Do Pediatric Dentists Practice the Orthodontics They are Taught?

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Abstract

Purpose: The purpose of this study was to determine whether the orthodontic treatment provided by pediatric dentists reflects the orthodontic training received in pediatric dental residency programs.

Methods: Five questions from a survey of the diplomates of the AAPD in August 2002 and from a survey of pediatric dental residency program directors in June 2002 were statistically analyzed to compare the orthodontic treatment provided by diplomates to that provided within pediatric dental residency programs.

Results: Patient populations differed financially between pediatric dental residencies and diplomates of the AAPD. Residents treated significantly more public assistance patients. The residents were more likely than diplomates to use most orthodontic appliances; they were also more likely to treat most stages of dental development and most conditions/malocclusions with orthodontics. Diplomates anticipated a decrease in the amount of orthodontic treatment provided in the next 5 years, while program directors anticipated an increase.

Conclusions: The majority of the orthodontic treatment provided by pediatric dental residents and diplomates was similar, although the residents were exposed to more diverse orthodontic treatment modalities than those used by diplomates. The residencies were also more likely than the diplomates to increase the amount of orthodontic treatment provided in the next 5 years. (*Pediatr Dent.* 2004;26:XXX-XXX)

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Certification by the American Board of Pediatric Dentistry includes the submission of a board case involving the management of a malocclusion requiring tooth movement.[1] This encompasses either interceptive treatment in the primary/transitional dentition or comprehensive treatment into the adolescent full permanent dentition. In addition, the American Academy of Pediatric Dentistry has written Guidelines for Management of the Developing Dentition.[2]

The amount of orthodontic treatment provided by pediatric dentists is a controversial topic among pediatric dentists and orthodontists. In 1984, Gottlieb[3] reported to the orthodontic community that pediatric dentists were providing more orthodontic treatment than in the past, which resulted in fewer referrals to orthodontists. Gottlieb speculated that increased professional competition with orthodontists by non-orthodontists was for income purposes. Unfortunately, his follow-up study in 2001[4] did not specifically address this issue and only reported a decline in the number of referrals by "other dentists (specialists)".

In a survey of the diplomates of the American Academy of Pediatric Dentistry (AAPD)[5] in August of 2002, 59% of the respondents stated that they spent less than 10% of their time providing orthodontic treatment, while 11% stated that they did not provide any orthodontic treatment at all. When asked about the orthodontic training they had received after the completion of dental school, 48% percent of responding diplomates stated that the majority of their orthodontic training was during their pediatric dental residencies. Thirty-two percent attended 1- to 2-year-long (weekend) continuing education (CE) courses in orthodontics, 11% attended 1- to 2-day CE courses, 7%

completed formal graduate orthodontic residencies, and 2% received informal training such as apprenticeships.

Although only 7% had completed orthodontic residencies, 11% stated that they were "dual trained". The majority of responding practitioners (63%) also considered the adequacy of the orthodontic education they received during their pediatric dental residencies to be "average" or "above average".

The amount of orthodontic training received by pediatric dental residents may vary widely due to the ambiguity of the accreditation standards made by the Commission on Dental Accreditation. The standards[6] state that pediatric dental residents should receive training in "craniofacial growth and development" to enable the student to diagnose, consult, and/or refer to other specialists, problems affecting orofacial esthetics, form, and function. This includes but is not limited to the following:

1. theories of growth mechanisms;
2. principles of comprehensive diagnosis and treatment planning to identify normal and abnormal dentofacial growth and development;
3. indications and contraindications for extraction and nonextraction therapy, growth modification, dental compensation for skeletal problems, growth prediction, and treatment modalities.

In June of 2002, 60 pediatric dental residencies in the United States, Canada, and Puerto Rico were surveyed[7] to document the orthodontic education provided in pediatric dental residencies. Within 2 years of residency (if programs offered a third year, it was not evaluated), most pediatric dental residents spent 10% to 25% of their time providing clinical orthodontic treatment. A wide variety of conditions/maloccusions were treated using several types of therapies/appliances.

Unfortunately, no studies have compared the orthodontic treatment provided by pediatric dentists to the orthodontic education received during pediatric dental residency training. Due to this lack of knowledge and because many of the diplomates surveyed stated they received the bulk of their orthodontic training during their pediatric dental residencies, the purpose of this study was to determine whether the orthodontic care delivered by pediatric dentists reflects the training that pediatric dental residents currently receive.

Methods

Two separate surveys of the diplomates of the AAPD[5] and pediatric dental residency program directors[7] were conducted in 2002. Details of the surveys are reported elsewhere.[5,7] Fifty-two of 60 (response rate=87%) program directors of pediatric dental residencies and 358 of 492 (response rate=73%) of the diplomates completed mailed questionnaires. The questionnaires assessed the type and amount of orthodontic treatment taught in the pediatric dentistry residency programs and the amount and type of treatment provided in pediatric dental practices. The response of each diplomate was not linked to the particular residency in which he or she trained. The questions were closed-ended, multiple choice, and similar in nature (between those sent to diplomates and residency program directors), with identical options for answers. There were 5 questions common to both questionnaires, including:

1. Approximately what percent of the patients that (you/ the residents) treat are on public assistance?
2. Which of the following stages of dental development do (you/ the residents) treat with orthodontics?
3. Which of the following conditions do (you/the residents) treat with orthodontics?
4. Which types of orthodontic therapy do (you/the residents) use?
5. Do you anticipate a change in the amount of orthodontic treatment provided (by diplomates/residents) in the next 5 years?

Table 1. Comparison of Patients Receiving Public Assistance in Diplomates' Practices and Pediatric Dental Residencies*

Public assistance (%)	Diplomates (%) N=358	Residencies (%) N=52
0	31	0
1-20	42	0
21-60	19	23
>60	8	77

*P<.001.

Statistical considerations

Comparisons of the responses to the questions common to both questionnaires were analyzed through cross tabulation using chi-square and Fisher exact tests, where appropriate. Significance was set at P<.01, because multiple comparisons were made.

Results

The patient population treated by diplomates and pediatric dental residents were financially different. A higher proportion of patients treated in the residencies received public assistance than those treated by the diplomates (P<.001). As listed in Table 1, less than one fifth of patients received public assistance in 73% of the responding diplomates' practices, while almost two thirds of patients received public assistance in 77% of the responding pediatric dental residency programs.

Table 2 compares the stages of dental development treated with orthodontics by pediatric dental residents and diplomates. Residents were more likely to provide orthodontics to patients in the primary dentition (P<.001), early mixed dentition (P<.01), and late mixed dentition (P<.001) than diplomates. There was no significant difference in the treatment of patients in the permanent dentition.

Table 3 compares the orthodontic conditions/ maloccusions treated by diplomates with those taught

Table 2. Comparison of Dental Development Stages Treated by Diplomates and Pediatric Dental Residents

Stage	Diplomates (%) N=358	Residencies (%) N=52
Primary*	65	96
Early mixed**	85	100
Late mixed*	58	96
Permanent	41	60

*P<.001.
**P<.01.

Table 4. Comparison of Orthodontic Therapies Used by Diplomates and Taught in Pediatric Dental Residencies

Appliance	Diplomates (%) N=358	Residencies (%) N=52
Removable Hawley with finger springs*	71	92
Fixed rapid palatal expanders**	74	96
Intra-arch molar distalization appliances	39	52
Straight archwires**	47	81
Utility archwires**	43	71
Removable rapid palatal expanders**	28	58
Headgear*	31	56
Edgewise techniques**	16	46
Functional appliances*	26	50
Invisalign	6	6

*P<.01.
**P<.001.

during the residency programs. diplomates were less likely to treat dental Class I, open bite, molar uprighting, dental Class II, rotations, ectopic eruptions, space regaining (P<.001), as well as deep bite and serial extractions (P<.01) than those taught in residencies.

Table 4 compares the orthodontic therapies/appliances used within residencies and by diplomates. A higher percentage of residencies taught the use of fixed rapid palatal expanders (RPE), straightwire therapy, utility archwires, removable RPEs and edgewise techniques (P<.001), as well as removable Hawley appliances with finger springs, headgear, and functional appliances (P<.01) than diplomates who reported their use.

Table 5 compares the anticipated change in the amount of orthodontic care provided by diplomates and in pediatric dental residencies. diplomates were more likely to anticipate a decrease, while residency program directors anticipated an increase in the next 5 years (P<.01).

Table 3. Comparison of Conditions/Malocclusions Treated by Diplomates and Taught in Pediatric Dental Residencies

Condition	Diplomates (%) N=358	Residencies (%) N=52
Anterior crossbite	88	98
Dental Class I*	46	85
Deep bite**	37	58
Open bite*	31	60
Molar uprighting*	37	67
Space maintenance	95	100
Posterior crossbite	88	98
Dental Class II*	35	63
Skeletal Class II	31	25
Rotation*	49	85
Ectopic eruption*	78	98
Space regaining*	58	90
Habits	86	98
Dental Class III	29	46
Skeletal Class III	23	10
Dental impactions	24	39
Serial extractions**	51	73

*P<.001.
**P<.01.

Discussion

Diplomates reported seeking further orthodontic education after completing their pediatric dental residencies. Less than half (48%) of responding diplomates[5] stated that they received the majority of their orthodontic training during their pediatric dental residencies, which decreased from when they were last surveyed (74%) in 1983.[8] Interestingly, over half of the responding diplomates in the 2002 study[5] also felt that the orthodontic training in their pediatric dental residencies was adequate or better. Unfortunately, the relationship between the number of CE hours and diplomate satisfaction with pediatric dental residency orthodontic education was not investigated in this study. The reported increase in orthodontic education post residency may suggest increased support for the concept of "lifelong learning," or it may simply reflect increased CE requirements for hospital privileges and state licensure.

"Dual training" is a term many use to refer to those individuals who have completed graduate residency programs in both pediatric dentistry and orthodontics. In the 2002 survey,[5] 11% of diplomates stated they were "dual trained" (although only 7% had completed an orthodontic residency). No definition was given for "dual training" in the survey, and it is unclear why more practitioners considered themselves "dual trained" than the number of practitioners who had completed orthodontic residencies. Although only a small percentage of practitioners had

Table 5. Comparison of Anticipated Change in Orthodontic Treatment Provided by Diplomates and Pediatric Dental Residents

Change	Diplomates (%) N=358	Residencies (%) N=52
Increase*	14	27
Decrease*	15	2
Same	71	71

*$P<.01$.

completed orthodontic residencies, these practitioners may have been the majority who reported providing more comprehensive treatment. This would, however, only strengthen the differences seen between the treatment provided by the diplomates who had not completed orthodontic residencies and that provided by pediatric dental residents.

Diplomates reported seeing significantly fewer public assistance patients. This may be due to poor reimbursement rates in most states, the additional paperwork required to submit claims, the higher "no show" rate of this patient population, and the types of communities in which practitioners have chosen to practice. Because orthodontic treatment is not often covered by public assistance and because pediatric dental residents treat a large percentage of public assistance patients, it was hypothesized that residencies would provide less orthodontic treatment than diplomates. This, however, was not reported, and no questions regarding reimbursement practices were queried. Therefore, the reasons for this finding are unclear, but several explanations are possible. Certainly, the need for residencies to provide a broad-based education (including orthodontic care) may lead residencies to offer some "free" or reduced-fee care, which private practitioners may not be inclined to undertake. Also, diplomates may not provide orthodontic treatment for other economic reasons. Providing orthodontic treatment requires the office to "switch gears" from the typical restorative/preventive treatment rendered and to maintain orthodontic supplies, which may not be cost effective.

Residents were significantly more likely than diplomates to treat patients with orthodontics in all stages of dental development except the permanent dentition. Residents were also more likely to provide treatment of most of the malocclusions surveyed as well as use most of the orthodontic therapies. This suggests that pediatric dental residency programs are attempting to educate residents in various treatment options while guidance and supervision are available. Unfortunately, the reported differences in treatment between the residents and Diplomates may be due to varied interpretation of the survey questions. Program directors were asked which stages of development residents treat; they were also asked which (malocclusions/therapies) are residents ("trained to treat"/"trained to use"). The respondents may have reported what the residents are taught didactically rather than clinically. In addition, the experiences of each resident may vary, even within the same program.

The treatment of several conditions/malocclusions did not significantly differ between residencies and diplomates. These included those commonly treated, such as: anterior crossbite, posterior crossbite, space maintenance, and habits. It also included those which were less commonly treated: dental Class III and dental impactions.

Residents were significantly more likely to use all orthodontic therapies except the intra-arch molar distalization appliances and Invisalign. The use of Invisalign by both parties studied, however, was very limited. Further studies are warranted to determine whether its use will increase in the future by pediatric dentists or by other dental providers (ie, general dentists and orthodontists), since it is a fairly new technique.

The amount of orthodontic treatment provided in the next 5 years was anticipated to increase in pediatric dental residencies but not by diplomates. Although a reason for this finding was not ascertained, this may be an attempt by the program directors to more closely reflect the large amount of orthodontic treatment that some pediatric dentists are providing.

Conclusions

1. Pediatric dental residencies educate residents using more diverse orthodontic treatment modalities than those used by the majority of responding diplomates of the AAPD. This includes the stages of dental development treated, the conditions/malocclusions treated, and the orthodontic therapies/appliances used.
2. The amount of orthodontic treatment provided in pediatric dental residencies is more likely to increase in the next 5 years than that provided by diplomates.

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