

Should Endodontists Place Dental Implants? A National Survey of General Dentists

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Abstract

Introduction: The purpose of this study was to assess whether general dentists support the placement of dental implants by endodontists. **Methods:** A 29-item written survey was developed and mailed to 1,500 randomly selected practicing general dentists within the United States to assess whether respondents supported implant placement by endodontists and whether they would refer patients to endodontists for implant placement. Univariate, bivariate, and logistic regression analyses were performed. **Results:** Three hundred sixty-six subjects completed surveys. Sixty-six percent of respondents opposed endodontists placing implants, and 73% indicated they would not refer patients to an endodontist for implant placement. The following characteristics were associated with respondents who support implant placement ($P < .05$): yes, willing to refer to an endodontist for implant placement; believes other specialists would support endodontists placing implants; never or sometimes refers patients for molar root canal treatment; and plans to retire in 5 years. **Conclusions:** The majority of respondents did not support implant placement by endodontists. As the demand for implant therapy continues to grow, it may be necessary to increase the number of practitioners who place dental implants. However, general dentists' and specialists' attitudes should be further assessed before modifying the scope of endodontic practice to include implant placement. (*J Endod* 2011; ■:1–5)

Key Words

Dental care, dental education, dental implants, dentists, endodontics, endodontic therapy, dental specialists, referral

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Implant therapy has become a routine procedure within dentistry. Historically, dental implants were mainly placed by oral surgeons. However, the specialty of periodontics determined that dental implant placement was within the scope of periodontal practice in the 1990s (1). Today, a variety of dental practitioners (eg, general dentists, periodontists, prosthodontists, and endodontists) place implants (2).

The American Association of Endodontics defines their scope of practice as “the branch of dentistry concerned with the morphology, physiology and pathology of the human dental pulp and periradicular tissues. Its study and practice encompass the basic and clinical sciences including the biology of the normal pulp and the etiology, diagnosis, prevention and treatment of diseases and injuries of the pulp and associated periradicular conditions (3).” Although the majority of endodontists limit their scope of practice to the aforementioned definition, a limited number of endodontists (<10% nationally) have begun to place dental implants (4, 5). Furthermore, there has been discussion within the field debating whether to modify the current scope of endodontic practice to include implant placement (6). A recent survey examined endodontists' opinions regarding implant placement within their own specialty and found the majority of respondents (57.0%) supported implant placement by endodontists (5). Additionally, a limited number of endodontic residency programs have incorporated implant placement into their curriculum. Although some endodontists are in favor of including implant placement within their scope of practice, it is unknown whether general dentists, endodontists' primary referral source, share this same view. As such, it is important to identify general dentists' opinions before implementing changes to the American Association of Endodontics' definition of endodontics or mandating curricular changes to endodontic residency programs. The purpose of this study was to assess general dentists' opinions regarding implant placement by endodontists and identify the predictor variables associated with general dentists who favor implant placement.

Methods

A 29-item written survey was developed and distributed to a random sample of general dentists currently practicing in the United States (N = 1,500). The survey was modeled after a similar questionnaire that was distributed to endodontists (5). The names and addresses of potential subjects were obtained from the American Dental Association. Participants received a cover letter that explained the purpose of the study and obtained informed consent; a copy of the 4-page survey; and a prepaid, addressed envelope. The first mailing was sent in July 2009, and a follow-up mailing was sent to nonrespondents 1 month later. Approval to conduct the study was obtained from the University of Iowa's Institutional Review Board before commencing the study.

The survey assessed general dentists' opinions regarding dental implant placement. The dependent variable in this study was whether general dentists believed that implants should be placed by endodontists. The main question read, “In your opinion, should endodontists place implants (Yes/No)?” Possible predictor variables were assessed through a variety of questions. For example, the survey asked subjects whether they (1) restore implants, (2) place implants, and (3) would be willing to refer patients to endodontists for implant placement. Additional questions inquired about respondents' referral to endodontists for other procedures (eg, molar root canal treatment and root-end surgery) as well as questions pertaining to the

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respondents' practice and demographic characteristics such as age, sex, year of graduation from dental school, employment status, and occupational satisfaction.

Data were entered into a database and analyzed using statistical software (SAS 9.1; SAS Institute Inc, Cary, NC). Descriptive frequency tables were generated. Chi-square and Wilcoxon rank-sum tests were used to assess associations between the dependent variable and the predictor variables. Multiple logistic regression models were developed to identify the predictor variables associated with general dentists who favor implant placement. Variables showing an association with the primary outcome ($P \leq .1$) in the bivariate analyses were used to build the final model using forward stepwise logistic regression analysis. The model was verified using a backward elimination model. Variables that were significant at $P < .05$ were included in the final model. All possible 2-way interactions were explored.

Results

Three hundred sixty-six respondents completed surveys for a response rate of 24.4%. Table 1 displays the demographic and practice characteristics of respondents. Although 91.7% of respondents reported restoring implants, only 13.5% of respondents currently place dental implants. A majority of respondents who place implants reported receiving training at a CE course (90.2%) or by an implant company/representative (83.7%), whereas 47.2% received formal training in a residency program.

Respondents' opinions regarding implant placement by endodontists are shown in Table 2. Approximately one third of respondents believed that endodontists should place dental implants, and one fourth of respondents would refer a patient to an endodontist for implant placement. A slightly larger percentage of respondents would be willing to let an endodontist place an implant if the endodontist determined that a patient's referred tooth was nonrestorable.

Bivariate analyses showed that many predictor variables were statistically significantly ($P \leq .1$) associated with whether general dentists supported the placement of implants by endodontists (yes/no, Table 3). For example, respondents who never or sometimes refer patients to an endodontist for premolar root canal therapy were more likely to support endodontists placing implants (yes) than those who often or always refer (37.1% vs 25.2%, $P = .03$). Ninety-three percent of respondents who strongly agreed or agreed that other dental specialists in the community would support endodontists placing implants stated they would support the placement of implants by endodontists. In contrast, only 13.3% of respondents who disagreed or strongly disagreed with the statement indicated that they would support endodontists placing implants.

Variables that were considered but were not statistically significant in the bivariate analyses ($P > .1$) included the length of time to schedule an appointment with an endodontist, the distance of the nearest endodontist to whom the dentist refers, whether the endodontist to whom the respondent refers places implants, the respondent's perception of how the frequency of referrals to endodontists has changed in the past 10 years, the perceived importance of endodontic therapy to dentistry in the next 10 years, the belief that extraction and implant therapy is a valuable alternative treatment to traditional root canal therapy, the belief that implants have an equal or better long-term success rate than traditional root canal therapy, whether the respondent places implants, which dentists in the community place implants (ie, general dentists, specialists, or both), if the respondent restores implants, whether the respondent received his/her dental degree from a private or public institution, whether the respondent completed a residency program, the number of hours the respondent works per

TABLE 1. Demographic and Practice Characteristics of Responding General Dentists (n = 366)

Dentist characteristics	%
Sex	
Male	79.1
Female	20.9
Years since graduation from dental school	
<10 years	19.7
≥ 10 years	80.3
Location of dental training	
Public university	57.4
Private university	39.8
International university	2.8
Plan to retire in 5 years	
Yes	17.5
No	82.5
Practice characteristics	
Region of practice	
1, New England	4.7
2, Middle Atlantic	15.6
3, South Atlantic	16.4
4, East South Central	3.6
5, East North Central	19.2
6, West North Central	8.6
7, West South Central	8.6
8, Mountain	8.3
9, Pacific	15.0
Primary practice/employment situation	
Solo/partner	87.8
Other	12.2
Currently restores implants	
Yes	91.7
No	8.3
Currently places implants	
Yes	13.5
No but interested in placing implants in the future	23.0
No not interested in placing implants	63.5
Perception of how their referrals to endodontists have changed in the past 10 years	
Referrals have increased	33.0
Referrals have decreased	18.6
No change in referrals	46.3
Do not refer	2.1

week, employment status (ie, sole owner vs other), the American Dental Association district in which the respondent resides, the busyness of the respondent's practice, the respondent's satisfaction with income, and the respondent's satisfaction with his/her occupation.

Regression analysis identified 4 predictor variables that were statistically significantly associated ($P < .05$) with the belief that endodontists should place implants (yes) (Table 4). Holding all other variables constant, general dentists who reported they would refer a patient to an endodontist for implant placement were 91.4 times as likely to support implant placement by endodontists compared with general dentists who said they would not refer a patient to an endodontist for implant placement. General dentists who strongly agree or agree that other specialists in the community would support the placement of implants by endodontists were 53.8 times as likely to support endodontists placing implants as those who strongly disagree or disagree. General dentists who never or sometimes refer molar root canal treatment to an endodontist were 3.5 times as likely to support implant placement by endodontists compared with respondents who often or always refer molar root canal treatment. General dentists who plan to retire in the next 5 years were 2.8 times as likely to support endodontists placing implants than those who did not plan

TABLE 2. General Dentists' Opinions Regarding the Placement of Implants by Endodontists (n = 346)

Opinion	%
Believe endodontists should place implants	
Yes	33.8
No	66.2
Would refer a patient to an endodontist for implant placement	
Yes	26.5
No	73.5
Believe that general dentists in the community would support endodontists placing implants.	
Agree/strongly agree	23.3
Neutral	41.4
Disagree/strongly disagree	35.3
Believe that other dental specialists in the community would support endodontists placing implants.	
Agree/strongly agree	13.2
Neutral	39.5
Disagree/strongly disagree	47.3
If the endodontist determined that a tooth is non-restorable, the general dentist would be comfortable with them placing an implant instead of root canal treatment.	
Agree/strongly agree	32.0
Neutral	16.3
Disagree/strongly disagree	51.7

to retire in that timeframe. No significant 2-way interactions were found in the final model.

Discussion

Patients and clinicians are regularly confronted with the difficult choice of deciding whether a tooth should be maintained through endodontic treatment or extracted and replaced by a dental implant. Many factors need to be considered before determining a course of treatment. These factors include patient health-related factors (eg, systemic health and patient comfort), tooth and periodontium-related factors (eg, pulpal and periodontal conditions and quantity and quality of bone), and treatment-related factors (eg, procedural complications and treatment outcomes) (7). In deciding between implant placement versus endodontic treatment, time and cost also should be considered (8). If endodontists received implant placement training, they would have additional expertise that could be used in conjunction with their endodontic specialty training to help clinicians and patients determine which treatment would be best for the patient, endodontic or implant therapy (6). If appropriate communication occurred between the referring general dentist and the endodontist before the patient's first appointment with the endodontist, the endodontist could perform traditional endodontic therapy or implant-related procedures at the patient's first visit, thus helping to ensure timely patient-centered care. Indeed, this study found that 32% of respondents reported that if they referred a patient to an endodontist for traditional endodontic therapy, they would be comfortable with the endodontist placing an implant if the tooth was deemed nonrestorable by the endodontist.

This study, along with others (2, 9, 10), suggests that general dentists are more likely to restore implants than place implants. Consequently, general dentists must rely on specialists to place implants. Although a majority of endodontists stated that they support implant placement by endodontists (5), this study shows that fewer general dentists share this sentiment. This finding is somewhat surprising because general dentists are able to obtain implant placement training through a variety of venues outside of traditional supervised residency programs (eg, CE courses and implant representatives). Future studies should explore the rationale behind general dentists' opinions regarding who should place implants. Such a study will be important as an increased number of practitioners, such as endodontists and prosthodontists (2, 11), begin to place

implants. It will also be important to monitor general dentists' opinions over time. Many dental schools in the United States and abroad have actively sought to increase predoctoral curriculum time associated with implant restoration (12–14). This may be because of the increased numbers of patients who request dental implants and expect implants to be presented as a treatment option of dental care (15, 16). As more dentists begin to routinely offer implant treatment to their patients, the demand for the number of providers who can place implants may increase.

Four predictor variables were statistically significantly associated with general dentists' support of endodontists placing implants. Respondents who reported they would refer patients to endodontists for implant placement were more likely to support the placement of implants by endodontists. This finding implies that some respondents recognize their own limitations regarding implant placement and are willing to increase their patients' access to implant therapy by expanding the scope of which dental specialists place implants. Respondents who believed that other specialists would support implant placement by endodontists were more likely to support endodontists placing implants. As mentioned, oral surgeons historically were the only specialists to place implants, but periodontists incorporated implant therapy into the scope of their practice in the 1990s. Today, it is accepted that both oral surgeons and periodontists are capable of placing implants. Cottrell et al (10) found that 31.0% of general dentists refer patients to periodontists for implant placement, and Zemanovich et al (17) found that 51.9% of general dentists reported the same. Perhaps the respondents who reported that other specialists would support endodontists placing implants believe that general dentists and specialists would eventually recognize the value of having multiple specialists being able to provide implant placement for patients, especially if endodontic residency programs were modified to incorporate the additional training required to place implants.

The other predictor variables that were statistically significantly associated with general dentists' support of endodontists placing implants are less easy to explain. The finding that general dentists who never or sometimes refer molar root canal treatment to an endodontist were 3.5 times as likely to support implant placement by endodontists compared with respondents who often or always refer molar root canal treatment is somewhat surprising. One might expect that respondents who frequently refer patients to endodontists would

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TABLE 3. Summary Table of Predictor Variables That Were Statistically Significantly Associated ($P < .1$) with General Dentists' Support of Implant Placement by Endodontists

Predictor variable	n	Support implant placement		P value
		Yes (%)	No (%)	
Frequency of referral to an endodontist				
Anterior teeth				
Never/sometimes	238	36.1	63.9	.06
Often/always	98	25.5	74.5	
Premolar teeth				
Never/sometimes	224	37.1	62.9	.03
Often/always	111	25.2	74.8	
Molar teeth				
Never/sometimes	150	41.3	58.7	.0025
Often/always	183	25.7	74.3	
Retreatment				
Never/sometimes	85	43.5	56.5	.02
Often/always	250	30.0	70.0	
I believe that other dental specialists in my community would support endodontists placing implants.				
Strongly agree/agree	46	93.5	6.5	<.001
Neutral	130	36.9	63.1	
Strongly disagree/disagree	165	13.3	86.7	
I believe that general dentists in my community would support endodontists placing implants				
Strongly agree/agree	81	90.1	9.9	<.001
Neutral	138	26.1	73.9	
Strongly disagree/disagree	124	4.8	95.2	
Would you refer a patient to an endodontist for implant placement?				
Yes	91	92.3	7.7	<.001
No	252	12.3	87.7	
If the endodontist to whom I refer cases determined that a tooth is nonrestorable, I would be comfortable with him/her placing an implant instead				
Strongly agree/agree	110	80.9	19.1	<.001
Neutral	55	18.2	81.8	
Strongly disagree/disagree	179	9.5	90.5	
Age				
<40 years of age	80	21.3	78.7	.0067
≥40 years of age	266	37.6	62.4	
Sex				
Male	271	36.5	63.5	.08
Female	71	25.4	74.6	
Year of graduation				
≤10 years ago	69	18.8	81.2	.0033
>10 years ago	277	37.6	62.4	
Do you treat Medicaid patients?				
Yes ≥0%	90	42.2	57.8	.06
No=0%	241	31.1	68.9	
Do you plan to retire in the next 5 years?				
Yes	60	50.0	50.0	.0031
No	279	30.1	69.9	

also be willing to refer patients to endodontists for implant placement. Perhaps some respondents are concerned that if endodontists reserve a portion of appointments for placing implants, patients who are being referred for traditional root canal therapy will have a more difficult time

scheduling appointments. An alternative possibility is that general practitioners who perform root canals on molar teeth only refer complicated root canal cases or surgical procedures (ie, root-end surgery) to an endodontist. As a result, the respondent may be more likely to

TABLE 4. Final Logistic Model Associated with the Belief That Endodontists Should Place Dental Implants (n = 321)

Predictor variable	Adjusted odds ratio	95% confidence interval	P value
Would refer a patient to an endodontist for implant placement: yes vs no*	91.4	31.7, 263.5	<.0001
Believes that other specialists in the community would support the placement of implants by endodontists: strongly agrees/agrees vs strongly disagrees/disagrees*	53.8	10.4, 278.4	<.0001
Frequency of referral to an endodontist for molar root canal treatment: never/sometimes vs often/always*	3.5	1.5, 8.3	.0045
Plans to retire in the next 5 years: yes vs no*	2.8	1.0, 7.6	<.05

*The reference group.

appreciate endodontists' surgical skills and therefore would be more likely to support endodontists placing implants.

General dentists who plan to retire in the next 5 years were 2.8 times as likely to support endodontists placing implants than those who did not plan to retire in the near future. Historically, general dentists were expected to provide a vast range of treatment for their patients; thus, they may be more tolerant of specialists providing a variety of services than more recent graduates who are encouraged to rely upon specialists for specific procedures (18). Another possibility may be that dentists who plan to practice for an extended period may envision learning to place implants themselves; thus, their perception may be that there will be a decreased need for implant referral services. Indeed, 23.0% of respondents reported that they are interested in learning how to place implants.

A majority of the respondents who stated they place implants reported learning how to place implants through continuing education (CE) courses (90.2%) or an implant company/representative (83.7%) as opposed to formalized, accredited educational programs (47.2%). Although CE courses and other training resources can produce confident, competent clinicians (19), the number of hours of training received by the recipient and the quality of the education can vary greatly. Although practitioners participate in CE courses that teach how to place implants, many choose not to place dental implants after viewing the complexities of implant treatment planning, placement, and restoration (9). For this reason, formalized training programs with direct supervision, such as those found within residency programs, are preferred for teaching implant placement.

There are some limitations to this study. Twenty-four percent of dentists who received the survey completed the survey. Although this is a low response rate, it is similar to other national studies (2, 10). Nonresponse bias testing shows that there were differences in the rate of response by region. For example, 31% of dentists who received the questionnaire completed the survey within region 5, whereas 15% of dentists completed the questionnaire within region 9. Because the region was not significantly associated with general dentists' opinions pertaining to implant placement, the impact of the difference in response rates may be minimal to this study. Furthermore, the percentage of dentists who place implants and the sex distribution of respondents (Table 1) is similar to dentists nationally (12.3% place implants (20), 20.0% female (21)), which lends credibility to the generalizability of this study.

Conclusion

This study found that the majority of respondents do not currently support implant placement by endodontists. As the demand for implant therapy continues to grow, it may be necessary to increase the number of practitioners who place dental implants. Studies have shown that with appropriate training, general practitioners can achieve similar clinical results with implant placement as specialists (18, 22). Given the extensive surgical training included in endodontic residency programs, endodontists could potentially become a future resource for implant placement. However, general dentists' and specialists' attitudes should be further assessed before modifying the scope of endodontic practice to include implant placement. Future studies should assess general dentists' opinions about implant therapy versus endodontic treatment, rationale pertaining to why they support or oppose dental implant placement by endodontists, and practice patterns. Such a study could assess whether general dentists who perform a wide variety of procedures within their practice are more

or less likely than general dentists who perform more limited services within their offices to support expanding the type of services provided by endodontists and other dental specialists.

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