

# Future practice plans of orthodontic residents in the United States

James Noble,<sup>a</sup> Frank J. Hechter,<sup>b</sup> Nicholas E. Karaiskos,<sup>c</sup> Nikola Lekic,<sup>d</sup> and William A. Wiltshire<sup>e</sup>  
Winnipeg, Manitoba, and Toronto and Ottawa, Ontario, Canada

**Introduction:** The purpose of this study was to investigate the future clinical practice plans of orthodontic residents in the United States. **Methods:** All program chairs and directors of the 65 US orthodontic residency programs were contacted by e-mail and telephone and asked for permission to e-mail their residents and invite them to take part in an anonymous 57-item questionnaire online. A total of 335 e-mails from 37 programs were obtained, and the survey was sent in May 2007. Basic statistics including chi-square comparative analyses were performed by sex, age, and year of program. **Results:** A total of 63.04% of orthodontic residents plan to use self-ligating brackets; 84.06% plan to use Invisalign (Align Technology, Santa Clara, Calif); 92.03% plan to use temporary anchorage devices, and 72.26% plan on placing them themselves; 28.26% plan to use cone-beam computerized tomography; 92.75% plan to use a digital imaging program; 45.65% plan to use indirect bonding; and 10.87% plan to use lingual orthodontics. A total of 70.07% plan to use 2-phase treatment, and 61.59% said they will use functional appliances. A total of 81.16% plan to become certified by the American Board of Orthodontics, but only 18.12% thought certification should be mandatory for licensure; 36.50% indicated that a master of science degree should be required in their program, and 77.94% believe that a 24- to 30-month program adequately prepares them for future orthodontic practice. **Conclusions:** Newer orthodontic technologies such as self-ligating brackets, temporary anchorage devices, and Invisalign as well as functional appliances are expected to grow in popularity in the United States because of projected future use by orthodontic residents. Two-phase orthodontic treatment with functional appliance mechanics will continue to be used. Most orthodontic residents will become certified by the American Board of Orthodontics but do not believe it should be necessary for licensure. Orthodontic residents in the United States believe that a 2-year program adequately prepares them for private practice. (*Am J Orthod Dentofacial Orthop* 2009;135:357-60)

Orthodontics is an evolving specialty, and technological innovation has a large role in determining how it is practiced. Orthodontists have shown enthusiasm and willingness to incorporate developing technologies into their clinical practices despite limited independent scientific evidence supporting efficacy. Along with technological innovation, the attitudes and aspirations of orthodontic residents will undoubtedly shape the future practice of orthodontics.

The literature includes 4 previous studies involving self-administered questionnaires of orthodontic resi-

dents.<sup>1-4</sup> Only the Canadian study assessed future clinical practice plans.<sup>4</sup> Knowledge of the future plans of residents can give the profession a window to the future and assist educators with development of the curriculum that will provide the most effective education. The purpose of this study was to assess the future clinical practice plans of orthodontic residents in the United States.

## MATERIAL AND METHODS

We received ethics approval from the University Health Research Ethics Board of the University of Manitoba, Winnipeg, Manitoba, Canada. An e-mail was sent to program chairs and directors (the same person in some cases) of all 65 US orthodontic programs identified in the American Dental Association's list of accredited graduate programs, asking for permission to contact the residents and invite them to participate anonymously. A questionnaire was attached to the e-mail. Programs that did not respond were subsequently contacted at least 3 times by telephone.

The survey was administered on a website. E-mails with personalized links to the website were sent to 335 residents in 37 programs in May 2007. The residents

<sup>a</sup> Part-time clinical instructor, Department of Preventive Dental Sciences, Division of Orthodontics, Faculty of Dentistry, University of Manitoba, Winnipeg; private practice; staff orthodontist, Bloorview Kids Rehab, Toronto, Ontario, Canada.

<sup>b</sup> Professor, Department of Preventive Dental Sciences, Division of Orthodontics, Faculty of Dentistry, University of Manitoba, Winnipeg.

<sup>c</sup> Private practice, Ottawa, Ontario, Canada.

<sup>d</sup> Dental student, Faculty of Dentistry, University of Manitoba, Winnipeg.

<sup>e</sup> Professor and head of the Division of Orthodontics and the Department of Preventive Dental Science, University of Manitoba, Winnipeg.

Reprint requests to: James Noble, Faculty of Dentistry, Preventive Dental Science, 790 Bannatyne Ave, Winnipeg, Manitoba R3N 0W3, Canada; e-mail, [drjamesnoble@gmail.com](mailto:drjamesnoble@gmail.com).

Submitted, January 2008; revised and accepted, September 2008.  
0889-5406/\$36.00

Copyright © 2009 by the American Association of Orthodontists.  
doi:10.1016/j.ajodo.2008.09.024

were invited to complete anonymously a 57-item survey containing multiple choice and 1-line answers. The personalized link prevented respondents from completing the survey more than once. To ensure privacy and anonymity, no personal information was collected, and this was clearly emphasized to all residents with each communication. The survey was divided into segments: demographics, reasons for choosing orthodontics, evaluation of their orthodontic program, and future directions. The data were compiled into Excel (Microsoft, Redmond, Wash) and categorized by demographic variables. Basic statistics and comparative analyses with chi-square evaluations were undertaken by sex, age, and year of program.

## RESULTS

A total of 138 residents started and 136 completed the survey, resulting in a response rate of 40.60%; the respondents took an average of 12 minutes to complete the survey. Sex, age, and year of program are given in Table I. Responses to questions about projected practice mechanics and future practice plans are reported in Table II. Residents were asked from which company they plan to purchase brackets and why; the results are presented in Figures 1 and 2.

Most respondents (77.94%) thought a shorter 24- to 30-month program adequately prepares them for future clinical practice, and the same number (77.94%) said that a 36-month program should not be enforced for licensure. When asked whether completing a master of science degree should be required during their program, 36.50% said yes, 36.50% said no, and 25.55% said maybe.

## DISCUSSION

Similar to the Canadian study, most US respondents plan to incorporate self-ligating brackets and Invisalign (Align Technology, Santa Clara, Calif) into their practices, and few were adverse to using either.<sup>4</sup> The extensive marketing of self-ligating brackets and Invisalign by orthodontic companies might influence their acceptance. Many orthodontic companies, including Align Technology, make these technologies available to residents either free or at a reduced rate, so that residents can assess and compare them with more traditional techniques.

An overwhelming number of respondents plan to use temporary anchorage devices (TADs), and most were prepared to place TADs themselves. This might be because they are not far removed from dental school or general dental practice and are comfortable with administering local anesthesia and performing surgery.

**Table I.** Demographics of respondents to the questionnaire

Respondents	n (%)
Age (y)	
<25	1 (0.72)
25-29	71 (51.45)
30-34	54 (39.13)
35-39	8 (5.80)
>40	4 (2.90)
Sex	
Male	89 (64.49)
Female	49 (35.51)
Year in program	
1	31 (22.63)
2	67 (48.91)
3	34 (24.82)

A group of orthodontists who met in 2004 reported that orthodontists are the best qualified to place TADs.<sup>5</sup>

Most respondents indicated that they plan to use a digital imaging program, and some said they would use cone-beam computerized tomography. Almost half plan to use indirect bonding. Few plan to use lingual orthodontics, perhaps because of limited exposure during their training and unfamiliarity with its philosophy and mechanics. These responses suggest that residents are prepared to incorporate technological advances in their future practices and are a fertile group for marketing efforts of orthodontic companies.

Most residents plan to use 2-phase treatment and functional appliances, in contrast to evidence from recent randomized controlled clinical trials.<sup>6-9</sup> Perhaps residents have reviewed these studies in detail and identified their deficiencies,<sup>10</sup> or perhaps they see these approaches as potential practice builders.<sup>11</sup>

Nearly half the respondents indicated that 3M Unitek was the company from which they most likely will purchase brackets (Fig 1). Residents want to assess and compare various brackets and make informed purchase decisions. Companies would therefore benefit from making products readily available to residents.

Respondents were divided equally about the requirement that programs should include a master of science degree, in contrast to most Canadian residents, who might be biased because all Canadian programs have this requirement.<sup>4</sup> Most Canadian residents also indicated programs should be 36 months to obtain licensure, whereas US residents believe that a 36-month program should not be required. These responses, however, reflect differences in the current program lengths in the respective countries.

Cangialosi<sup>12</sup> supported the notion of a minimum 36-month program, arguing that this would allow for the opportunity to expand clinical didactic material,

**Table II.** Future practice plans of orthodontic residents in the United States

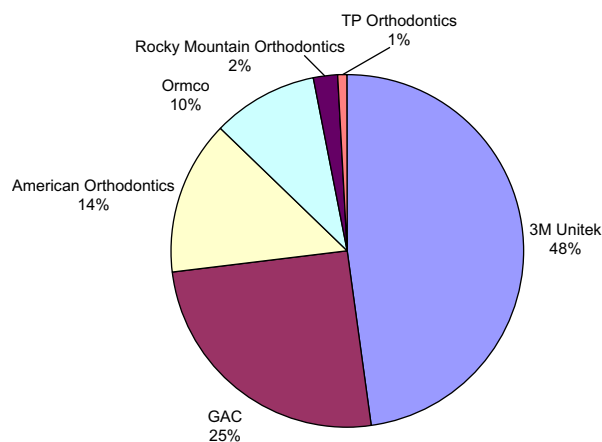
	Yes (%)	No (%)	Maybe (%)	Unsure (%)
Do you plan to use self-ligating brackets in your practice?	63.04	4.35	30.43	2.17
Do you plan to use Invisalign in your practice?	84.06	2.90	13.04	0.00
Do you plan to use TADs in your practice?	92.03	0.00	6.52	1.45
If yes, do you plan to place the TADs yourself?	72.26	6.57	17.52	3.65
Do you plan to use cone-beam computerized tomography in your practice?	28.26	17.39	47.10	7.25
Do you plan to use a digital imaging program in your practice?	92.75	1.45	5.07	0.72
Do you plan to use indirect bonding in your practice?	45.65	12.32	39.13	2.90
Do you plan to use lingual orthodontics in your practice?	10.87	61.59	23.19	4.35
Do you plan to perform 2-phase treatments in your practice?	70.07	3.65	25.55	0.73
Do you plan to use functional appliances in your practice?	61.59	8.70	27.54	2.17
Do you plan to receive ABO certification after graduation?	81.16	5.80	12.32	0.72
Should it be mandatory for all orthodontic graduates to receive ABO certification to practice in the US?	18.12	64.49	11.59	5.80

enhance experience in diagnosis and treatment planning, allow more experience with finishing treatment, and cause fewer transfers. Also, residents could start and finish patients and follow them into retention. In addition, residents could complete a comprehensive research project that might stimulate more researchers while advancing our knowledge. It was also suggested that a 3-year program allows for increased capacity for critical analysis and objective evaluation of new technological advancements.<sup>13</sup> Moskowitz<sup>14</sup> indicated that longer programs result in more seasoned, skilled, and critically thinking residents, who would seek board certification, since they could present cases completed during their residency. He asserted that graduates from 2-year programs are at a disadvantage to becoming board certified upon graduation because of their inability to finish cases.<sup>15</sup> Currently, the European standard is a 3-year orthodontic program.

In contrast, Lindauer<sup>16</sup> argued that no evidence supports these claims. He stated that extending program length would result in an immediate decrease in graduating orthodontists, more debt for residents, and increased financial hardship for programs because they might not have the room, faculty, and finances. Currently, there is no objective measure to compare clinical knowledge and skill to definitively address the issue of program length.

Most residents (81%) plan to take the American Board of Orthodontics (ABO) examination, slightly less than found by Bruner et al<sup>2</sup> in 2005 (87%) but still significantly more than found by Keith and Proffit<sup>1</sup> in 1994 (2%). Interestingly, only 18.12% believe that ABO certification should be mandatory for licensure.

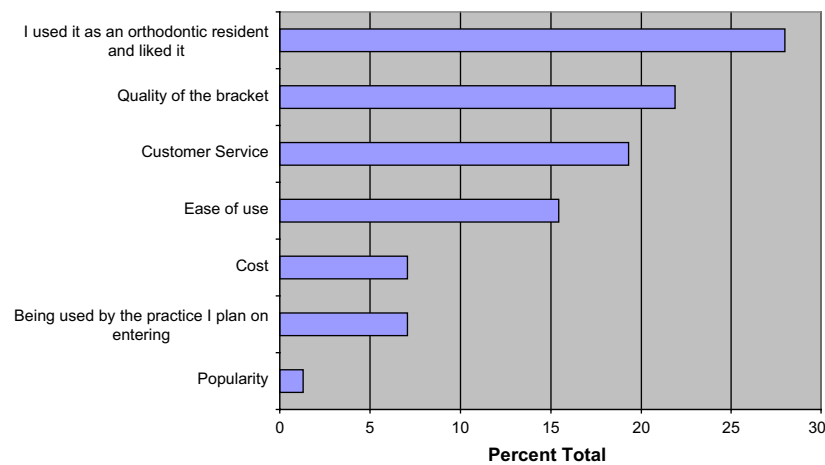
The percentage of American Association of Orthodontists members who are certified by the ABO has historically been low.<sup>17</sup> Recently, the ABO provided an alternative mechanism to become certified.<sup>17-20</sup> It also



**Fig 1.** Company from which residents plan to purchase orthodontic brackets.

facilitated resident certification by allowing them to use faculty-supervised patients, but this might be a formidable task for residents from 24-month programs.<sup>14,15</sup>

Most residents plan to become certified, but this might reflect the wishes and encouragement of their program chair or director. Most residents indicated that ABO certification should not be a requirement for licensure. This might be due to criticisms and concerns about the clinical component of the examination.<sup>21</sup> Furthermore, the new requirement that directors of accredited US programs must be certified by the ABO or eligible might result in programs with a more clinical focus. This requirement could place discriminatory barriers for foreign-trained orthodontists because these noncertified educators might not be considered for chairs at US programs despite their research and teaching credentials. Programs in the United States might then lose excellent candidates who could help solve the academic crisis in some schools.



**Fig 2.** Why residents plan to purchase brackets from a specific company (they could select more than 1).

The existence of more clinically based programs might be a reason that residents graduate with greater motivation to enter private practice rather than academics.<sup>2-4</sup> The lack of time available in shorter programs for residents to complete a comprehensive research project might exacerbate the problem.

## CONCLUSIONS

1. US orthodontic residents are interested in technological advances such as self-ligating brackets, TADs, and Invisalign.
2. US residents prefer a 24- or a 30-month program, and most will become certified by the ABO, but they do not believe that certification should be mandatory for licensure.

## REFERENCES

1. Keith O, Proffit WR. Orthodontic training: the residents' perspective. *Am J Orthod Dentofacial Orthop* 1994;106:649-53.
2. Bruner MK, Hilger KK, Silveir AM, Butters JM. Graduate orthodontic education: the resident's perspective. *Am J Orthod Dentofacial Orthop* 2005;128:277-82.
3. Keith O, Stevens CD, Proffit WR, O'Brien KD. A survey of the opinions of orthodontic specialist trainees in the U.K. *Br J Orthod* 1997;24:163-7.
4. Noble J, Karaikos N, Wiltshire WA. Motivations and future plans of orthodontic residents in Canada. *Am J Orthod Dentofacial Orthop* 2009 (in press).
5. Mah J, Bergstrand F. Temporary anchorage devices: a status report. *J Clin Orthod* 2005;39:132-6.
6. Tulloch JF, Proffit WR, Phillips C. Outcomes in a 2-phase randomized clinical trial of early Class II treatment. *Am J Orthod Dentofacial Orthop* 2004;125:657-67.
7. O'Brien K, Wright J, Conboy F, Sanjie Y, Mandall N, Chadwick S, et al. Effectiveness of early orthodontic treatment with the Twin-block appliance: a multicenter, randomized, controlled trial. Part 1: dental and skeletal effects. *Am J Orthod Dentofacial Orthop* 2003;124:234-43.
8. Dolce C, McGorray SP, Brazeau L, King GJ, Wheeler TT. Timing of Class II treatment: skeletal changes comparing 1-phase and 2-phase treatment. *Am J Orthod Dentofacial Orthop* 2007;132:481-9.
9. Wheeler TT, McGorray SP, Dolce C, Taylor MG, King GJ. Effectiveness of early treatment of Class II malocclusion. *Am J Orthod Dentofacial Orthop* 2002;121:9-17.
10. Darendeliler MA. Validity of randomized clinical trials in evaluating the outcome of Class II treatment. *Semin Orthod* 2006;12:67-79.
11. Bowman SJ. One-stage versus two-stage treatment: are two really necessary? *Am J Orthod Dentofacial Orthop* 1998;113:111-6.
12. Cangialosi TJ. The time is right for a 3-year orthodontic curriculum. *Am J Orthod Dentofacial Orthop* 2007;132:135-6.
13. Sinclair PM, Alexander RG. Orthodontic graduate education survey. *Am J Orthod* 1984;85:175-81.
14. Moskowitz EM. A mandatory 3-year orthodontic postgraduate program and the American Board of Orthodontics: what's the connection? *Am J Orthod Dentofacial Orthop* 2003;124:2-3.
15. Moskowitz EM. The role of the orthodontic residency in the ABO certification process. *Am J Orthod Dentofacial Orthop* 2007;132:137-8.
16. Lindauer SJ. Is the time really right for mandatory 3-year orthodontic residency programs? *Am J Orthod Dentofacial Orthop* 2008;133:2-3.
17. Riolo ML, Owens SE Jr., Dykhouse VJ, Moffitt AH, Grubb JE, Greco PM, et al. A change in the certification process by the American Board of Orthodontics. *Am J Orthod Dentofacial Orthop* 2005;127:278-81.
18. Riolo ML, Owens SE Jr., Dykhouse VJ, Moffitt AH, Grubb JE, Greco PM, et al. The American Board of Orthodontics: diplomate recertification. *Am J Orthod Dentofacial Orthop* 2004;126:650-4.
19. Cangialosi TJ, Riolo ML, Owens SE Jr., Dykhouse VJ, Moffitt AH, Grubb JE, et al. The American Board of Orthodontics and specialty certification: the first 50 years. *Am J Orthod Dentofacial Orthop* 2004;126:3-6.
20. Owens SE Jr., Dykhouse VJ, Moffitt AH, Grubb JE, Greco PM, English JD, et al. The new American Board of Orthodontics certification process: further clarification. *Am J Orthod Dentofacial Orthop* 2005;128:541-4.
21. Ackerman MB, Rinchuse DJ, Rinchuse DJ. ABO certification in the age of evidence and enhancement. *Am J Orthod Dentofacial Orthop* 2006;130:133-40.