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Utilization of Non-Dentist Providers and Attitudes Toward New Provider Models: Findings from The National Dental Practice-Based Research Network

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Abstract

Objectives—The purpose of this study was to quantify within The National Dental Practice-Based Research Network current utilization of dental hygienists and assistants with expanded functions and quantify network dentists' attitudes toward a new non-dentist provider model - the dental therapist.

Methods—Dental practice-based research network practitioner-investigators participated in a single, cross-sectional administration of a questionnaire.

Results—Current non-dentist providers are not being utilized by network practitioner-investigators to the fullest extent allowed by law. Minnesota practitioners, practitioners in large group practices, and those with prior experience with expanded function non-dentist providers delegate at a higher rate and had more-positive perceptions of the new dental therapist model.

Conclusions—Expanding scopes of practice for dental hygienists and assistants has not translated to the maximal delegation allowed by law among network practices. This finding may provide insight into dentists' acceptance of newer non-dentist provider models.

Keywords

dental practice patterns; dental auxiliaries; delivery of dental care; dental group practices

INTRODUCTION

The Surgeon General's report, Oral Health in America, documented the lack of access to oral health care by many Americans (1). The report identified many barriers to adequate

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Contributors

Christine Blue contributed to the development of the survey questions used in the study; interpretation of all aspects of the study; analysis and writing the article. Ellen Funkhouser contributed to the statistical analysis of data; interpretation of all aspects of the study and to the writing of the article. Sheila Riggs and Brad Rindal contributed to the development of the survey questions, interpretation of the results, and to the writing of the article. Don Worley, Dan Pihlstrom, and Paul Benjamin contributed to the interpretation of the results and to the writing of the article. Gregg Gilbert contributed to obtaining the funding, originating the study, the conduct, design, interpretation of all aspects of the study; and writing the article.

access to care, including inadequacy in the number of dentists and/or their distribution (1). This led some to advocate for diversifying the types of providers (e.g., dental therapists, community dental health coordinators) or expanding the scopes of existing non-dentist providers (dental assistants, dental hygienists) as a solution (2). Expanding the scope of practice for dental auxiliaries is not new; expansion emerged in the 1960's in an effort to increase dental access (3).

Since the 1970's, states have continued to expand allied scopes of practice via their respective dental practice acts. Whether these changes in law resulted in an actual change in the utilization of non-dentist providers has not been widely studied, and our review of the literature revealed that most of our knowledge about allied dental provider utilization is decades old. Given the current debate over new non-dentist provider models, it should be helpful first to understand the current utilization of allied dental providers within dental practice, as this information could provide insight into the potential acceptance or rejection of the newest non-dentist provider – the dental therapist.

Dental therapy is relatively new to the United States. However, dental therapists have played a critical role in delivering dental care in fifty-four countries (4). Studies in the United Kingdom have shown that dental therapists can play an important role in delivery of care in a dental practice and that their role may vary according to the composition of the dental team in a practice (5, 6). The first dental therapy program in the United States, the Dental Health Aide Therapist (DHAT), was created in Alaska in 2003 by the Alaska Native Tribal Health Consortium. Dental therapists in Alaska are deployed for Native American populations under federal jurisdiction and are delivering quality dental care within their scope of training (7). In 2009, the Minnesota legislature, signed into law groundbreaking legislation authorizing two new dental providers, the dental therapist and the advanced dental therapist (8). Soon,dental therapy may expand to other states (9, 10).

The purpose of this study was to: 1) quantify current utilization of dental hygienists and dental assistants with expanded functions; 2) quantify dentists' attitudes toward expanding functions via a new non-dentist provider model (the dental therapist), as well as Minnesota dentists' attitudes toward the dental therapist model; 3) ascertain whether dentist and practice characteristics are associated with current utilization and dentists' perceptions and attitudes towards expanded functions, and investigate the association between current utilization and perceptions and attitudes.

METHODS

The research setting is The National Dental Practice-Based Research Network. Many details about the network are publicly available at its web site (11); briefly, it comprises practitioner-investigators and staff in outpatient dental practices from the United States and Scandinavia (12, 13, 14). The network has a wide representation of practice types, treatment philosophies, and patient populations, including diversity with regard to the race, ethnicity, geography and rural/urban area of residence of both its practitioner-investigators and their patients. Analyses of these characteristics confirm that network dentists have much in common with dentists at large, while at the same time offering substantial diversity with

regard to these characteristics (15, 16). However, a distinguishing characteristic of dentists in the network is their active participation in research, which may indicate a predilection for embracing new developments in dentistry. The network includes six regions, two of which include large group practice preferred provider organizations, the HealthPartners Dental Group (HP) located in the Midwest region and the Permanente Dental Association (PDA) located in the Western region. Until recently, most of the dentists were located in the southeast because it was the region of origin for the network (12).

The design for this study was cross-sectional, consisting of a single administration of a questionnaire to all network practitioner-investigators who had participated in one or more network studies of any type previously, and who were in current practice with an active practice address. This project was approved by the human participants institutional review boards (IRBs) at the University of Alabama at Birmingham and applicable regional IRBs of the network. The informed consent of all human subjects who participated in this investigation was obtained. Questions were taken from a larger questionnaire ("Infrastructure Update Survey"), the intent of which was to update certain practice characteristics of DPBRN practitioner-investigators. The full questionnaire is publicly available at the network's Publications page (17).

The questionnaire queried practitoners' current utilization of non-dentist providers and their perceptions of quality and practice efficiency with regard to these providers. Given a list of dental procedures, practitioner-investigators were asked to identify what dental procedures are done by each dental team member. Additional questions quantified dentists' attitudes and opinions regarding emerging dental providers, such as the dental therapist. Five additional questions were asked of Minnesota dentists only and queried their interest in hiring a dental therapist, important hiring factors, and barrriers to hiring. In this survey, the term "expanded functions" means activities that dental hygienists and dental assistants cannot do in all U.S. states. Examples of "expanded functions" include placing and carving complex amalgam filling, composite, and stainless steel crowns,, administering local anesthetic injections, re-cementing permanent crowns or comparable procedures.

At the time the survey was conducted (December 2010 to March 2011), there were no practicing dental therapists in Minnesota. Practitioner-investigators were asked to complete the questionnaire within three weeks; reminder letters were sent at monthly intervals to those who had not completed the questionnaire within the three week timeframe.

Analysis

All analyses were done using SAS (18). Statistical significance was assumed alpha =0.05. Chi-square tests were used to assess significance of differences in frequency distributions, including employment of dental personnel by practitioner and practice characteristics, and whether selected procedures were delegated to dental hygienists or assistants differed by geographic region (Minnesota) and practice setting (PDA/HP). Logistic regression was used to adjust for the inter-relationship of practice being in Minnesota, being in PDA or HP practice, and graduating since 2000. Outcome variables included employment and experience working with expanded function dental hygienists or assistants, delegation of

expanded functions, opinions regarding and likelihood of hiring a dental therapists. Odds ratios (OR) and 95% confidence intervals (CI) were calculated from the equations.

RESULTS

Practitioner and Practice Characteristics

A response rate of 76.3% (632/828) was achieved. Response rates did not differ by gender or year graduated dental school, but were lower in the southeast than other U.S. regions. Overall, 81% of practitioners were male, 92% were general practitioners, 55% were in solo practices, of which the majority (78%) was from the southeastern U.S. Of the entire sample, almost all practices employed dental assistants ([592/624] 95%) or dental hygienists ([591/628] 94%). Fewer practitioners employed associate dentists ([195/611] 32%), *expanded function* dental hygienists ([89/599] 15%), *expanded function* dental assistants ([188/609] 31%). In general, female practitioners, more-recent graduates and group practices employed associate dentists and expanded function dental hygienists or assistants at higher rates (Table 1). In adjusted analyses, only large group practices (PDA/HP) and dentists practicing in Minnesota were associated with employment of expanded function dental hygienists or assistants at higher rates (Table 1).

Experience with and attitudes toward expanded function dental hygienist/assistant

Of 604 practitioners who answered both questions, whether practice currently employs and whether *ever* worked with an *expanded function* dental hygienist or assistant, 90 (14.9%) of network dentists reported they had worked with and/or are in a practice that currently employs an expanded function dental assistant or dental hygienist. Sixty-eight dentists (11.3%) reported they had worked with expanded function allied personnel but did NOT currently employ, and 108 (17.9%) currently employ but had NOT previously worked with an expanded function dental assistant or hygienist. The majority of dentists (n=338; 56.0%) have never worked with an *expanded function* dental hygienist or assistant, nor currently employ one. This distribution differed substantially for PDA/HP practices than other practices, e.g., among PDA/HP practices, 52% of practitioners reported current employment of an expanded function dental hygienist or assistant and that they have had experience working with one compared to 9% in other practice settings (Table 1).

A higher proportion of dentists from Minnesota (64% [48/75]) than elsewhere (21% [117/552], $p<0.001$) reported having had experience working with an *expanded function* dental hygienist or assistant. This difference was present when stratified by large group private practices (PDA or HP) ($p<0.001$ in each stratum), the largest employers of expanded function personnel [in this study population]. Overall, 54% [335/626] of dentists thought expanded function capabilities of these personnel had a positive impact on provision of quality dental care. Experience working with or being in a practice that currently employs an *expanded function* dental hygienist or assistant was the only characteristic that was significantly associated with agreeing that expanded function personnel had a positive impact on quality of dental care (OR=4.1; 95% CI: 2.8 – 6.0, $p<0.001$), while working in PDA or HP had an association of marginal statistical significance (OR=1.9; 95% CI: 1.0–

3.7, p=0.06); neither practice in Minnesota nor graduation year had any association when adjusted for the former two.

Utilization

The most frequently performed procedures by dental hygienists are oral health education, radiographs, removal of supra- and sub-gingival deposits, and root curettage; for assistants, oral health education, radiographs, and impressions for diagnostic casts (See Table 3). Dental hygienists administered local anesthesia in only 17% of the dental offices even though at the time of the survey it was within the dental hygiene scope of practice in all but seven of U.S. states (19). With respect to restorative procedures performed in 621 (98%) practices, 6% percent of dentists reported that they delegate these procedures to dental assistants and less than 2% percent reported delegation to dental hygienists. Varying degrees of restorative procedures are permitted in Ohio, Minnesota, Washington, New Mexico, California, Oregon, Pennsylvania, New York, Maine, Tennessee and Mississippi. In analysis adjusted for year graduated (2000 or later), two practice settings, Minnesota practice and whether or not PDA/HP, were more likely to delegate two of the expanded function procedures: place, carve, and adjust restorations and administer local anesthetics (Figure 2).

Attitudes Toward New Non-Dentist Provider, Dental Therapist

When asked about the newest non-dentist provider, the dental therapist (excluding Minnesota dentists): 27% [N=149] had never heard of a dental therapist, 27% [N=151] reported being “a little” familiar, 19% were “somewhat” [N=103], 18% [N=97] were moderately, and 9% were very [N=51] familiar with the dental therapist. Among the non-Minnesota dentists who were at least somewhat informed, a majority felt that having a dental therapist would disrupt their relationship with their patients (67%) and add an administrative burden (63%). However, 39% of the respondents reported that having a dental therapist would free up time to focus on more complex and interesting dental procedures and 27% would trust the quality of the dental therapist’s work. Minnesota dentists in the network had more positive opinions on all four aspects of the dental therapist model that were queried (Figure 2).

Out of the entire sample, 25% of dentists thought that dental therapists would have a positive or somewhat positive impact on quality of dental care, 51% thought that dental therapists would increase access to care, 45% thought they would have no impact on access, and 4% thought they would decrease access to care in their state. In analysis adjusted for year graduated (2000 or later), state, and practice setting (PDA/HP or not), in general, Minnesota dentists in the network, dentists practicing in PDA/HP, and dentists with prior experience working with expanded function personnel had more positive attitudes towards dental therapists (Figure 2).

Minnesota Dentists’ Perceptions/Attitudes, Dental Therapist

Twice the proportion of Minnesota dentists compared to non-Minnesota dentists (49% [37/76] vs. 20% [112/551], P<0.001) were at least somewhat likely to hire a dental therapist. Similarly, twice the proportion of Minnesota dentists compared to non-Minnesota dentists (62% [48/77] vs. 37% [206/552], P<0.001) thought dental therapists would at least

somewhat increase access to dental care, and would have a positive impact on quality of dental care provided. These differences remained present and significant when adjusted for practice setting (PDA or HP) and graduation year, also when adjusted for whether ever worked with or currently employs an expanded function dental hygienist or assistant (Figure 2).

DISCUSSION

Although the scopes of practice have expanded during the past four decades for both dental assistants and hygienists, results from this study suggest that the procedures delegated to these providers have remained aligned with conventional roles. It appears that changes to the law have not resulted in non-dentist providers being utilized to the fullest extent in the NDPBRN. With the exception of oral health education, radiographs, deposit removal and root curretage, the dentist is performing all procedures at a much higher percentage of the time even though a dental assistant or hygienist legally can perform these tasks in most states.

The majority of respondents feel that non-dentist providers with expanded functions have a positive impact on dental practice. This sentiment has not changed as previous studies have confirmed that dentists support delegation to allied personnel as a means to increase dental services (20, 21, 22). Yet, expanding the scopes of practice for allied providers has not dramatically changed dental delivery (23). Since the 1960s, studies have demonstrated that non-dentist providers can reduce cost, provide high quality care and do not put patients at risk (24–31). These findings have motivated policy makers in many states to consider expanding the workforce via non-dentist providers.

Dentists in this study indicated dental hygienists and assistants with expanded functions have a positive impact on the quality of dental care yet underutilize them in comparison to what is allowed by law. Similarily, nearly one quarter of respondents indicated that they would trust the quality of a dental therapist’s work, and felt that employing a dental therapist would free up their time for more complex and interesting dental procedures; however, the majority indicated that it is unlikely that they will consider hiring a therapist. Therefore, dentists appear to embrace the concept of utilizing non-dentist providers; nonetheless, they have not changed their practice delivery models. It is clear from the results of this study that exposure to and utilization of *expanded* function allied providers is associated with higher delegation of procedures and more positive attitudes toward these providers and toward dental therapy (Figure 1). Ever working with or being in a practice that currently employs an *expanded function* dental hygienist or assistant was the only characteristic that was significantly associated with agreeing that expanded function personnel had a positive impact on quality of dental care. A higher proportion of Minnesota dentists and larger group practices (HP and PDA) were more likely to delegate procedures and had more positive views of dental therapy than did solo practitioners. Minnesota dentists in the network supported the passage of the dental therapy law, so it is not surprising that that they would have more positive views of dental therapy than dentists in other network regions.

Limited experience integrating and utilizing non-dentist providers in a team delivery model may explain why the roles of dental assistants and hygienists have remained largely unchanged. Early research on delegation to non-dentist providers is consistent with the notion that lack of knowledge on how to optimally integrate and utilize allied providers can be a barrier to maximum delegation and teamwork (21, 33). A recent study by Beazoglou found that general dental practices could substantially increase their capacity to see more patients with the effective use of expanded function allied dental personnel (32). Investigators have recommended that dental students have opportunitues to work with allied providers to learn how to utilize their team members more effectively and be comfortable in the role of delegator (23). The socialization to this role is central to the success of the new dental therapist workforce model (33).

A limitation of this study is the varying degrees of expanded functions that exist among states in the network. All states in the network permit some form of expanded functions for either dental assistants or dental hygienists. However, states in the southeast region, the largest region in the network, have the most restrictive scopes of practice for allied dental providers. The only states in the network that allow dental hygienists and/or dental assistants to perform a full range of restorative procedures are Oregon, Washington and Minnesota. Delegation of the EF procedures are presented separately in Figure 1 for these regions/type of practice. In addition, the study sample is not a representative sample of dentists in the US and therefore the results cannot be generalized to all U.S. dentists.

CONCLUSION

This study informs the practicing dental community about the duties that are actually being performed by non-dentist providers in a U.S.practice-based research network. The results of this study indicate that changes to the law have not resulted in expanded function allied personnel being utilized to the fullest extent. This study found that dentists who have previously worked with or currently employ expanded function dental hygienists or assistants in their practices view them more positively and are more likely to delegate procedures to these providers. In addition, they have more positive views of dental therapists and believe they have the potential to increase access to care. Effective use of expanded function allied dental personnel has the potential to expand the capacity of general dental practices to treat more patients, yet these providers are under-utilized. Limited experience integrating and utilizing non-dentist providers in a team delivery model may explain why the roles of dental assistants and hygienists have remained largely unchanged. This finding poses a challenge for dental education and should be addressed in light of the oral health disparities that exist in our nation.

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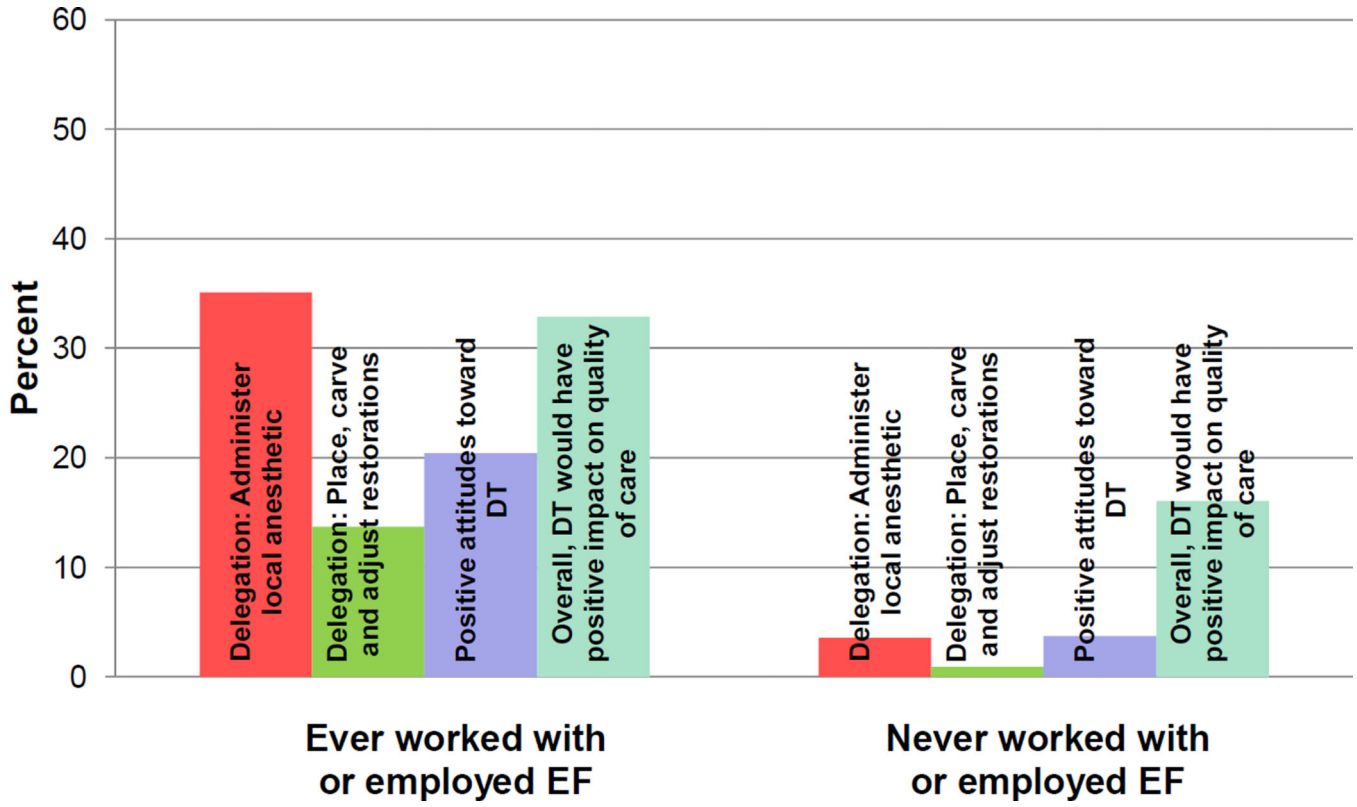

Figure 1.

Distribution (%) of practitioners' delegation to expanded function allied providers and attitudes* toward dental therapy (DT) and its potential impact on quality of care according to experience with expanded function (EF) allied providers

* Agree with all 4 aspects of attitudes towards DT assessed: would free up time, would trust quality of their work, they would NOT disrupt relationships nor increase administrative burden

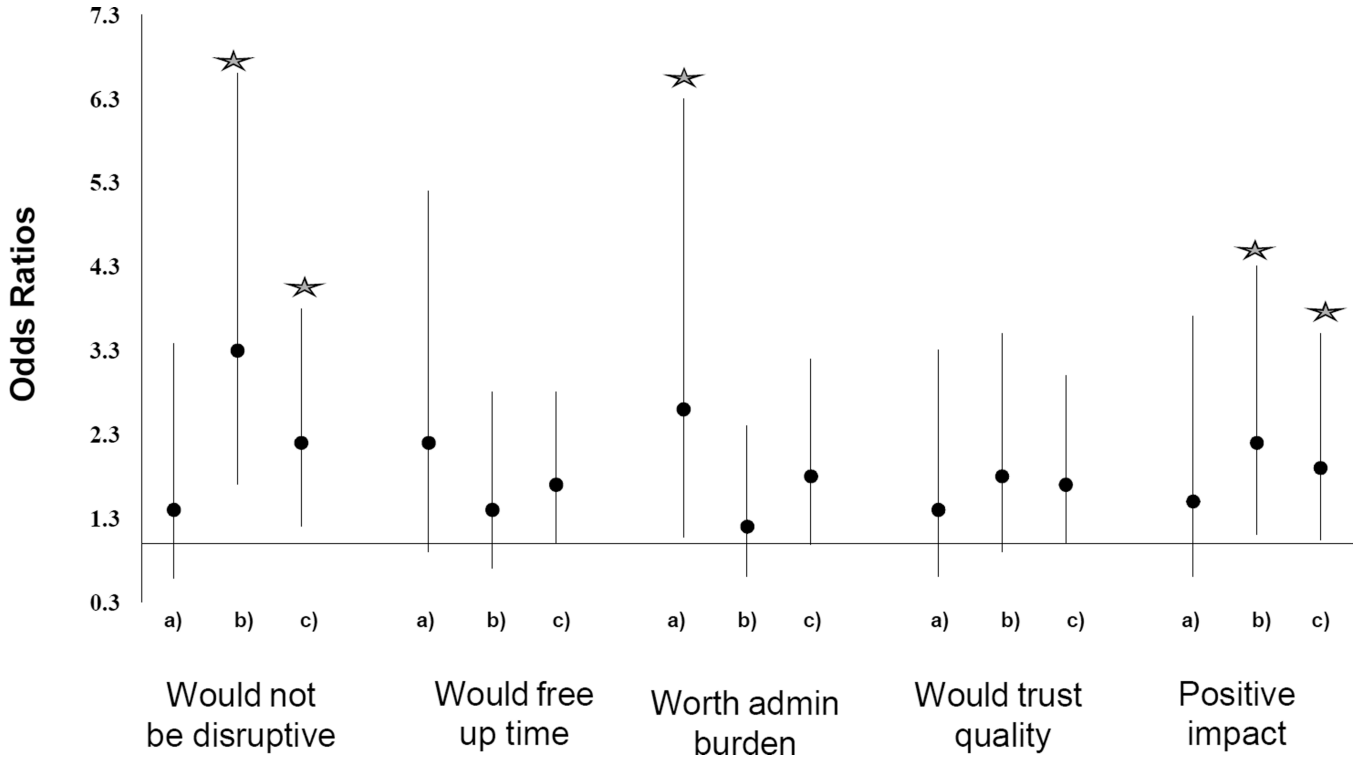

Figure 2.

Associations (a,b,c below) with positive attitudes towards dental therapists

a) PDA/HP b) MN c) Ever work with or currently employ expanded function dental hygienist/assistant – all 3 in models, as is graduation year. Vertical lines represent 95% confidence intervals.

★ P<0.05

Table 1

Employment of allied dental personnel, by selected practitioner and practice characteristics

Practitioner/practice characteristic	Total		Employs Associate Dentist[1]		Employs an Expanded Function Dental Hygienist or Assistant[2]	
	N	Col[3] %	N	Row[4] %	N	Row[4] %
ALL	**632**	**100.0**	**195**	**31.9**	**200**	**32.8**
Gender						
Male	512	81.0	144	28.9	153	30.8
Female	120	19.0	51	45.1	47	42.0
p-value=				*<.001*		*.02*
Graduation Year						
Before 1970	30	4.8	5	17.2	3	10.0
1970 – 1979	171	27.1	51	30.9	46	28.2
1980 – 1989	208	32.9	44	22.1	67	33.7
1990 – 1999	140	22.2	47	34.6	45	33.1
2000 or later	83	13.1	48	58.5	39	48.2
p-value=				*<.001*		*.002*
Practitioner specialty						
General practice	584	92.4	174	30.9	185	32.9
Specialist	48	7.6	21	43.8	15	31.9
p-value=				*.07*		0.88
Practice Type						
Solo Private	351	55.5	16	4.7	64	18.9
Group Private	168	26.6	108	66.7	51	31.9
HP or PDA[5]	82	13.0	63	81.8	76	92.7
Public Health	10	1.6	4	40.0	5	55.6
Academic setting/other	21	3.3	4	21.0	4	20.0
p-value=				*<.001*		*<.001*
Region						
Southeast	495	78.3	105	21.7	96	20.2

Practitioner/practice characteristic	Total		Employs Associate Dentist[1]		Employs an Expanded Function Dental Hygienist or Assistant[2]	
	N	Col[3] %	N	Row[4] %	N	Row[4] %
ALL	**632**	**100.0**	**195**	**31.9**	**200**	**32.8**
Midwest	80	12.7	43	58.9	53	68.0
Northeast	4	0.6	1	33.3	2	50.0
West[6]	53	8.4	46	90.2	49	92.4
p-value=				*<.001*		*<.001*
Minnesota[7]	77	12.2	43	61.4	52	69.3
Non-Minnesota	555	87.8	152	28.1	148	27.7
p-value=				*<.001*		*<.001*

[1] Associate dentists: Missing for 21

[2] Expanded function: Missing for 23

[3] Col: Column percent

[4] Row %: Percent among the row characteristic (e.g., Male) who employed the column specified personnel (e.g., associate dentist)

[5] HP: HealthPartners Dental Group, PDA: Permanente Dental Associates

[6] 45 (85%) 53 of practitioners from West were from PDA

[7] 37 (48%) 77 of Minnesota practitioners were from HP

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Table 2

Delegation of procedures[1] to dental assistants and hygienists

Procedure	N	Performed by Dentist %	Hygienist %	Assistant %	Hygienist or Assistant %
Remove supra-gingival deposits	621	63.4	93.4	14.5	95.3
Take radiographs	631	53.7	87.8	89.2	93.7
Oral health education and prevention	627	78.5	90.3	75.1	93.3
Remove sub-gingival deposits	618	68.8	91.8	2.3	93.0
Applying topical medications	621	70.8	87.4	62.6	91.1
Taking impressions	621	69.9	55.1	87.6	90.7
Perform root curettage	610	63.9	84.4	1.3	85.7
Remove excess cement	628	85.4	62.9	71.2	84.6
Etch enamel surfaces, apply sealants	614	79.0	76.2	36.6	80.6
Cement/adjust temporary restorations	621	81.8	23.7	61.7	66.2
Place/remove rubber dams	541	86.9	13.9	57.9	60.6
Fabricate athletic mouth guards	488	73.6	23.2	53.9	59.6
Place temporary fillings	619	94.4	27.8	48.6	54.3
Suture removal	622	78.0	24.1	42.8	46.1
Denture soft relines	567	95.6	4.1	12.7	15.2
Re-cement permanent crowns	622	85.7	3.0	2.9	5.1
Extract primary teeth	617	83.8	1.5	0.2	1.5
Cavity excavation/preparation for simple permanent filling	622	85.7	0.6	0.2	0.8
Expanded function procedures					
Place, carve, adjust restorations	621	84.4	1.8	6.0	6.6
Administer local anesthetics	629	82.8	17.5	0.2	17.6
Administer nitrous oxide inhalation	535	76.1	35.7	22.2	39.4

[1] Procedures may be performed by more than one member of dental team/staff. All procedures listed are within the scope of practice of dental therapists. Procedures not quieried about that are within the scope of practice of dental therapists include charting of the oral cavity, pulp vitality testing, atraumatic restorative therapy, administration of local anesthetics, preparation and restoration of decidous and permanent teeth with complex amalgam fillings and stainless steel crowns, pulpotomy, simple extraction of decidous and permanent teeth, dressing changes, reimplantation of avulsed teeth.

[2] Number of practices (of total of 632) that indicated the procedure was performed there by either dentist, dental hygienist, or assistant.