POSTER #

Periodontic Graduate Students and Program Directors' Considerations concerning Digital Dentistry: A National Survey

Raurie Petrich, Hom-Lay Wang & Marita R. Inglehart

University of Michigan - School of Dentistry, Ann Arbor, MI

ABSTRACT

Background: During the last two decades, a digital revolution occurred in dentistry with the introduction of Computer Aided Design & Computer Aided Manufacturing (CAD/CAM) and digital implant technology. The objectives were to assess how periodontic residents and program directors in the U.S. evaluate (a) the quality of periodontic graduate education about CBCT, intraoral scanning, 3-D printing and implant planning software and Stereolithography, (b) their satisfaction with this education, (c) their comfort with using this technology, and (d) their motivation for more education.

Methods: Data were collected with anonymous web-based surveys from 66 periodontic residents and 36 graduate program directors. The students answered the questions concerning their own educational experiences and the program directors focused on the educational experiences of their residents.

Results: The directors rated the residents' classroom-based education about intraoral scanning, 3-D and Stereolithography more positive than the residents. The same pattern of responses was also found when both groups rated the quality of their clinical education about these topics, their satisfaction with this education, their comfort with using it, and their motivation for more education. Both groups were moderately to very satisfied with the clinical graduate education about all topics other than Stereolithography. However, the residents were less comfortable to use intraoral scanning, 3-D printing, implant planning software and Stereolithography than the directors thought the residents were. Both groups wanted more education about these topics.

Lessons Learned: Program directors evaluated the quality of their residents' education and the degree of comfort with the technologies more positive than residents. However, both groups wanted more education about these topics. Open-ended responses were consistent with these differences and similarities.

INTRODUCTION

- In dentistry, the "digital workflow" comprising intraoral scanning for data acquisition, object design and 3D printing, is already in use for manufacturing of surgical guides, dental models and reconstructions.[1]
- Digital workflow education should be analyzed to better understand how the future generation and those entering practice are prepared for the digital era.[2]
- American Academy of Oral and Maxillofacial Radiology recommend-dation to use 3D imaging for all implant planning, with CBCT as the imaging modality of choice.[3]
- Technology enables dental education programs to improve patient care, and to revolutionize all aspects of the curriculum, from didactic courses to clinical instruction.[4]

AIMS

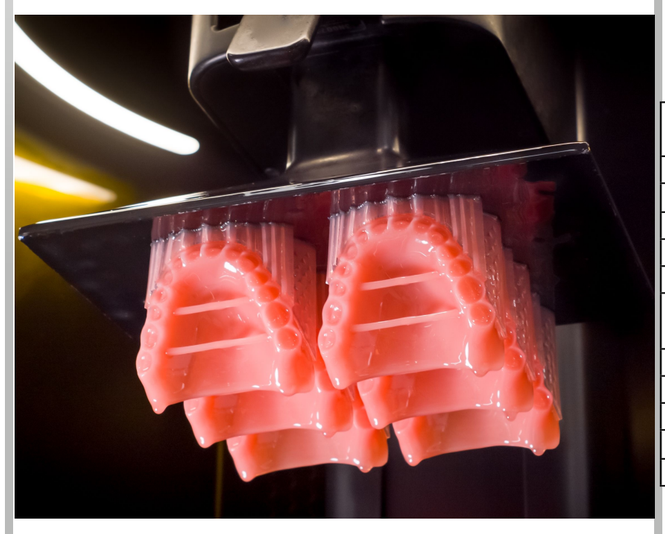
The objectives were to assess how periodontic residents and program directors in the United States evaluate

a. the quality of periodontic graduate education regarding CBCT, intraoral scanning, 3D printing, implant planning software, and Stereolithography

b. their satisfaction with this education,

c. their comfort with using this technology, and

d. their motivation for more education.



METHODS

This study was determined to be exempt from Institutional Review Board (IRB) oversight by the Health Sciences and Behavioral Sciences IRB at the University of Michigan, Ann Arbor, MI.

Study design: This research is a cross-sectional study of residents vs. directors of periodontic graduate programs in the U.S.

Respondents: Data was collected with anonymous web-based surveys from 66 residents and 36 directors. (See Table 1).

Procedure: The students answered the questions concerning their own educational experiences and the program directors focused on the educational experiences of their residents.

Table 1:
Background of residents and program directors

Background characteristics	Residents N = 66	Directors N = 34
Gender: - male - female	 62.5% 37.5%	n/a
Age: Mean - SD - Range	32.69 3.541 26-42	n/a
Educational characteristics	Residents Mean SD	Directors Mean SD
Year of dental school graduation: - Mean - Range	 2015.06 2005-2020	n/a
Year of residency program: - 2nd year - 3rd year - Just graduated	 4.8% 25.8% 69.4%	n/a
Type of program: - University based - Hospital based - Other setting - Military	 84.8% 4.5% 3.0% 7.6%	 97.1% 0 0 2.5%

Note: % might not add up to 100% due to rounding.

RESULTS

The first objective was to to assess how residents vs. program directors evaluated the quality of education about CBCT, intraoral scanning, 3-D printing, implant planning software and Stereolithography. Table 2 shows that the directors rated the residents' classroom-based education about intraoral scanning, 3-D printing, implant planning software and Stereolithography more positive than the residents. The same pattern of responses was also found when both groups rated the quality of their clinical education about these topics

Table 2: Comparison Residents vs. Directors

How well did your classroom education educate you about:	Residents Mean	Directors Mean
- CBCT	4.19	4.35
- Intraoral scanning	2.66	3.44***
- 3-D printing	2.62	3.35**
- Implant Planning software	3.47	4.41***
- Stereolithography	2.24	3.36***
How well did your clinical education educate you about:	Residents Mean	Directors Mean
- CBCT	4.57	4.53
- Intraoral scanning	3.08	3.79**
- 3-D printing	2.98	3.62*
- Implant Planning software	4.16	4.59**
- Stereolithography	2.50	3.56***

Note: * = p<0.05; ** = p<0.01; *** = p<0.001

The second objective was to assess how satisfied residents and program directors were with their education about these topics. Table 3 shows that both groups were moderately to very satisfied with the clinical graduate education about all topics other than Stereolithography.

Table 3: Residents vs. directors' satisfaction with their education

Satisfaction with clinical education about:	Residents Mean	Directors Mean
- CBCT	4.43	4.41
- Intraoral scanning	3.02	3.35
- 3-D printing	2.92	3.18
- Implant planning software	4.00	4.29
- Stereolithography	2.52	3.41***

The third objective was to compare resident-reported and director perceived comfort with using these technologies. Table 4 shows the directors were more confident in the residents vs the residents rated themselves regarding comfort levels in utilization of 3D printing, intraoral scanning, and Stereolithography.

Table 4: Resident-reported and director-perceived comfort

How comfortable are you to use	Residents Mean	Directors Mean
- CBCT	4.62	4.74
- Intraoral scanning	3.32	3.88**
- 3-D printing	2.91	3.65**
- Implant Planning software	4.35	4.62
- Stereolithography	2.52	3.76***

Note: * = p<0.05; ** = p<0.01; *** =p<0.001.

The fourth objective was to assess how motivated residents and program directors are for more education regarding these topics. Table 5 shows that both groups were moderately to very motivated in the pursuit of continuing education.

Table 5: Residents' and directors' motivation for more education

How much would you like to have more education about	Residents Mean	Directors Mean
- CBCT	3.26	3.32
- Intraoral scanning	3.75	4.06
- 3-D printing	4.09	4.15
- Implant planning software	3.60	3.47
- Stereolithography	3.77	3.67

DISCUSSION

As digital workflow burgeons and becomes commonplace for implantology and other facets of dentistry, the assessment of attitudes, comfort level, satisfaction, and quality in how these technologies are being implemented in Periodontal curricula is essential for future successes and practice. As both residents and program directors responses showed a motivation for continuing education, different educational modalities may be implemented to increase the overall quality, satisfaction, and comfort amongst periodontal residents.

CONCLUSIONS

- Program directors evaluated the quality of their residents' education and the degree of comfort with the technologies more positive than residents.
- However, both groups wanted more education about these topics.
- Open-ended responses were consistent with these differences and similarities.

ACKNOWLEDGEMENTS

We want to thank

- the program directors for forwarding our resident email to their residents and for responding to the survey.
- the residents for taking time out of their busy schedules to respond to our survey.

REFERENCES

1. Nesic D, Schaefer BM, Sun Y et al. (n.d.) Clinical Medicine 3D Printing Approach in Dentistry: The Future for Personalized Oral Soft Tissue Regeneration. J Clin Med. 2020 Jul 15;9(7):2238.
2. Zande MM, Gorter RC, Wismeijer D. Summary of: Dental Practitioners and a Digital Future: An Initial Exploration of Barriers and Incentives to Adopting Digital Technologies. Br Dent J .2013;215:562–563.
3. Beals DW, Parashar V, Francis JR, et al. Advanced Dental Education CBCT in Advanced Dental Education: A Survey of U.S. Postdoctoral Periodontics Programs. J Dent Educ 2020; 84(3):301-307.
4. Prager MC, Liss H. Use of Technology in Dental Predoctoral Education and Patient Care in North American Dental Schools. J Dent Educ 2020; 84(3):350-357.