The Effectiveness of a Self-Instructional Radiographic Anatomy Module on the Improvement of Test Performance for Dental Hygiene Faculty

Demah AlGheithy*, BSDH, MS; Enrique Platin, RTR, MS, EDD; Shannon Mitchell, RDH, MS; Jennifer Brame, RDH, MS

INTRODUCTION

National Dental Hygiene Research Agenda focus area: professional education and development.

Faculty calibration or training is a means of determining a standard that can be reproduced consistently.[1] Years of experience or educational background[2] may contribute to the lack of consistency among faculty, which can be frustrating for students, pose as a distraction to their learning, and affect their overall satisfaction with their education.[1]

Radiographs are used in conjunction with the clinical exam during patient care.[3] Moreover, dental radiology is an integral part of the dental hygiene (DH) curriculum, and national/regional board examinations.[4] To our knowledge there are no studies that attempt to calibrate DH faculty in the identification of normal radiographic anatomy.

Self-instructional modules have become popular in the dental education literature.[5] Studies evaluating the effects of self-instructional packages on student test performance, have found them to be no different or just as effective as other instructional formats.[6,7] Use of self-instructional packages in faculty groups has not been explored to the same extent.

CONTACT

Demah AlGheithy
Email: demah_algheithy@live.com
US Phone: +1 720 917-8212
SA Phone: +966 55 1353508

PROBLEM

Research evaluating the effectiveness of instructional methods to calibrate Dental Hygiene (DH) faculty in radiographic anatomy is limited.

AIM

This study evaluated the effect of using a Self-Instructional Radiographic Anatomy (SIRA) module on the improvement of DH faculty test performance regarding the identification of normal anatomy in intraoral and extraoral radiographic images.

HYPOTHESIS

Use of a SIRA module will improve DH faculty test performance in identification of normal radiographic anatomy. DH educators with more years of teaching experience will perform better than those with less experience.

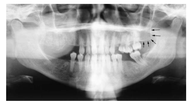
METHODS

This pilot study used a repeated measures design that was exempt from Institutional Review Board (IRB) review. DH clinical faculty (N=23) were invited to participate by completing a **pre-test**, **SIRA module**, an **immediate post-test**, and a **four-month follow-up post-test**. All study components were online and all tests were administered via Qualtrics (refer to **Figure 1** for examples of the test questions). Descriptive analyses, the Friedman's ANOVA, and the Exact-Wilcoxon-Signed-Rank test were used to analyze the data. Level of significance was set at 0.05

(a) The radiopaque feature at the tips of the arrows is:

O Nasal border
O Nasal fossa
O Anterior nasal spine
O Posterior nasal spine

(b) The anatomic feature delineated by the arrows is:



O Glenoid fossa
O Maxillary tuberosity
O Maxillary sinus
O Infraorbital canal

Test questions asked participants to correctly identify normal radiographic anatomy from: **(a)** intraoral periapical radiographs or **(b)** extraoral panoramic radiographs.

Figure 1: Examples of the Qualtrics multiple choice test questions

RESULTS

Pre-test response rate was **73.9%** (N=17); **88.2%** (N=15) of initial participants completed the immediate and follow-up post-tests. Participants included: **5 full-time faculty**, **5 part-time faculty**, and **5 graduate teaching assistants**. The Friedman's ANOVA indicated no statistically significant difference (P=0.179) in the percentage of correct responses between the three tests (pre, immediate post and follow-up post).

RESULTS

Table 1: Dental hygiene faculty test performance for all pre and post-tests

	N (%)	P25	Median	P75	P-value
Percentage of correct responses:					0.179[(a)]
Pre	17 (73.9)	60.0	65.0	70.0	
Immediate post	15 (88.2)	65.0	75.0	80.0	
Follow-up post	15 (88.2)	60.0	70.0	75.0	
Percent change between tests:					
Pre to immediate post	15 (88.2)	-5.0	5.0	15.0	0.054[(b)]
Pre to follow-up post	15 (88.2)	-10.0	0.0	10.0	0.665[(b)]
Immediate post to follow-up post	15 (88.2)	-15.0	0.0	0.0	0.106[(b)]

(a) P-value for the Friedman's ANOVA
(b) P-value for the Exact-Wilcoxon-Singed-Rank

Table 2: Percent change between the different tests according to faculty groupings

	N (%)	P25	Median	P75
Percent change from pre-test to immediate post-test:				
Full-time faculty	5 (33.3)	5.0	5.0	10.0
Part-time faculty	5 (33.3)	10.0	15.0	20.0
Graduate teaching assistant	5 (33.3)	-10.0	-5.0	5.0
Percent change from pre-test to follow-up post-test:				
Full-time faculty	5 (33.3)	-10.0	5.0	10.0
Part-time faculty	5 (33.3)	-5.0	10.0	10.0
Graduate teaching assistant	5 (33.3)	-5.0	-5.0	0.0

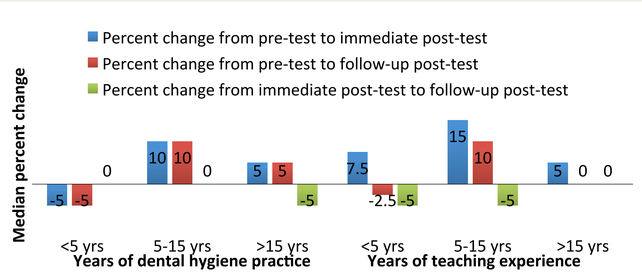


Figure 2: Median percent change for different test intervals according to years of dental hygiene practice and years of teaching experience

RESULTS

Table 3: Percent change between the different tests according to preference of instructional method

	N (%)	P25	Median	P75
Percent change from pre to immediate post-test:				
Face-to-face instruction	9 (60.0)	-5.0	5.0	10.0
Online instruction	5 (33.3)	5.0	5.0	15.0
Other	1 (6.7)	20.0	20.0	20.0
Percent change from pre to follow-up post-test:				
Face-to-face instruction	9 (60.0)	-5.0	0.0	5.0
Online instruction	5 (33.3)	-10.0	-5.0	10.0
Other	1 (6.7)	20.0	20.0	20.0

CONCLUSIONS

- Use of a SIRA module did not significantly affect DH faculty test performance. Lack of significance may be attributed to the small number of participants.
- Test performance at four-months was lower in comparison to immediate post-test results, indicating a need for frequent calibration interventions.
- Clinical DH faculty were receptive of using a SIRA module for knowledge enhancement; however, the preference for face-to-face instruction needs to be considered.
- Research evaluating the effectiveness of instructional methods aimed at calibrating DH faculty in intraoral and extraoral radiographic anatomy is scarce.
- Future research should consider a larger sample size when evaluating the effectiveness of possible calibration methods.

REFERENCES

1. Garland & Newell. J Dent Educ 2009.
2. Hellen-Halme & Petersson. Swed Dent J 2010.
3. Tetradis, Mallya, & Takei. In: Carranza's Clinical Periodontology 2015.
4. Potter, Powell, & Shrout. J Dent Educ 1993.
5. Chambers. J Dent Educ 2006.
6. Ludlow & Platin. J Dent Educ 2000.
7. Fleming, Mauriello, McKaig, & Ludlow. J Dent Hyg 2003.

ACKNOWLEDGEMENTS

Sincere thanks to: My thesis advisor, Jennifer Brame, and to my thesis committee members: Enrique Platin and Shannon Mitchell for their invaluable insight, feedback and motivation throughout the research process. Teresa Etscovitz for her IRB guidance; Katie Clark, MSPH for her Qualtrics consulting; John B. Ludlow, DDS, MS, FDS RCSEd, Professor of Oral and Maxillofacial Radiology for granting permission to use his online SIRA module; Ceib Phillips, MPH, PhD, Assistant Dean of Advanced Education and Graduate Studies, Professor for her statistical analysis and statistical consulting.