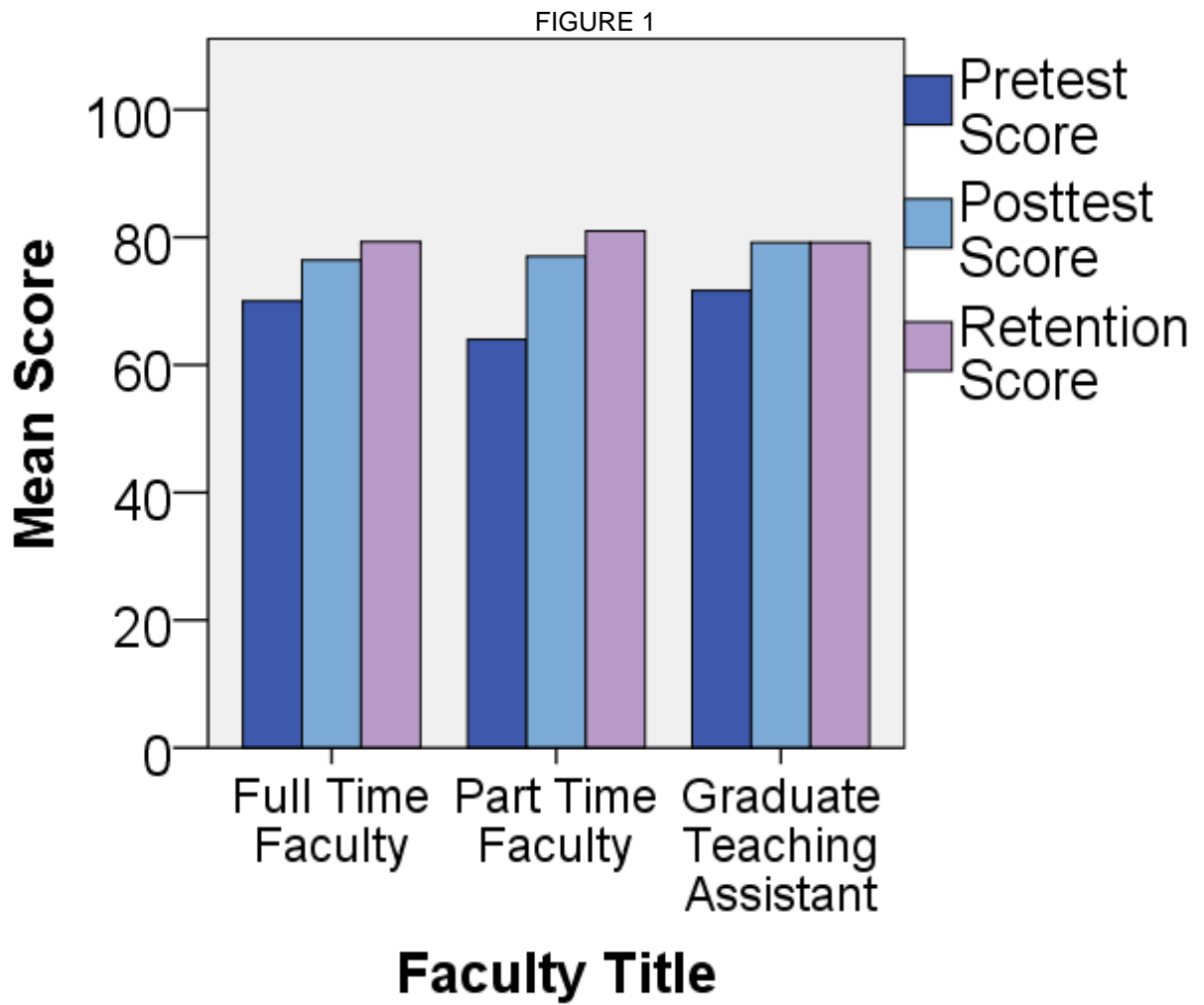
PERCENTAGE OF SCORE CHANGE FROM PRE-TEST TO RETENTION TEST

TABLE 3

Test Comparison	Mean Score	Percentage of Score Change	Significance of Change
Posttest vs Pretest	77.5 68.9	12.4%	.009
Retention vs Posttest	79.7 77.5	2.8%	.227
Retention vs Pretest	79.7 68.9	15.7%	.001

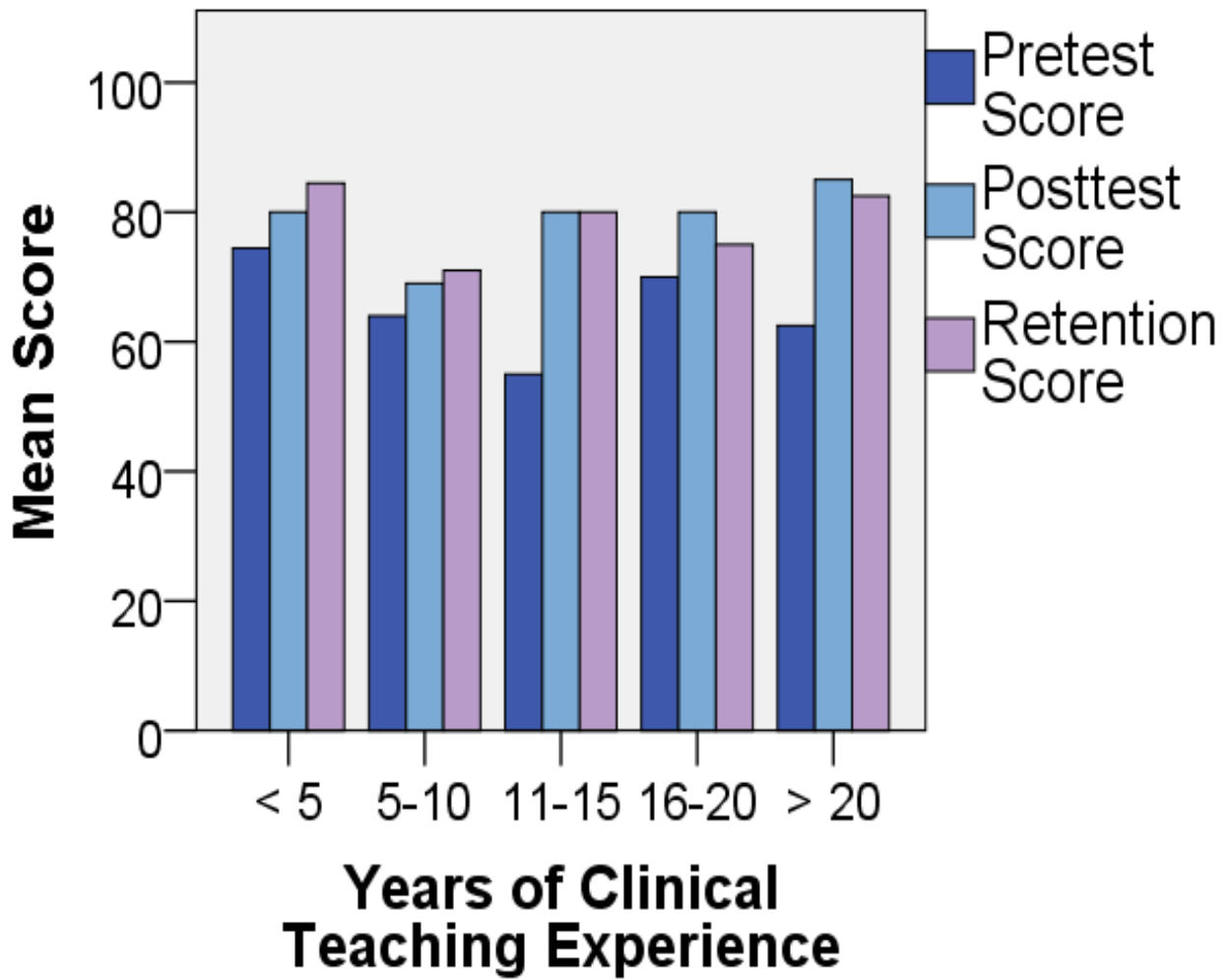
HIGHEST LOWEST AND MEAN TEST SCORES BASED ON FACULTY POSITION

FIGURES



PARTICIPANT DEMOGRAPHICS BASED ON FACULTY POSITON

FIGURE 2



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