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Endodontic Residents: Factors Influencing the Decision to Become a Dental Educator

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A thesis submitted to the faculty of the Medical University of South Carolina in partial fulfillment of the requirement of Master of Science in Dentistry in the College of Dental Medicine.

Department of Oral Rehabilitation

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Approved by:

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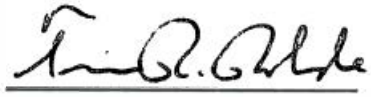

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ABSTRACT

LAUREN ELIZABETH KUHN. Endodontic Residents: Factors Influencing the Decision to Become a Dental Educator (Under the direction of Dr. Lindsey M. Hamil).

Significance and Introduction: Dental schools in the United States are faced with a shortage of faculty. Endodontic residencies and pre-doctoral clinics are not immune to the faculty scarcity. The purpose of this study was to assess factors that influence endodontic residents' decisions on whether to pursue a career as a dental educator. This information may be used to inform future recruitment and retention efforts for endodontic faculty.

Materials and Methods: All United States American Association of Endodontists (AAE) members designated as "resident members" (525) were sent an electronic survey. The survey included demographic data, and factors impacting their career decisions.

Results: One hundred and seven (107) respondents completed the survey. Twenty-six (26) respondents (24.3%) stated they plan to pursue a career in dental education at some point in the future. Four (4) respondents (3.7%) stated they would never consider a career in dental education. The remaining 72% indicated they would be open to pursuing a career in dental education if the conditions were favorable. Factors that respondents reported would motivate them toward pursuing a career in dental education were: "Salary" (76.6%), "Loan Reimbursement or Loan Forgiveness" (61.7%), "A Reduced Number of Work Days per Week" (29.9%) and "Opportunity to Practice Outside the University" (29.9%). Over half (56.7%) of residents anticipated incurring an educational debt

of $200,000 or more, and only 17% of the respondents anticipated graduating with no debt. Financial compensation and work-life balance were major factors impacting residents' decisions to pursue a career in dental education. In addition, infrequent discussions between residents and faculty about the components of an academic career were statistically correlated with a response of "unsure" about becoming a dental educator. Residents with one to three (1-3) years of experience as a general dentist before residency were statistically more likely to be interested in pursuing a career in dental education. Importantly, they were also statistically more likely to intend to begin their teaching careers within five years of finishing residency. No significant differences in responses or preferences existed based on gender or underrepresented minority (URM) status.

Discussion and Conclusion: Financial factors and desire for independence were major contributors to the decision to pursue a career in dental education. The average educational debt reported by respondents was more than double the debt for endodontic residents in a 2002 study. Respondents recommended solutions to these issues, including loan repayment options and the ability to practice outside of the university at least once per week. They also expressed an interest in increased training and mentorship options, including fellowships, teaching assistantships, and instruction of general dentistry residents. Additional reasons for avoiding a career in dental education included a desire to avoid the politics and bureaucracy of academic institutions and the need for a convenient location for work and family.

Introduction

The lack of educators in dental schools is a concern expressed by universities throughout the United States. In 2001, Schenkein and Best described factors that have a negative impact on choosing a career in education (1). They include: income level of dental faculty, pressure to generate income for the university, time required to prepare for an academic career, income difference from private practice, few tenure-track positions available, and level of indebtedness (1).

In addition, in 2002, McNally et al. stated that the two major reasons for endodontic residents to not enter academia were salary and educational debt (2). At that time, it was reported that 26% of responding endodontic residents reported a projected educational debt of $150,001 or greater and 29% had projected debt between $87,701 and $150,000 (2). This has only continued to rise.

In 2005, Glickman and colleagues reviewed the current status of dental faculty recruitment and retention. The survey had an 82% response rate and included the opinions of 90 full-time endodontic educators (3). The study found that low salaries and a lack of interest were major reasons for dwindling faculty numbers (3). They provided the following perspectives on the positive and negative aspects of careers as endodontic educators:

Positives:

- Personal fulfillment
- Knowledge sharing
- Giving back to the profession
- Passion for teaching

Negatives:

- Income inequality (relative to private practice)
- Lack of mentorship
- High demands of the job

Overall, faculty and departments may need to become innovative and customize their approaches to faculty recruitment. In 2005, 13% of full-time endodontics educators said their schools had used creative approaches to attract part-time faculty (3). Even lower, 7% said that they themselves were recruited with tailored and innovative approaches (including doing 50% endodontics residency with 50% teaching, ability to access research start-up funds, and receive special mentorship to become an educator) (3). In addition to actively recruiting within the university and at academic meetings, it may also be necessary to attract new educators from private practice. When considering faculty members' most recent employment, it appears that 51% of faculty come to education directly from private practice, while only 24% come from another institution, 18% come straight from residency, and only 3% come to institutions immediately after a military career (3). This means that recruiting from private practice and residencies could be good ways to close a significant gap in the national faculty shortage, without borrowing instructors from other institutions.

Significance

Dental schools—and not just endodontic residencies—in the United States have been facing faculty shortages for decades. In the late 1900s, it was believed that 210 new full-time faculty members would be necessary each year in order to preserve the status quo in the United States (4-6). This is partially due to the

relatively stable five-year faculty turnover rate, which is approximately 33 percent (4). During the 1980s, full-time clinical dental faculty diminished by 12% (7). Between 1986 and 1997, the average number of faculty declined by 18% (8) and, by the next decade, the retirement of those 60 years of age and older was projected to create a critical shortage of educators. In 1997, dental school deans were surveyed regarding issues facing their schools. At the time of the survey, deans named faculty recruitment and retention as their main challenge (8).

According to the American Dental Education Association (ADEA), in the year 2005, there were 374 full-time, vacant faculty positions at dental schools in the United States (9). In 2007, there were 316 full-time, vacant positions for faculty members (10).

With this knowledge, it can be seen that dental faculty recruitment and retention has been an issue for decades. This problem has only intensified, as total predoctoral enrollment is at its highest level historically, with 25,010 dental students enrolled in the 2017-18 academic year (11). This has left many dental students to be educated on endodontics by the general faculty (non-endodontists). This trend may also be exacerbated as new dental schools are established and current dental schools expand their class sizes. While increasing the number of dental students in the United States may seem unfavorable given the faculty shortages, it may in fact be necessary to meet the needs of the population at large. In fact, forecasts indicate that by 2020, the dentist-to-population ratio will be at its lowest point since before World War I (8, 12).

This compounds the difficulty of finding and employing qualified faculty candidates and reinforces the importance of the problem at hand. A 2000–2001

survey (13) found that “46% of the vacancies were due to an inability for candidates to meet the specific educational, training, and experiential requirements of the position.” Failure to meet position or scholarship requirements was cited as the reason for 235 vacancies in 2000–2001 and 218 in 2001–2002. However, the most troubling factor was the lack of applications (8). Response to advertisements for almost a third of the vacant positions was limited (13).

Wanchek and colleagues analyzed the status of faculty vacancies at 63 of the 65 United States dental schools for the 2014-2015 academic year. The main concern dental schools were facing with regards to faculty recruitment was financial compensation (14). During this time period, there were 16 lost positions and 82 new positions that needed to be filled (14). This information hints toward the expansion of dental schools and that recruitment efforts for new faculty may be a critical area of focus.

In a 2015-16 survey by ADEA, faculty positions were evaluated for the amount of time they were vacant. Both part-time and full-time positions were analyzed. At the time of the survey, there were 248 full-time vacancies and 57 part-time vacancies (15). Among the full-time faculty vacancies, 40.3% had been vacant for 7-12 months and 11.2% had been vacant for more than one year (15). The fact that over half of full-time faculty vacancies were vacant for more than six months suggests a serious need to consider recruitment strategies, especially for full-time educators who serve as the main influencers and stabilizing forces for dental schools and the dental students they educate. The same survey by ADEA found that the top eight factors impacting the ability to fill vacant

positions were as follows: salary/budget limitations (25.5%), lack of response to position announcement (18.3%), meeting requirements of the position (17.0%), other department priorities/needs (9.8%), licensure requirements (3.9%), geographic location (3.3%), board eligibility/status requirements (1.3%), and meeting scholarship requirements (0.7%) (16).

When considering that the main challenge schools face with filling vacancies is "salary/budget limitations", it is important to have a baseline understanding for the earning potential of an endodontist in private practice. According to the *ADA Health Policy Institute Survey of Dental Practice data for 2000-2015,* the average endodontist salary for 2015 was $327,521, which was the second highest paying dental specialty, behind oral surgery (17). This suggests that the practice of endodontics is financially lucrative.

Focusing on faculty demographics, ADEA provided information on the 10,198 dental educators in the United States for the 2016-2017 academic year. Of all dental educators, 51.6% were part-time. There were only 23 American Indian or Alaska Native dental educators (0.2%), while 11.3% were Asian, 65.1% were White, 7.0% were Hispanic, and 3.6% were Black or African American (18).

Materials and Methods

This study aimed to identify factors that contributed to endodontic residents' decisions of whether to pursue careers in dental education and potential solutions that could improve the recruitment and retention of endodontic faculty.

Following a literature review to determine what factors have been shown to influence endodontic residents' decisions to pursue careers as dental educators,

questions and factors were incorporated into a RedCap (online) survey. The survey also included questions on demographics, career plans, experiences in residency, and other preferences related to teaching. Based on each respondent's career plans, follow-up questions were used to ask them how they came to that decision and what would motivate them to pursue a career as a dental educator. The final survey question was optional and asked the respondents to identify their anticipated educational loan debt upon residency completion. IRB approval was granted by the Medical University of South Carolina IRB (Study ID Pro00073888).

All United States American Association of Endodontists members designated as "resident members" (525) were asked to participate in the electronic survey. One reminder email was sent. The survey included demographic data and factors impacting their career decisions.

Of the 525 potential participants, exclusions were made for the following reasons:

- Affiliation with the study
- Not an endodontics resident
- Non-valid email address

These scenarios accounted for approximately 10 ineligible individuals, which brought the response rate to roughly 107/515 (20.8%) instead of 107/525 (20.4%). This minor difference did not impact the meaningfulness of the findings.

The response rate for this survey was slightly less than expected (20.4%) and may have been due to a variety of factors. Initially, multiple email addresses

appeared invalid or inactive. Additionally, at least one dentist classified as a "resident member" of the AAE was not an endodontics resident and was thereby disqualified from participating. The email list also included the principal investigator, who did not respond due to a clear conflict of interest. The low response rate may also be due to the electronic nature of the survey, which required 20+ questions to be answered. Past studies show that when studies involve interaction with a survey administrator, the response rate is higher (51.2%), which is followed by telephone interviews (45.2%), personal interviews (36.6%), and mail surveys (27.4%) having lower response rates (19). The response rate from this electronic survey was similar to the findings of past studies. This may be due to multiple factors, including that emails may be overlooked or forgotten due to the fact that the survey was not tangible or may have been delivered to the recipients' spam folders.

Results

In total, 107 respondents completed the survey (20.4% response rate). Of the respondents, 65.3% were male and 34.7% were female. Respondents represented a wide range of clinical experience between dental school and residency. In Figure 1, it can be seen that those survey respondents with more dental experience between dental school and residency tended to be male, although this was not statistically significant ($p = 0.1902$).

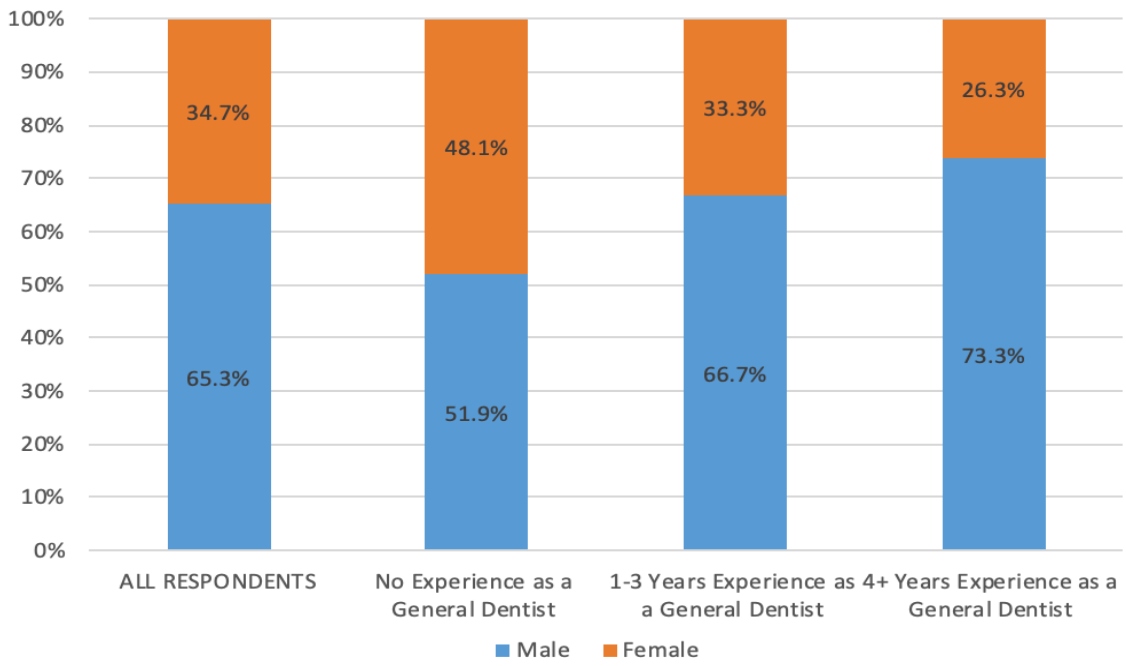

Figure 1. The relationship between gender and dentistry experience among responding endodontics residents

The respondents to the current survey were demographically similar—when evaluating race and ethnicity—to 2017-18 enrolled endodontics residents, as well as incoming dental students across the United States (see Table 1). It is important to remember that future educators will be drawn from the existing pools of endodontic residents and dental students, which the right columns illustrate.

Table 1. The demographic data for respondents to this study, 2017-18 endodontic residents in the United States, and the 2017 incoming dental students in the United States.

	Demographics of the Current Study	Demographic Data for 2017-18 Endodontic Residents in the United States (20)	Demographic Data for 2017 Entering Dental School Enrollees (21)
American Indian or Alaska Native	0%	0.2%	0.3%
Asian	21.5%	26.7%	24.2%
Black or African American	0.9%	2.3%	5.1%
White	62.6%	55.1%	50.4%
Hispanic or Latino	9.3%	6.8%	9.4%
Other or Unknown	5.6%	8.9%	10.6%

Respondents (n = 107) were asked whether they planned to pursue a career as a dental educator (answer choices: yes, no, unsure). The results in Figure indicate that approximately one-quarter of respondents (26 respondents, 24.3%) stated that they plann to pursue a career as a dental educator. The most frequent reasons included "Intellectual Challenges and Stimulation," "Knowledge Sharing and Passion for Teaching," and "Personal Fulfillment" in that order. Nearly 40% responded that they did not plan to become a dental educator (42 respondents, 39.3%). The common factors that dissuaded a resident from becoming an educator were "Income/Salary Concerns," "Desire to Be Own Boss," "Level of

Debt," and "Disinterest in Research," respectively. The remainder of residents (39 respondents, 36.4%) were unsure of whether they would pursue a career in dental education. These residents were asked what factors would help motivate them to pursue such a career. The top five factors cited were "Opportunity to Practice Outside of the University," "Salary is Closer to Private Practice," "Less Than 5 Days per Week is Considered Full-time," "Additional Vacation Time," and "Flexible Benefits Package".

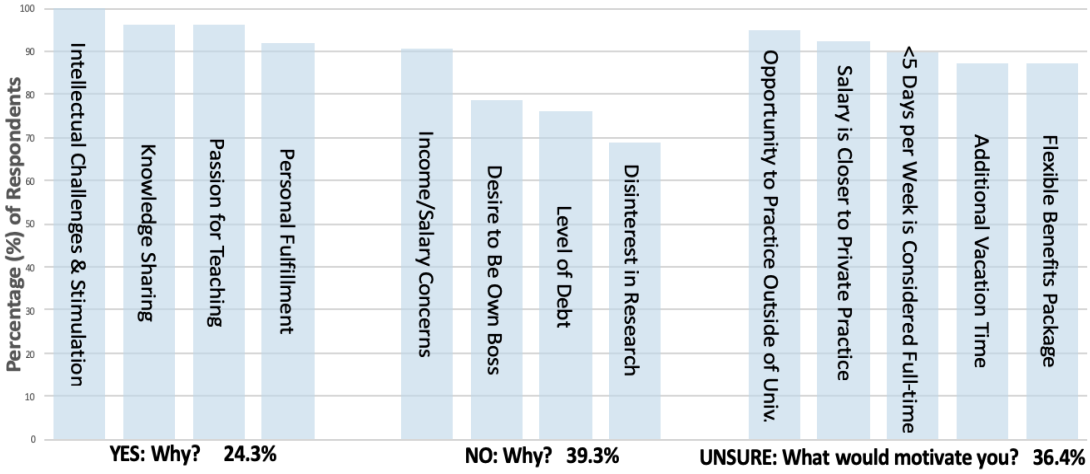

Figure 2. Respondents' intentions to pursue a dental education career and the factors influencing their decisions. The respondents answered the questions: "Are you planning to pursue a career as a dental educator? What factors relate to this decision?"

Respondents self-identified as underrepresented minorities (URM) included individuals identified as Black/ African-American or Hispanic/Latino. URM respondents did not have a statistically different response to pursuing a career in dental education from non-URM respondents ($p = 0.0951$). However, there was a tendency for more URMs to be "unsure" about pursuing a career in

academia and more non-URMs to say “no” to pursuing careers in education. Gender also did not prove to be a significant factor in whether respondents planned a career in dental education ($p = 0.5029$).

All respondents were given the opportunity to make free response comments regarding their plans of whether to become a dental educator.

A total of 26 respondents answered “yes” to pursuing a career in dental education and three (3) chose to provide comments on their rationale. The themes of perceived lower stress than private practice, an opportunity to give-back, and to provide mentorship to the next generation of dentists, were expressed. The following remarks offer insight into why residents may say “yes” to planning a career in dental education:

- *“To decrease stress and fatigue from private office.”*

- *“Financial stability from private practice that would allow time for volunteer education.”*

- *“As I see it being an educator should be among the noblest of professions intended to help students achieve… it is very important to maintain a positive educational environment because that has a powerful influence on both the student doctor and patient care.”*

Forty-two (42) responded “no” to planning a career as a dental educator. Eight (8) elected to provide feedback on their rationale. Of the responses, 88% (7 of the 8 respondents) explicitly mentioned the words "politics" and/or

"bureaucracy" as major factors influencing their decision to avoid academia. The eighth respondent expressed an opinion of poor leadership by a department chair and administrators. Overall, a strong theme of desire for independence, autonomy, and respect was noted. One comment that appeared representative of the group's reasoning for avoiding a career in dental education is:

- *"[I don't want to become a dental educator because of] politics involved with being an employee/volunteer of the school."*

The remaining 39 respondents who were "unsure" about their plans to become dental educators yielded six (6) responses in the open comment section. Of the six (6) respondents, two (2) specifically mentioned that geographical location would be an important factor in their decision making. Other factors that were singularly mentioned—and would motivate the respondents to pursue a career in dental education—included sufficient department funding, protected time for research, ability to draw a pension, and ability to help others learn the profession and enjoy the specialty. One respondent's comment on what would motivate him/her to pursue a career in dental education is shown below:

- *"[I would want the job to be in a] location that is close to family and good schools for my kids."*

All respondents (n = 107) were asked what other resources would be beneficial to students and residents that could help them pursue careers as dental

educators. Three (3) responses were recorded and all three had a common theme of increased training, including offering a master's degree during residency programs (for programs that currently do not offer it) and/or additional time spent teaching while in residency. One respondent had a specific suggestion to benefit the teaching skills of endodontics residents:

- *"Clinical instruction of GPR residents"*

Overall, four (4) respondents (3.7%) stated they would *never* consider a career in dental education, regardless of the circumstances. An additional 24.3% stated that they wanted to pursue a career in dental education. This left the remaining 72% who indicated they would consider pursuing a career in dental education if the conditions were favorable.

Regardless of their career plans, residents were asked what they believed would motivate their peers to pursue careers in dental education. The top factors that residents identified would motivate their peers were "Salary Closer to Private Practice" (76.6%), "Loan Reimbursement or Loan Forgiveness" (61.7%), "Less Than 5 Days per Week is Considered Full-time" (29.9%), and "Opportunity to Practice Outside the University" (29.9%).

Additionally, the correlation between work experience and plans to pursue dental education was evaluated. Figure 3 shows the proportion of respondents who fit each category of work experience (years working as a dentist before entering residency) and their intentions to become dental educators (yes, no, or unsure). Respondents with 1-3 years of work experience between dental school and residency made up the largest group of respondents. Relatively few

respondents had 7-10 or 10+ years of experience as a dentist before entering residency. Fisher's exact test demonstrated significant differences between groups ($p = 0.0356$) and their intended career plans (displayed as colored segments with percentages). Those with 1-3 years of experience made up the largest group of intended dental educators.

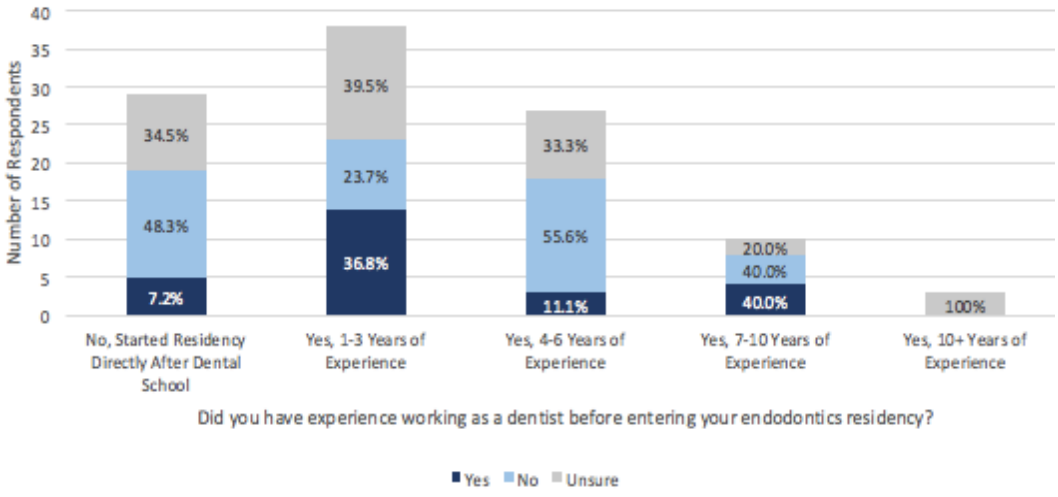

Figure 3. Respondents' plans to pursue a career as a dental educator (yes, no, or unsure) and the amount of experience the respondent had between dental school and entering residency.

Moreover, residents who responded "yes" to pursuing a career in dental education were asked when they intended to begin such a career. The results of this question are shown in Figure 4. Nearly one-quarter (23.1%) intend to begin teaching immediately after finishing residency, 50% plan to begin teaching within five years, and the remainder of residents planned to wait at least five years after residency before becoming a dental educator. Within these responses, a

statistically significant difference ($p = 0.0496$) was identified when comparing the amount of work experience residents had before residency and when they intended to begin their careers as dental educators. Residents with 1-3 years of work experience were significantly more likely to be interested in beginning careers in dental education "within 5 years of finishing residency" whereas other groups planned to pursue dental education further in the future.

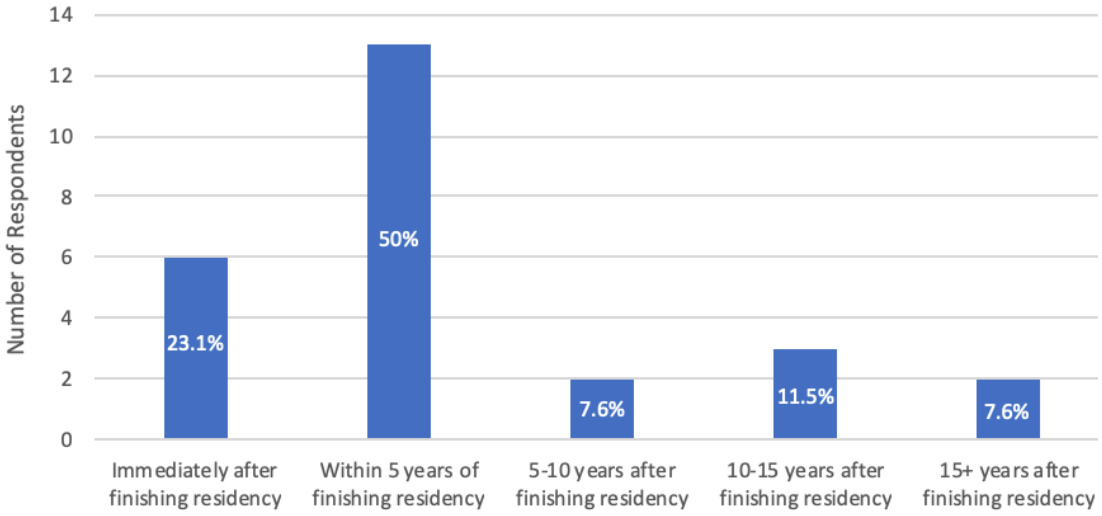

Figure 4. Residents planning to become dental educators (n = 26) declared when they intended to begin such a career.

Additionally, residents were asked how teaching during residency has benefitted them (Figure 5). The top three responses were: "Opportunity to Critically Evaluate the Work of Others" (63.6%), "Accountability for Understanding Topics and Materials" (58.9%), and "Increased Mastery of Topics and Skills" (57.9%). Four (4) respondents (3.8%) answered: "I do not think teaching has helped me at all".

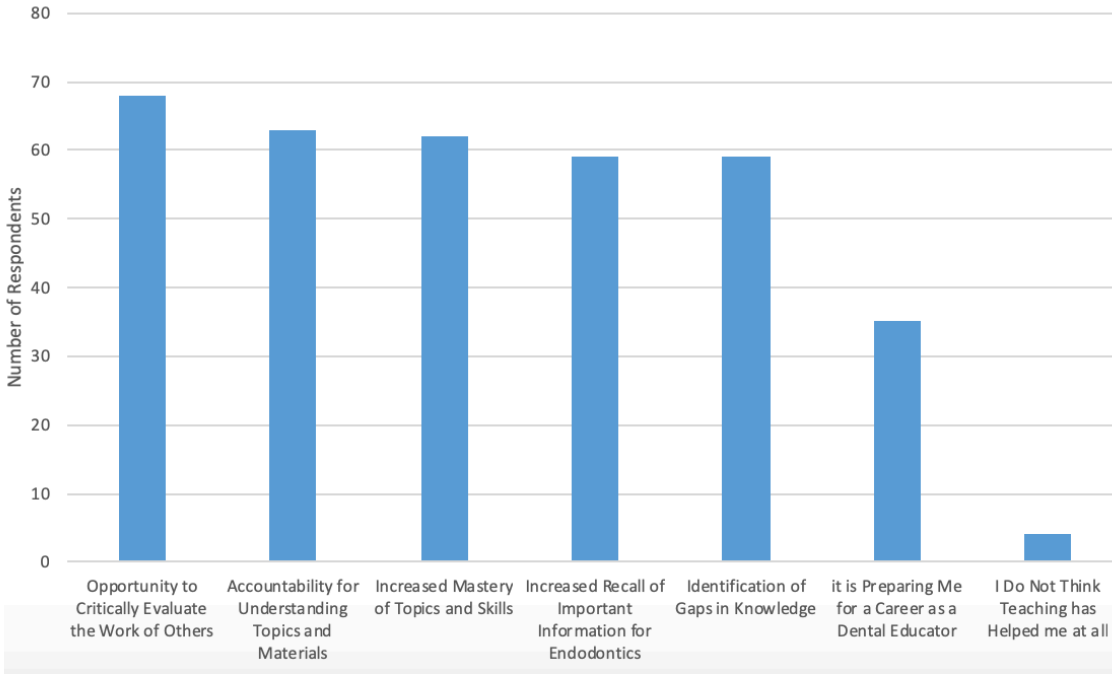

Figure 5. Residents responses on how the Commission on Dental Accreditation's (CODA) teaching requirement has been beneficial to them during residency.

Respondents noted that their single most rewarding teaching experiences in residency were clinical teaching (66.4%) and simulation lab teaching (23.4%). Lecturing was viewed as the least rewarding teaching experience, with 2.8% selecting that option. In addition, the majority of residents (82.3%) said that teaching experiences during residency did not have a negative on their view of dental education and therefore did not dissuade them from pursuing such a career.

Residents were asked whether they have supplemental opportunities for teaching during their residencies. Examples of supplemental opportunities included speaking to local dental study clubs and additional teaching and mentorship roles with pre-doctoral students. Thirty (30) residents (28.1%)

responded that they have these opportunities either weekly or monthly. The same number said they have opportunities once per semester. Nineteen (19) residents (17.8%) reported that they "never" have supplemental teaching opportunities while 28 residents (26.2%) said they did not know if they had supplemental opportunities available to them.

With regard to communications with current dental educators, residents were asked whether they engage in "discussions with faculty regarding the three components of being a dental educator: service, teaching, and research" (Figure 6). In total, 15 respondents (14.0%) stated that they have these discussions on a frequent basis. At the same time, 61 respondents (57%) stated that they "rarely" or "never" have these discussions. In Figure 7, the frequency of discussions with faculty is compared to the residents' plans to pursue dental education. Those who were "unsure" about pursuing a career as a dental educator were the least likely to have frequent discussions with faculty about the components of dental education ($p = 0.0202$).

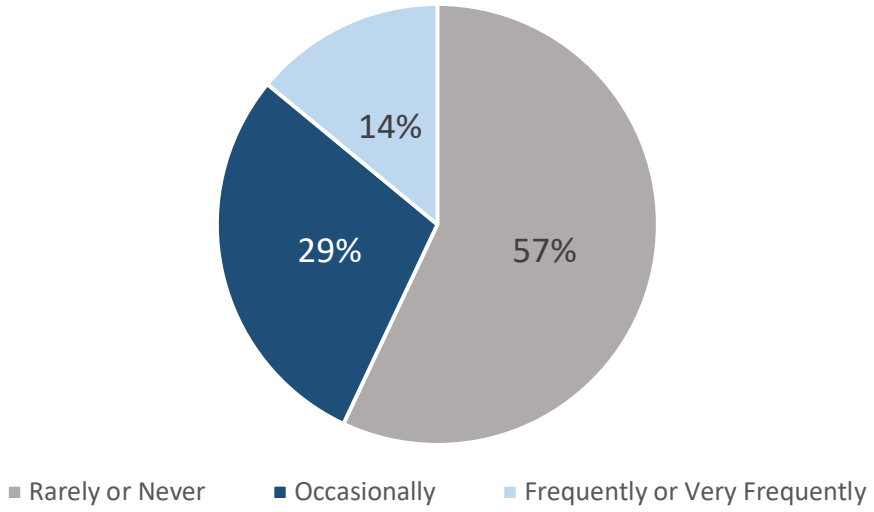

Figure 6. Respondents' reported frequency of discussions with faculty about the components of a career in dental education: service, teaching, and research.

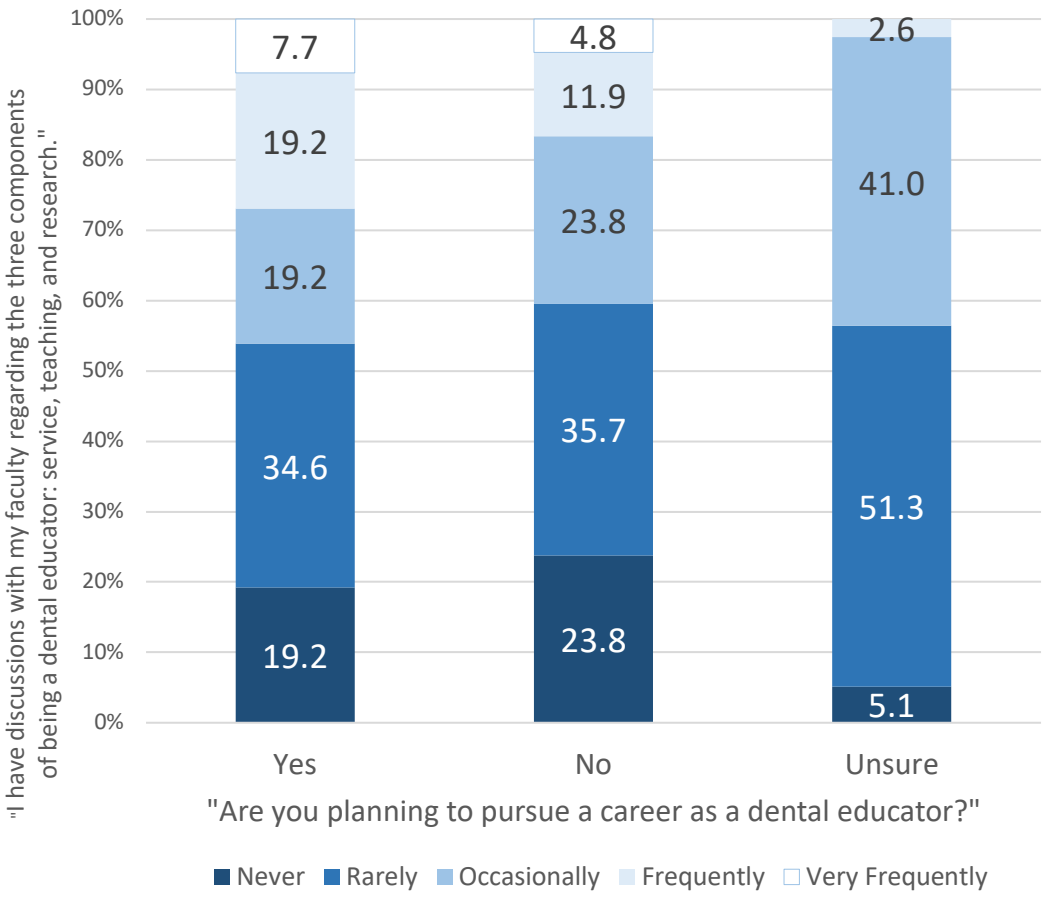

Figure 7. The relationship between plans to become a dental educator and the frequency of discussions with faculty about the components of a career in dental education.

Residents were asked whether they believed their faculty members' workloads are too heavy. No clear trend was identified among the responses (Figure 8). Approximately one-fifth of residents (20.6%) were undecided. The remainder disagreed or strongly disagreed (39.3%) and agreed or strongly agreed (40.2%)

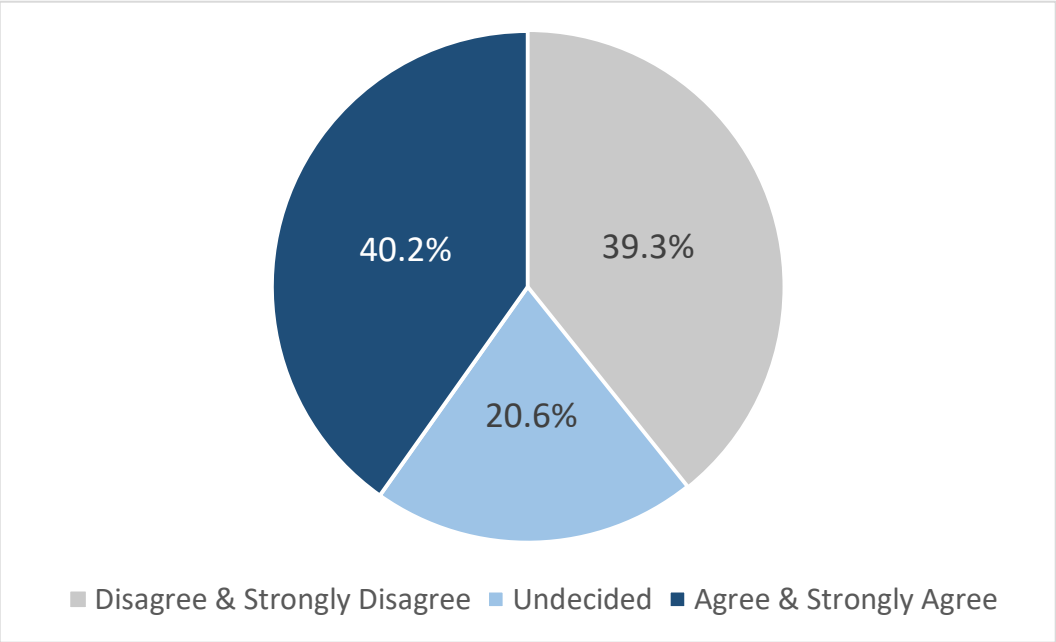

Figure 8. Residents' level of agreement with the statement "My faculty members' workload is too heavy".

There was not a significant relationship between the perceived workload of faculty members and whether respondents planned to pursue a career in dental education ($p = 0.2716$).

At the survey's end, residents were invited to self-report their projected educational debt upon residency completion (Figure 9). This question was optional, with 106/107 respondents answering the question. Over half (56.7%) of residents anticipated incurring an educational debt of $200,000 or more, and 17% of the respondents anticipated graduating with no debt. Those anticipating more than half a million dollars in educational loan debt accounted for 17% of the responses.

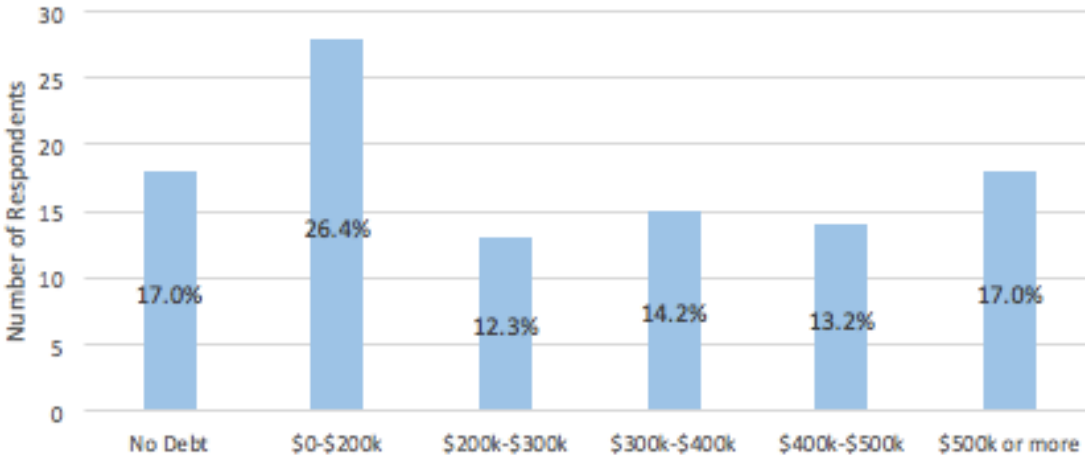

Figure 9. Respondents' self-reported anticipated educational debt upon residency completion.

There was a statistically significant correlation between the respondents' years of work experience in dentistry and self-reported educational debt. Respondents with more work experience as a general dentist between dental school and residency tended to have less educational loan debt ($p = 0.0038$). When comparing those with no debt to those with $0-$200,000 and $200,000+, there was a tendency for respondents with more educational loan debt to answer "no" to the question "Are you planning to pursue a career as a dental educator?" although it was not statistically significant ($p = 0.3816$).

There was no statistically significant relationship between gender and educational debt ($p = 0.0921$) although there was a tendency toward males having more debt. In addition, there was no link between underrepresented minority status and debt ($p = 0.1473$).

Finally, residents were asked to provide comments or suggestions related to the dental faculty shortage. Open responses (n=14) included themes of

income/debt concerns (6/14 responses) and desire to avoid specific factors related to careers in education, including politics, requirements to conduct research, and responsibilities for administrative tasks, etc. (5/14 responses). Three (3) of the 14 responses are showcased below:

- *"They aren't paid as much as in private practice… [Universities could try loan] reimbursement, some tax forgiveness programs, paid vacation, 4 or more weeks of vacation a year, 4-day work week. Career satisfaction is not all about money, it's also about the quality of life for some.*

- *"I did want to be at least part-time dental educator… but I did not have positive role models in my program and therefore lost interest."*

- *"The monetary disparity… becomes more and more significant as the cost of dental (and post-grad dental) education continues to rise… Some ground can be gained in allowing faculty to practice outside the university… This is why Public Service Loan Forgiveness is so important."*

Discussion

Demographic Characteristics of Respondents

The gender demographic information seen in Figure 1 provided a background for the survey, where overall, about two-thirds of the respondents were male (65.3%), while one-third (34.7%) were female. These percentages appear to align with national findings. Published data suggests that 37.9% of 2017-18 enrolled endodontic residents in the United States were women (20). In this study, there was also a tendency for residents with more years of general dentistry experience to be male, while the residents entering residency directly from dental school were more evenly split. The correlation between experience and gender was not statistically significant. Additionally, in this study, gender did not have a significant impact on respondents' plans to pursue careers in dental education.

Gender data may be important when analyzing the preferences of future faculty and potential recruits. The fact that the majority of participants in this study were male presents a potential limitation to the generalizability of the results to other areas of areas of dental education and advanced dental education programs. Women accounted for 47.2% of all advanced dental education programs in 2018.

Future studies may consider identifying how gender impacts career decision-making in endodontics and dental education. Determining gender-specific motivating factors for pursuing endodontics and dental education may help with future recruitment and retention efforts that are gender-sensitive and representative of the population at large.

Race, ethnicity, and representation of diversity are also key issues for faculty recruitment and retention. The respondents to the current survey were demographically similar—when evaluating race and ethnicity—to 2017-18 enrolled endodontics residents, as well as incoming dental students across the United States (see Table 1). This is important to consider because future educators will be drawn from the existing pools of endodontic residents and dental students.

Key Survey Findings

Financial motivating factors were a common theme among survey responses. In Figure 2, it can be seen that 92.3% of residents who were unsure about pursuing a career in dental education responded that if the "Salary is Closer to Private Practice," they would be more motivated to pursue a teaching career. Residents who did not plan to become dental educators cited "Income/Salary Concerns" (90.5%) as their top reason for pursuing a non-teaching career. In addition, "Level of Debt" (76.2%) was another important reason that these respondents stated a disinterest in becoming educators. All respondents were asked what they felt would motivate their peer to pursue careers in dental education and the top two responses were related to finances. These potential motivating factors were "Salary Closer to Private Practice" (76.6%) and "Loan Reimbursement or Loan Forgiveness" (61.7%). These results were not surprising when considering the sharp increase in endodontic residents' student loan debt since the 2002 report by McNally and colleagues (2). At that time, 26% of surveyed endodontic residents projected educational debt of $150,000+. The present study was completed in late 2018, with 30.2% of respondents anticipating

educational debt of $400,000+. This is more than double the amount of debt endodontic residents had in 2002 when surveyed by McNally, et al. (2). There appears to be a tendency toward disinterest in a career as a dental educator for those with more educational debt, although it was not statistically significant ($p = 0.3816$).

Quality of life and lifestyle preferences were common influencing factors. In Figure 2, potential motivating factors for respondents "unsure" about pursuing a career in dental education included "Less Than 5 Days per Week is Considered Full-time" (89.7%), "Additional Vacation Time" (87.2%), and "Flexible Benefits Package (ability to select benefits)" (87.2%). These factors may help improve work-life balance and help prevent burn-out. Residents who did not plan to become dental educators cited "Desire to Be Your Own Boss" (78.6%) as a reason to avoid a career in dental education. Comments from respondents also mentioned location and education opportunities for family members as important factors. This suggests that schedule flexibility, autonomy, and time away from work are major factors impacting today's residents' decisions on whether to become dental educators. Recruiting and retention efforts should consider ways to maximize faculty's quality of life and minimize the apparent "politics" and "bureaucracy" that dissuades potential educators from pursuing such a position. Since specific details of quality of life, lifestyle, and politics/bureaucracy are beyond the scope of this study, universities and future research may consider think-tanks, surveys, and/or interviews to elucidate the factors most salient to the satisfaction and retention of their faculty.

Based on the responses received, it is clear that lifestyle and work-life balance will be important influences on the career decision plans of endodontic residents. The phenomenon that younger dentists experience more stress—and try to find adaptations to help diminish this stress—is not new. This information may inform future recruiting efforts. In a study published in 2016, approximately 5% of dentists surveyed experienced "high" burnout symptoms (23). Additionally, that study noted that older dentists felt a greater sense of accomplishment, which was protective for burnout (23). Long work hours, long commute times, and commuting by driving a personal vehicle all were also significant factors that increased the incidence of burnout (23). Similar results were found in a 1990 publication that showed that dentists with more experience and older age tended to adapt better to their work and have a lower level of stress (24). Considering stress and burnout risk, it is possible that efforts to recruit and retain new faculty with more clinical experience and/or age may be more successful. For more junior faculty positions, burnout factors may be more important to consider, since the protective factors or age and experience may not be present. Future studies could investigate potential solution to help new and/or young faculty prevent burnout. These solutions might include, but are not limited to, flexible work hours or transportation solutions.

Respondents with 1-3 years of work experience between dental school and residency appear to be the most interested in pursuing careers as dental educators (Figure 3). In addition, this group was most likely to be interested in starting a job as a dental educator within five years of residency completion. Nearly 75% of residents planning to pursue a career in education intended to begin such careers

immediately after or within five years of finishing residency (Figure 4). Efforts to recruit faculty that are customized for this group of fledgling endodontists may be more successful. The fact that 50% of interested future educators desire to begin teaching with five years of finishing residency means that universities have an opportunity to expand their faculty with diverse educators. These relatively new endodontists will have the potential to continue such employment for 20-30 years or more. This may help stabilize departments and provide opportunities for long-lasting impacts within academia. The most important step would be to recruit these interested individuals and then to retain them.

One strategy to simultaneously improve residents' readiness for private practice and for a teaching career is to encourage them to engage in the teaching of trainees. In Figure 5, it can be seen that residents feel strongly that teaching others helps solidify their knowledge and helps them learn to appraise the quality of techniques and treatment. When asked "What other opportunities would help prepare you for a career in dental education?" one respondent also suggested "clinical instruction of GPR residents." The types of teaching that seems most appealing to residents are clinical teaching (66.4%), followed by simulation lab teaching (23.4%). Lecturing was not viewed favorably by the respondents, with only 2.8% saying it was the most rewarding teaching experience they've had in residency. Focusing on teaching opportunities that residents enjoy, such as clinical and simulation lab teaching, may help residents with their clinical discernment and their enthusiasm for teaching. Additional opportunities recommended by the respondents include teaching assistantships/fellowships or preceptorships/rotations, teaching methods classes, and opportunities to present at

conferences. This may empower more residents to prepare for careers as dental educators. The Academic Dental Careers Fellowship Program (ADCFP) offered through ADEA may be a suitable model for endodontic residency programs to consider. This program combines multiple opportunities for potential future educators, including additional teaching experiences during DDS/DMD education, completion and presentation of a research project focused on dental education, bimonthly meetings with a faculty mentor, and interviewing faculty members to understand their career perspectives (25).

The majority of residents (86%) do not engage in frequent discussions with faculty regarding what it means to be a dental educator (Figure 6). Interestingly, among residents who wanted to pursue a career in dental education ("yes" respondents) only 26.9% had frequent or very frequent discussions with faculty about their careers. While this was more than other groups, it suggests that many residents are interested in dental education despite the lack of mentorship and discussions with faculty. Mentorship is merely one piece of the puzzle. Nevertheless, it is not surprising that residents who were "unsure" about whether to pursue dental education were the least likely to have frequent or very frequent discussions with faculty about such careers (Figure 7). This baseline suggests that faculty discussions and mentorship provide one factor related to residents' interest in pursuing dental education careers, but it may be an area that could be improved and capitalized upon. This finding echoes results from the 2002 study by McNally and colleagues. Their study found that only a minority (12.67%) of residents were inspired by a mentor to pursue a career as an endodontic educator (2). There is untapped potential for mentorship from existing faculty to encourage residents to

pursue dental education and to inform them of the career's benefits and drawbacks. This is an opportunity that can be capitalized on and one which could prevent the type of comment seen on page 22. Conversations between faculty and mentees/residents could be simple, short, and not cumbersome. For example, during treatment planning, a faculty member may notice that he/she likes the way a resident explained a diagnostic dilemma. In the moments following, the faculty member might consider saying "I like the way you explained your findings and discussed the potential etiologies. The ability to articulate in this way would serve you well if you went into teaching. Have you ever considered becoming a dental educator?" On another occasion, the faculty member could follow-up with the resident by asking "Have you given any more thought to becoming an instructor? What questions do you have about teaching in a dental school?"

When evaluating whether residents perceive the demands on faculty as being too high, no clear trend was seen (Figure 8). This finding stands in contrast to Glickman's results in 2005 where current full-time dental educators were asked to weigh-in on the positive and negative aspects of their careers. Full-time educators (with over 80% response rate) stated that the high demands of the job were a significant negative to their careers. The finding that residents are split on this factor could be interpreted in multiple ways. Perhaps residents do not understand the high demands of a career in dental education until they begin such a career. As it stands, it does not appear that faculty workload impacts residents' decisions to become dental educators. It may be that residents do not see the behind-the-scenes efforts that their faculty are responsible for. In this sense, faculty workload does not appear to be a deterrent for entering academia, but if

the workload is too heavy once employed, it certainly could lead to attrition of new dental faculty. This raises the question of why faculty leave their positions. Wanchek, et al. described that in the 2014-15 academic year, 23% of all faculty—full-time and part-time—who left their positions did so to return to private practice (14). An area of potential research would be to determine the rationale for faculty departure to private practice.

Only four respondents (3.8%) stated that they would never pursue a career as a dental educator, even if the job was attractive. Of these four individuals, three provided their gender (optional category) and all four provided their work experience information. The three gender respondents were all male and all four had at least four years of work experience between dental school and residency. Although this is a small sample size of individuals who would never consider careers in academia, the results may indicate that men who have previously practiced as general dentists for many years before residency are less interested in switching to an academic career after residency. In addition, since only four (4) of 107 survey respondents said they would never become dental educators, this suggests that the majority of residents may be open to becoming dental educators, if the positions are attractive and if they are encouraged to do so.

The correlation between respondents with more work experience having less educational debt may be due to a variety of factors. There are multiple potential explanations for this finding. First is that with more work experience, the dentist had more time to pay off loans and also had a source of income. Secondly, tuition and fees have significantly increased in recent years meaning that even after adjustments for inflation, more recent graduates have accrued more debt for

their educational training. If schools want to take educational debt out of the equation or cannot offer loan repayment opportunities to their future faculty members, they may consider mentoring and encouraging endodontic residents who have a significant amount of past dental work experience to consider pursuing careers in dental education.

Future research should aim to determine specific salary ranges that are amenable to residents graduating with differing amounts of educational loan debt. In Figure 9, it can be seen that residents are graduating with a wide variety of education loan debt amounts. Over 30% of respondents anticipate having $400,000 or more in educational loan debt when they finish residency. What if these people also want to become educators? Their debt may be prohibitive when it comes time to make a decision and sign a contract with a university. In the present study, residents were not asked to consider finances when answering whether they wanted to become dental educators. In fact, the question on student loan debt was the final question of the survey.

Future study questions could ask: "If a full-time dental educator position paid $X per year, would you consider the position?" In addition, there are many factors that residents are not aware of that can cause faculty to become frustrated or to choose to stay part-time instead of becoming full-time. Scheduling difficulties, communication problems, politics, and bureaucracy should all be reviewed in a future study of residents, as well as part-time and full-time educators. Specifically asking residents and current faculty for details about the "politics" and "bureaucracy" they observe and solutions to diminish these problems may also improve residents' interest in pursuing dental education.

Conclusion

Dental schools in the United States are struggling to recruit new faculty and account for the expansion of dental schools. If resources or time are limited, developing residents with 1-3 years of work experience between dental school and residency may provide the highest yield of future educators. Conversely, residents with more work experience between dental school and residency were less likely to have a sizeable education loan burden. Residents also felt that additional teaching opportunities during residency (clinical teaching and simulation lab teaching are most enthusiastically welcomed by residents) may help encourage a new generation of dental educators. Teaching assistantships/fellowships, presenting at conferences, teaching preceptorships/rotations, and teaching methods classes are all potential factors that could encourage more residents to become dental educators.

One simple way to encourage more residents to pursue dental education is that faculty and residents should engage in more frequent discussions about the components of being a dental educator. Residents who had infrequent discussions with their faculty about their careers were statistically more likely to be "unsure" about whether to pursue a teaching career.

Financial compensation and work-life balance appear to be major factors impacting residents' decisions of whether to pursue a career in dental education. In addition, the theme of autonomy was identified. Many residents expressed the desire to practice outside of an academic institution if they were to become dental educators and to avoid institutional politics/bureaucracy.

The majority of endodontic residents are open to pursuing a career as a dental educator, if the conditions are favorable. Remarkably few endodontic residents are adamantly opposed to a career in dental education. Those who tend to have a significant amount of work experience between dental school and residency, which suggests that they may have robust plans to return to private practice.

A significant number of current endodontic residents are willing and interested to pursue careers as dental educators in the near future. To help encourage young faculty to join universities, it will be imperative that universities address financial obstacles and provide mentorship and resources for residents to feel prepared to enter academic careers. The future of endodontic education depends on it.

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