Motivational factors and future life plans of orthodontic residents in the United States

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Introduction: The purposes of this study were to investigate factors influencing career choice and identify future life plans of orthodontic residents in the United States. Methods: Program chairs and directors of all 65 orthodontic residency programs in the United States were contacted by e-mail and telephone for permission to e-mail their residents and invite them to take part in an online survey. A total of 335 residents from 37 programs were invited to complete an anonymous 57-item questionnaire in May 2007. Data were categorized, and basic statistics including chi-square comparative analyses were performed. Results: A total of 136 (40.6%) residents completed the survey. A “passion for orthodontics” emerged as the most important factor (20.29%) influencing the decision to pursue orthodontics as a career, followed by “intellectual stimulation or challenge” (18.12%). Most residents decided to become an orthodontist before they were in dental school (44.93%). Most residents (89.05%) plan to engage in private practice, and only 2 intend to pursue primarily an academic career. The average resident debt was $165,226 at the end of their program. Conclusions: The decision to become an orthodontist is often made early in life, before dental school, and a passion for orthodontics is the motivational factor. Residents plan to enter private practice and not pursue a career in academia. The current shortage of academics and orthodontic researchers will not be resolved from the current pool of orthodontic residents. A possible solution to the academic crisis is to change the selection criteria in programs to accept orthodontic residents who develop a passion for orthodontics while in dental school or to recruit primary researchers and teachers to the specialty. Residents plan to practice in an urban setting. Rural and underserved areas will probably continue to experience shortages of orthodontists in the future. (Am J Orthod Dentofacial Orthop 2010;137:623-30)

Orthodontics is the most popular of the postgraduate dental specialty programs in the United States, enrolling over 700 residents and graduating almost 300 each year.1 Currently, 65 orthodontic residency programs offer 2- or 3-year programs and a certificate or master of science degree on completion.

Two surveys of orthodontic residents in the United States, 2,3 1 in the United Kingdom, 4 and 1 in Canada5 have been published. These studies found that residents chose orthodontics as a career because they expect future job satisfaction and intellectual stimulation. These studies established that most residents were interested in entering private practice after graduation, and few were considering an academic career involving teaching and research.

Determining what inspires residents to choose orthodontics as a specialty is potentially important information that orthodontic program directors can use as they try to recruit the brightest and best candidates into their programs. Program directors might be particularly interested in applicants who express a genuine interest in pursuing an academic career. Furthermore, the orthodontic specialty can gain an insight into the reasons for its popularity among dental graduates, and this might assist in recruitment strategies, particularly to underserved and rural areas, and academia.

The crisis in recruitment and retention of orthodontic educators has been well documented, 6-13 However, the orthodontic community must provide supporting evidence that there will continue to be a shortage of persons interested in pursuing academic careers. This evidence will underscore the need for strategies directed toward a solution.

This study identified the reasons that orthodontic residents in the United States have chosen orthodontics as a career, their future aspirations, and their career plans after graduation.
MATERIAL AND METHODS
The study received approval from the Research Ethics Board of the University of Manitoba. An e-mail was sent by the primary author (J.N.) to program chairs and directors (in some programs, this was the same person) of all 65 graduate orthodontic programs in the United States identified in the American Dental Association’s listing of accredited orthodontic programs. The questionnaire was attached to the email, and a request was made for permission to contact their residents by e-mail and invite them to participate anonymously in the study. Programs that did not respond to the e-mail request were contacted 3 more times by telephone; if they failed to respond, they were excluded from the study. An online program was used to send an e-mail with a personalized online link to 335 residents from 37 orthodontic programs. This link prevented any respondent from attempting to complete the survey more than once. The residents were invited to complete the 57-item survey containing multiple choice and 1-line answers in May 2007. As an incentive to complete the survey, they were informed that those who completed the survey would be entered into a random drawing to win a new orthodontic curing light. To ensure privacy and anonymity, no personal information was collected, and this was clearly emphasized to all residents with each e-mail communication. The participants were assured that the results of this study would be reported only as group data and could not be traced. The survey was divided into the following segments: demographics, reasons for choosing orthodontics, evaluation of their orthodontic program, and future directions. Data from the survey were then compiled into an Excel spreadsheet (Microsoft, Redmond, Wash) and categorized by demographic variables. Basic statistics and comparative analyses with the chi-squared analysis were undertaken by sex, age, and year of program.

RESULTS
A total of 18 program chairs or directors responded to the e-mail request. After 3 additional phone calls to the program department, the e-mail addresses of residents from 37 programs were obtained. In some cases, program chairpersons forwarded the e-mail to all their residents and asked them to contact the author if they were interested in participating. Therefore, in some cases, 1 resident from a program was invited to participate. A total of 335 resident e-mail addresses were obtained. From these residents, 138 started the survey, and 136 completed it, resulting in a response rate of 40.60%. The average time to complete the survey was 12 minutes.

Table I. Demographics of respondents to the questionnaire

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td></td>
</tr>
<tr>
<td>&lt;25</td>
<td>1 (0.72)</td>
</tr>
<tr>
<td>25-29</td>
<td>71 (51.45)</td>
</tr>
<tr>
<td>30-34</td>
<td>54 (39.13)</td>
</tr>
<tr>
<td>35-39</td>
<td>8 (5.80)</td>
</tr>
<tr>
<td>&gt;40</td>
<td>4 (2.90)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>89 (64.49)</td>
</tr>
<tr>
<td>Female</td>
<td>49 (35.51)</td>
</tr>
<tr>
<td>Year in program</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>31 (22.63)</td>
</tr>
<tr>
<td>2</td>
<td>67 (48.91)</td>
</tr>
<tr>
<td>3</td>
<td>34 (24.82)</td>
</tr>
</tbody>
</table>

The sexes, ages, and years of study of the residents are given in Table I. There were 89 men and 49 women; most were between 25 and 34 years of age.
Most residents (64.23%) entered their graduate residency program directly from dental school, and only 9 (4.95%) had a previous graduate degree.
Chi-square analyses showed no significant differences between age categories or between male and female residents ($P > 0.05$) for any results.

Factors influencing career choice
Respondents received a list of factors influencing their desire to pursue graduate orthodontics and were encouraged to select all factors that influenced their decision. Intellectual stimulation or challenge was the most common reason for these respondents to choose orthodontics as a career. Doctor-patient relationship, passion for orthodontics, earning potential, and working with motivated patients were other important factors they identified (Fig 1). The residents were then asked to identify the single most important factor for choosing orthodontics. The results were a passion for orthodontics (20.29%), intellectual stimulation (18.12%), and workload flexibility and predictability (15.94%) (Fig 2).

When asked when they made the decision to pursue graduate orthodontics as a career, most respondents (44.93%) said that they had decided before they were in dental school; 29.71% decided during dental school, and 12.31% decided after dental school during dental residency (Fig 3).

Debt and future income
The average debt of orthodontic residents at graduation was $165,226 (n = 127) with a range of $0 to $500,000. When asked about projected income 1, 5, and 10 years after graduation, the results were as
follows: 1 year after graduation, residents expected on average to earn $137,570 (n = 116) with a range of $60,000 to $250,000; 5 years after graduation, $306,336 (n = 116), with a range of $75,000 to $1,000,000; 10 years after graduation, $645,307 (n = 116), with a range of $200,000 to $5,000,000.

Future plans

Residents were asked about their practice plans after graduation. They were allowed to indicate all answers that applied. The most popular choice was to practice orthodontics as an associate (32.35%, n = 55), followed by buying into an existing practice (31.18%, n = 53) and starting their own orthodontic practice (21.76%, n = 37). Only 1.76% (n = 3) intended to pursue a full-time research and teaching career, and 1.76% (n = 3) intended to pursue graduate training in the form of an MSc or a PhD degree or work in research (Table II). Furthermore, when asked about type of practice setting, 89.05% (n = 122) said private practice, 1.46% (n = 2) said primarily a community setting, 1.46% (n = 2) said primarily an academic setting (teaching hospital or research institute), 6.57% (n = 9) said a combination of community and academic setting, and 1.46% (n = 2) were undecided.

Most residents plan to practice in an urban or suburban setting (75.91%). Only 13.14% plan to practice in a rural setting and 2.92% in an inner city.

A total of 42.34% indicated that they wanted a solo practice, 30.66% preferred a group practice, and 26.28% were undecided.

Most residents (92.75%) intended to practice full time, defined as more than 3 days per week. Once in practice, 41.61% of the respondents indicated no time commitment devoted to clinical or didactic research, but 21.17% said they would like to spend 25% of their time on research.

DISCUSSION

Currently, 4 surveys of orthodontic residents are described in the literature. In 1994, Keith and Proffit published the results of a questionnaire of 168 US residents distributed at the Graduate Orthodontic Residents Program conference, which represented 81% of residents who attended the meeting. Keith et al published the results of a similar study in 1997 of orthodontic residents in the United Kingdom. They obtained responses from 57 residents for a response rate of 64%. In 2003, Bruner et al published the results of a questionnaire also administered at the Graduate Orthodontic Residents Program conference in addition to mailing the survey to residents who did not attend the meeting. They obtained responses from 330 residents (77% response rate) representing 46% of all residents in the United States. An anonymous survey electronically administered to all
54 Canadian orthodontic residents obtained a response from 44 residents, for a response rate of 81%. In this US study, 136 residents of the 335 who received an e-mail completed the 57-item survey, for a response rate of 40.60%. This was a smaller sample size than the 2 previous US studies. The smaller sample size was influenced by access to graduate resident e-mail addresses, since many program chairs and directors did not provide their residents’ e-mail addresses. This might have been due to privacy issues and concerns. Also, the residents contacted might not have been interested in participating in a relatively lengthy questionnaire, even though they were told that the survey would take only 10 to 15 minutes to complete. Despite a smaller sample size than the 2 previous studies, the sample nevertheless represents orthodontic residents from 37 programs throughout the United States, allowing for significant conclusions to be drawn.

The advantage of an online questionnaire was that it allowed residents to complete the survey on a personal computer at a time and location convenient to them. They were not constrained by time limits or rushed while attending an orthodontic resident conference.

**Reasons for choosing orthodontics**

The residents were given a list of factors that influenced their decision for orthodontics as a career and were asked to choose all answers that apply. In a separate question, they were asked to choose the most important factor. The answers obtained for both questions were different. When choosing several answers, intellectual stimulation or challenge was the most common reason that US residents chose orthodontics as a career, whereas a passion for orthodontics ranked sixth (Fig 1). When asked to identify the most important, residents indicated that a passion for orthodontics was the most important factor (Fig 2). When the residents were allowed to enter several influences, 6 factors obtained more than 60 responses, but when they were asked to pick 1 factor, only 3 emerged (passion for orthodontics, intellectual stimulation or challenge, and workload flexibility and predictability). Another interesting finding was that earning potential ranked low as the most important factor but was selected with high frequency when residents were permitted several options. For political correctness, residents might have been hesitant to indicate earning potential as the most important factor despite the anonymity of the questionnaire, but it certainly was an important overall factor in their decision to become an orthodontist.

Keith and Proffit\(^2\) in the United States and Keith et al\(^4\) in the United Kingdom reported that both groups of residents indicated that future job satisfaction was the most common reason for choosing orthodontics. These studies cannot be directly compared because different
multiple choice options were offered, although the responses could be related. The results from our study, however, can be directly compared with the Canadian study because both studies used identical multiple-choice options.

In descending importance, US residents indicated that intellectual stimulation or challenge, doctor-patient relationship, working with younger patients, earning potential, workload flexibility and predictability, and passion for orthodontics as the most important reasons for pursuing orthodontics. This was similar to the answers of the Canadian residents, whose main factors were intellectual stimulation, passion for orthodontics, working with younger patients, workload flexibility or predictability, earning potential, and positive dental-school experiences. Therefore, it seems that there is commonality in the expressed motivations for becoming an orthodontist by orthodontic residents in the United Kingdom, Canada, and the United States.

Although the passion for orthodontics factor ranked highly, it is difficult to determine how most residents developed their passion before even entering dental school. Perhaps these people were influenced by their perception of orthodontics as the prima donna of the dental specialties, their experience as a patient, and comments of others including general dental practitioners.

An alternate interpretation is that the experience of dental school convinced at least 40% of orthodontic residents that they were not passionate about general dentistry or other specialty areas. Most specialty areas in dentistry provide intellectual stimulation, and this should not be a unique descriptor to orthodontics. It could be that applicants perceive that orthodontics has a higher intellectual level because of their limited exposure to it in dental school.

Most US residents decided to become orthodontists before entering dental school (Fig 3). It is unusual for a true passion for orthodontics to be manifested before dental school. Rather, the residents might have been influenced by other confounding factors in life before dental school that motivated them to become orthodontists. Examples of these factors include orthodontic treatment they received as a child, a parent or family member who is an orthodontist, general preconceived notions about orthodontics portrayed by the media and public, or the lifestyle and career satisfaction of an orthodontist in their community.

Fig 3. Responses to “when did you decide to pursue an orthodontics training program?”

![](image-url)
The response pattern is inherently problematic, since residents said they chose orthodontics because of intellectual stimulation or challenge and passion for orthodontics; this is coupled with when they made their decision—before entering dental school. If residents truly have this intellectual interest and passion for orthodontics, this is not reflected by an interest to pursue academics, teaching, and even research. Perhaps a possible solution to the academic crisis can be addressed by changing the selection process in orthodontic residency programs to allow for candidates without preconceived notions of orthodontics before dental school. Instead, selecting candidates for admission who develop a true passion while being inspired in dental school or an intellectual interest in orthodontics after years of practicing general dentistry could result in more residents with an interest in pursuing academics.

**Future plans after graduation**

The residents were asked about their practice plans after graduation and were allowed to select all responses that apply. The most popular option was to practice orthodontics as an associate (32.35%), followed by buying into an existing practice (31.18%) (Table II). Furthermore, when asked about their intended practice setting, 89.05% said private practice, 1.46% said primarily a community setting, 1.46% said primarily an academic setting (teaching hospital or research institute), and 6.57% said a combination of a community and an academic setting. It would be expected that, at the minimum, the 5 residents in an extended 4-year program would express an interest in an academic career, since that program presumably involves a significant research component leading to the doctorate degree. Interestingly, only 2 residents indicated an interest in full-time academics. Moreover, these 2 residents might be registered in a 2- or 3-year program. Even if we assume that they are 2 of the 5 residents in an extended program, this would mean that 60% of residents in extended programs do not plan to pursue a full-time academic career. Program chairs therefore cannot expect that accepting residents into a longer program will guarantee that they will subsequently pursue an academic career. Because orthodontics is the most competitive of all the dental specialties, these subjects might express interest in an academic career at their interview to be accepted. Either their experiences have discouraged a career in academia or their ultimate true intention of pursuing private practice once the program is completed became obvious. This notion of residents expressing an interest in teaching at their interview only to have this sentiment disappear by graduation has previously been expressed in the literature.

The residents, when questioned about the percentage of time they intend to dedicate to either clinical or didactic research, indicated that they plan to dedicate little time to research. These results confirm those of previous studies and the notion that orthodontics, like other areas of dentistry, will probably continue to have significant difficulties in the recruitment of full-time academics. However, 21.17% said they would like to spend 25% of their time on research. This might mean that they would be interested in a part-time academic career. The survey unfortunately did not ask whether they intend to pursue a part-time academic career.

If residents do pursue orthodontics because of a passion for orthodontics and intellectual stimulation or challenge, then why are not more of them choosing an academic career and dedicating more time to research? One possibility is that dental and orthodontic educators need to be more successful in converting this expressed passion and intellectual stimulation or challenge into an interest for teaching and research. Alternatively, could it be that these residents do not truly have this passion and intellectual stimulation or challenge for orthodontics, and are instead motivated to become orthodontists because of other factors such as earning potential and lifestyle?

Yet another distinct possibility is that current guidelines for program directors in orthodontics to be certified by the American Board of Orthodontics places too heavy a focus on clinical orthodontics. This requirement might prevent the hiring of program directors based on higher doctorate degrees, research, teaching ability, and scholarly activity. This could subsequently translate into a clinically focused program that might result in breeding a generation of orthodontists who lack interest in research and scholarly activity.

Keith and Proffit found that only 6% of US residents planned to teach, and Bruner et al found that...
only 3% of residents had plans for academia, and 4% considered either academia or something else. Keith et al\(^4\) found that only 7% of residents in the United Kingdom had an interest in academia after graduation, and Noble et al\(^5\) found only 2 of 44 Canadian residents were interested in academics. In the study by Bruner et al\(^3\), 40% of the residents reported that they would be interested in full-time academics if the salaries at universities would improve. Flores-Mir\(^9\) summarized possible solutions to this crisis, including more training stipends,\(^9,16\) increased flexibility to move through academic ranks, recruitment of immigrants to academia,\(^16,17\) supplementation of salaries through intramural and extramural practices,\(^17,18\) use of government funds to subsidize a student’s education with the requirement that the student enters academics,\(^17,19\) and requesting funds from graduates to supplement faculty salaries. Another important recruitment strategy is for faculty to mentor dental students to become involved in student life and research, and attempt to inspire them early in their careers to contemplate an academic career.\(^20\) Inherent in this mentorship is that faculties of dental schools must develop an enriched and positive dental-school experience. Other solutions include funds to sponsor residents during their training, and research grants and programs for dental students to obtain additional degrees to help stimulate and nourish an interest in research. Based on our results, orthodontic educators might want to consider a different cohort of applicants who have been, or might be, inspired to develop a genuine interest in research and teaching during dental school, because current orthodontic residents are not filling the gaps in the dramatic shortage of academics.

It might be worthwhile to consider the recruitment of students with backgrounds in education or research, since teaching and research could truly be their first passions.

Another alternate could be to generate an interest in teaching and research during dental school by summer research projects or by creating research projects leading to a bachelor of science degree in dentistry. Students who express interest in these programs could be groomed for careers as dental educators and researchers. However, most students engaged in research might do so to enhance their opportunities for admission to graduate programs (or because they obtain an additional degree and funding during their summer vacations at universities).

Most residents plan to practice in an urban or suburban setting (75.91%). Only 13.14% plan to practice in a rural setting, and 2.92% in an inner city. Similar trends were found in Canada.\(^5\) This evidence suggests that the specialty in the United States and Canada might need to ensure access and availability of care in rural and underserviced areas. Perhaps orthodontic programs should accept students from rural and underserviced settings who plan to return to these communities. Orthodontic specialty programs might need to develop outreach programs in these areas and send residents to provide necessary orthodontic services as a social obligation of dental colleges and graduate programs to address access-to-care issues. By doing this, residents might be more likely to continue providing care to these underserviced areas after graduation. The long-term solution might be to instill in residents a sense that, as health care professionals, they have a social responsibility for ensuring access of care to all people.\(^21\)

Most residents said that they plan to work full time; this was defined as more than 3 days per week. No significant difference was found between the sex and age variables. This might be due to the increased debt residents have at graduation. The study found that the average debt was $165,226. This is an increase of more than $30,000 from the debt of $132,000 reported by Lindauer et al\(^{10}\) in 2002. This is less than the average total debt for dental graduates reported at $200,339.\(^22\) It was also reported that the average debt of Canadian dental students is $24,000 to $26,000 per year.\(^23-26\) This debt has been implicated as a reason that residents fail to pursue academic careers.\(^27\) Help in alleviating this debt could encourage more residents to pursue academic careers. Furthermore, this high debt might suggest why so many residents indicated that they plan to work as associates after graduation instead of buying into a practice or starting one from scratch. A solution might be to obtain a commitment by residents to deliver care to underserviced areas in exchange for debt relief or reduced tuition. However, cash-strapped universities could find it challenging to be the funding institutions for students.

Interestingly, residents do not seem to expect to earn an adequate income to both reduce this debt and sustain a reasonable lifestyle until 5 years after graduation. The residents indicated that they expect to earn on average only $137,570 (range, $10,000-$250,000) in their first year, with some believing that their salary will be as low as $60,000. If orthodontic residents are willing to accept salaries as low as $60,000, why are they not becoming academics? If educational institutions or government can provide a means to supplement the cost of resident’s education with the requirement that they teach after graduation, more residents might be willing to accept an academic salary, knowing that they will graduate without debt. However, residents might be motivated to become involved in teaching dental students after graduation as potential future referral sources, or
to impress their patients. Also, the residents who expect an initial low income might be starting a new practice without referral sources, student debt reduction, and patients. They might have a medium-term financial plan in place to allow their practice to build and mature. Another possibility is that residents underestimated their projected income for political correctness.

Most residents indicated that they intend to work full time (more than 3 days per week). No significant difference was found between the sexes and the decision to work full or part time. These results were similar to those from the survey of Canadian residents, indicating that female orthodontic residents, like their males counterparts, plan to practice full time.5

CONCLUSIONS

A passion for orthodontics is the most important reason that US residents choose orthodontics, and intellectual stimulation or challenge is also an important factor. There will continue to be a shortage of residents pursuing academia, since most plan to enter private practice with little time dedicated to research. For many respondents, the decision to become an orthodontist was made before entering dental school; these residents might have preconceived notions about orthodontic practice. This could be why so few residents plan to have academic and research careers. The solution to the academic crisis might be for orthodontic programs to change their selection process to accept candidates who develop a true passion for research in orthodontics while in dental school or general dentists who develop an interest in orthodontics after years in practice.

Residents are graduating with considerable debt and plan to work in urban areas. A solution to increasing the number of orthodontists in underserviced areas might be to institute programs of debt relief or reduced tuition if these residents make a commitment to serve these areas.

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REFERENCES