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ORIGINAL ARTICLE

The Practices of Treating Deep Carious Lesions Compared with the Dental Curriculum in Turkish Dentistry

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ABSTRACT

Objective: The aim of this cross-sectional study is to investigate Turkish dentists' opinions and preferences regarding the management of deep carious lesions and compare them with modern dental education concepts as provided by dental schools. **Methods:** Questionnaire 1 and Questionnaire 2 were sent separately to dental practitioners via the Turkish Dental Association and to university department heads of restorative dentistry. The data obtained were analyzed using chi-square tests and one-way ANOVA tests ($p < 0.05$). **Results:** Regarding Questionnaire 1, most of the dentists (89.3%) responded that caries lesions should be removed completely up to the hard cut-off condition of the cavity floor. There was a statistically significant difference between female and male dentists' preferences on less invasive treatment ($p < 0.05$). Female dentists prefer less invasive treatment compared with male dentists ($p = 0.002$). Relatively older dentists (mean age = 41.8) are more inclined towards complete caries removal even if pulp exposure is likely ($p = 0.040$). The results of Questionnaire 2 reveal that there is no association between the time spans of education at dental schools and their caries removal approach curriculum ($p > 0.05$). Most department heads of restorative dentistry prefer to apply complete caries removal (78.5%, $n = 51$). **Conclusion:** Despite today's curriculum encouraging less invasive caries removal techniques, most dentists prefer more invasive treatment options. Continuous education of contemporary dentistry could update these clinical treatment attitudes of dentists and improve their clinical practice.

Key words: dental caries, dental education, healthcare surveys, operative dentistry, professional practice gaps

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INTRODUCTION

Dental caries is an endemic oral disease, and its treatment has a high-cost burden.¹ Despite a significant decline in the prevalence of dental caries in the latter half of the twentieth century, it remains an important oral disease among all age groups.² Therefore, appropriate and up-to-date dental education regarding the management of caries lesions maintains a significant place in oral health.

According to current treatments concerning deep lesions in vital teeth, prioritizing the preservation of pulpal health over restoration success is strongly recommended to avoid potentially painful, costly, and invasive treatments.³ Thus, due to the destructive nature of traditional treatment strategies and the accepted opinion that complete caries removal is not required, minimally invasive treatment options have

become important.⁴ In stepwise removal, the cavity is temporarily restored after carious tissue has been completely removed from the peripheral walls of the cavity, but some carious tissue is left over the pulp. During the re-entry appointment, the remaining carious tissue is removed, and permanent restoration is performed.^{3,5} It has been reported that this approach reduces the risk of pulpal exposure significantly when compared with traditional methods.^{6,7} Another method involving incomplete carious dentine removal is selective removal, a method in which carious tissue is left over the pulp, and the cavity is restored permanently.^{5,8} Recent studies have reported this method to have advantages over both complete excavation^{9,10} and stepwise removal.¹¹⁻¹³ According to this procedure, the preservation of residual dentine thickness in cases of deep caries lesions is more likely

when soft; infected dentine is left over the pulpal wall rather than when it is removed.³

These current treatment approaches may not find a place in conventional dental education due to an uncertain prognosis of the remaining infected carious dentine sealed underneath the restoration.¹¹ Consequently, most dentists worldwide are skeptical of the incomplete caries removal concept,¹⁴⁻²¹ despite the evidence-based results of studies. Furthermore, it is not unexpected for one to observe that most graduates of dental schools tend to perform what they learned and experienced during their studies. However, it should be noted that dentists working in the field should update their practice through continuous education.

To the best of our knowledge, no published study has evaluated the educational philosophy of dental schools in terms of deep caries management and their reflections on clinical practice in Turkey. Therefore, the objective of this cross-sectional study is to evaluate Turkish dentists' opinions and preferences regarding the management of deep carious lesions and to compare their perspectives with current approaches as recommended by dental school curricula in Turkey.

METHODS

Ethical statement

This study was approved by the Baskent University Institutional Review Board and Ethics Committee (Project no: D-KA19/03 and D-KA20/24). This cross-sectional study complies with STROBE (strengthening the reporting of observational studies in epidemiology) guidelines for cross-sectional studies.²²

The study was performed by collecting data from two questionnaires (Questionnaire 1 and Questionnaire 2), which were sent separately to dental practitioners and university department heads of restorative and operative dentistry in Turkey.

Survey study based on questionnaire 1

The purpose of Questionnaire 1 was to evaluate the knowledge, attitudes, and treatment decisions of dentists regarding the concept of deep dentin caries. Questionnaire 1 was adapted from a questionnaire used in a previous study conducted by Schwendicke et al. (www.karger.com/doi/10.1159/000351662),¹⁶ and permission from the author and publisher was obtained. One researcher translated the English questionnaire into Turkish. This translation was then checked by senior lecturers. Subsequently, an independent native English speaker back-translated the questionnaire from Turkish to English in order to resolve any possible discrepancies or errors.

The seven-item questionnaire was comprised of the following topics: 1) general information related to age, years of experience, and gender; 2) an assessment of dentin on the pulpal floor after caries removal; 3) the preferred treatment approach for a deep caries lesion in a vital, asymptomatic molar of a 20-year-old subject; 4) a prognosis predicting the survival rate after various treatment options of deep caries lesions (from indirect pulp capping to root canal treatment, and from the most preventive to the most invasive option); 5) opinions about leaving carious tissue under restoration; 6) conditions and factors influencing dentists' treatment decisions; and 7) the treatment plan decided upon after radiographic evaluation of an asymptomatic tooth restored six months prior restored with radiolucency on the pulpal floor. The questionnaire was designed with a closed response mode using binary, multiple choice, and 4-point Likert scale batteries and an optional question allowing the respondents to write personal statements.

Pilot study for questionnaire 1

Prior to the application of the translated Questionnaire 1, a two-phase pilot study was performed. In the first phase, the pilot study was conducted using lecturers, final-year students, and postgraduate students, with the objective of testing the questionnaire's suitability and sufficiency (n = 45). After evaluating the responses and feedback, challenges related to the comprehension of the questions were identified, and the necessary modifications were made. In the second phase, Questionnaire 1 was transformed into an e-form. The feasibility and functionality of the e-form was tested by senior lecturers and clinical teachers of the Restorative Dentistry Department, Baskent University. Based on their feedback, the final e-questionnaire was completed.

Survey study based on questionnaire 2

Questionnaire 2 aimed to evaluate the existing curriculum of deep caries management in Turkish dental schools, particularly in terms of minimal invasive caries removal methods. It was prepared in consideration of Questionnaire 1 and other previously published studies^{21,22} and converted into an e-form. The feasibility and functionality of the e-form was tested by senior lecturers and clinical teachers of the Restorative Dentistry Department, Baskent University.

The seven items in Questionnaire 2 were comprised of the following topics: 1) general information, including the name of the university and education time span; 2) an assessment of the state of the pulpal floor after caries removal; 3) the preferred treatment approach for a deep caries lesion in a vital, asymptomatic molar tooth of a 20-year-old subject; 4) a prognosis predicting the survival rate after various treatment options of

deep caries lesions (from indirect pulp capping to root canal treatment, and from the most preventive to the most invasive option); 5) opinions for leaving the carious tissue under restoration; 6) the existence of contemporary caries removal methods at the bachelor's level of education; and 7) the existence of contemporary caries removal methods at the PhD level of education. The questionnaire was designed with closed response modes using binary, multiple choice, and 4-point Likert scale batteries.

Data collection

In collaboration with the Turkish Dental Association (TDA), Questionnaire 1 was emailed to dentists linked to the TDA in April 2019. The eligibility criteria were as follows: being a dentist or dental specialist; giving consent to participate in the study; and answering the questionnaire in full. A reminder email was sent at the end of every two-week period. After a total of six weeks, the survey was closed. As data protection guidelines prohibited participant self-identification, all responses were anonymous and did not contain any personal information.

Questionnaire 2 was sent to the department heads of restorative or operative dentistry in all Turkish dental schools between August 2020 and September 2020. All participants were also lecturers, gave consent to participate in the study, and were asked to answer the questionnaire in full. A reminder email was sent at the end of every two-week period. After a total of six weeks, online responses to the survey were closed.

Statistical analysis

Statistical analysis for Questionnaire 1 and Questionnaire 2 was performed using SPSS 22.0 (IBM, Armonk, USA). Categorical variables were presented both numerically and as percentages.

In case of doubtful, incorrect responses or missing data, the respondent was excluded from the assessment. For Questionnaire 1, a chi-square test was used to make comparisons between genders and participants' responses regarding deep carious lesion management. A one-way ANOVA was used to make comparisons between participants' mean age, years of experience, and their responses regarding deep carious lesion management at a significance level of $p < 0.05$.

For Questionnaire 2, a chi-square test was used to make comparisons between education time span at dental schools and participants' responses regarding deep carious lesions management ($p = 0.05$).

RESULTS

Questionnaire 1 was answered by 617 dentists (314 males [51%]; 303 females [49%]). The response rate of Questionnaire 1 was 3.1% of 19,640 of dentists linked

Table 1. Distribution of respondents with respect to age, experience, and gender.

	Demographics	n	%
Age	20–30	236	38.3
	31–40	147	23.9
	41–50	98	15.9
	51–60	94	15.3
	61–70	36	5.8
	>70	5	0.8
Gender	male	314	50.9
	female	303	49.1
Year of experience	0–5	203	33
	6–10	98	16
	11–15	64	10.3
	16–20	65	10.5
	21–25	40	6.4
	26–30	49	8
	31–35	40	6.4
	36–40	36	5.8
	41–45	13	2.1
	>45	8	1.3

Table 2. Distribution rates of Questionnaire 1 and Questionnaire 2 regarding preferred cut-off condition of dentin

	Consistency	Color
The results of the Questionnaire 1^a	n = 58 9.4% soft	n = 395 64% discolored
	n = 551 89.3% hard	n = 139 22.5% colored
	n = 8 1.3% not relevant	n = 83 13.5% not relevant
	n = 12 18.5% soft	n = 48 73.8% discolored
The results of the Questionnaire 2^b	n = 51 78.5% hard	n = 4 6.2% colored
	n = 2 3.1% not relevant	n = 13 20% not relevant

a. The results of the survey addressed to dental practitioners
 b. The results of the survey addressed to the heads of Restorative Dentistry Departments

to the TDA. As only the e-mail addresses of the dentists were available via the TDA, general information regarding nonrespondents' year of birth, experience, gender, place of practice, practice setting, and field of practice (specialization) were not available.

Of the responses, 616 of them were evaluated in terms of age and years of experience since one respondent entered an incorrect number. The average age of respondents was 38.7 years, and the average years of experience was 15 (Table 1).

Table 3. Percentage of answers received from participants concerning selective caries removal and restorative management

	Results of the Questionnaire 1					Results of the Questionnaire 2						
	Strongly disagree	Disagree	Agree	Strongly agree	Not Specified	Strongly disagree	Disagree	Agree	Strongly agree	Not Specified	Yes	No
Cariogenic microorganisms must be completely removed, otherwise the caries will progress.	4.4% (n=27)	27.2% (n=168)	43.3% (n=267)	23.2% (n=143)	1.9% (n=12)	12.3% (n=8)	46.2% (n=30)	33.8% (n=22)	7.7% (n=5)	0% (n=0)	-	-
A certain amount of cariogenic microorganisms can be left because well-made restorations can prevent the progression of caries by providing coverage.	10% (n=62)	34.7% (n=214)	40.7% (n=251)	10% (n=62)	4.5% (n=28)	4.6% (n=3)	16.9% (n=11)	56.9% (n=37)	21.5% (n=14)	0% (n=0)	-	-
The caries should always be completely removed, because the remaining (residual) caries threaten the viability of the pulp.	5.8% (n=36)	31.9% (n=197)	37% (n=228)	22.5% (n=139)	2.8% (n=17)	-	-	-	-	-	-	-
Carious tissue in the area close to the pulp can be left to prevent the pulp exposure	19.3% (n=119)	34% (n=210)	34% (n=210)	9.9% (n=61)	2.8% (n=17)	-	-	-	-	-	-	-
I prefer less invasive treatment and, if necessary, re-plan the treatment (eg repairing of restoration).	3.7% (n=23)	17.7% (n=109)	56.6% (n=349)	19.9% (n=123)	2.1% (n=13)	-	-	-	-	-	-	-
I don't have the opportunity to call and follow-up the patient with temporary restorations, so I prefer a more invasive treatment approach.	10.4% (n=64)	43.3% (n=267)	36.5% (n=225)	7.1% (n=44)	2.7% (n=17)	-	-	-	-	-	-	-
In the clinical applications carried out for educational purposes in undergraduate programs in our institution, caries should always be completely cleaned, because the remaining caries lesion threatens the viability of the pulp	-	-	-	-	-	4.6% (n=3)	43.1% (n=28)	43.1% (n=28)	9.2% (n=6)	0% (n=0)	-	-
In the clinical applications for educational purposes in undergraduate programs in our institution, caries lesion in the area close to the pulp can be left to prevent the pulp exposure	-	-	-	-	-	13.8% (n=9)	24.6% (n=16)	53.8% (n=35)	7.7% (n=5)	0% (n=0)	-	-
In the clinical practices conducted for educational purposes in undergraduate programs in our institution, students are encouraged to choose less invasive treatment methods in the treatment of deep carious lesions and to call patients for control appointments if necessary	-	-	-	-	-	6.2% (n=4)	27.7% (n=18)	40% (n=26)	24.6% (n=16)	1.5% (n=1)	-	-
In the clinical applications performed for educational purposes in undergraduate programs in our institution, it is not possible to call the patient for control and follow-up by making temporary restorations, so we direct the students to more invasive treatment approaches in which the caries is completely removed	-	-	-	-	-	12.3% (n=8)	44.6% (n=29)	26.2% (n=17)	10.8% (n=7)	6.2% (n=4)	-	-
Are contemporary caries removal methods (stepwise caries removal, selective caries removal) applied during clinical internship practices within the scope of undergraduate education in your institution?	-	-	-	-	-	-	-	-	-	-	69.2% (n=45)	30.8% (n=20)
Are contemporary caries removal methods (stepwise caries removal, selective caries removal) applied within the scope of undergraduate / docterate / specialty education in your institution?	-	-	-	-	-	-	-	-	-	-	95.4% (n=62)	4.6% (n=3)

Table 4. Summarized results of responses of Questionnaire 1 regarding clinical scenarios with deep caries

You are treating the tooth of a 20-year-old patient with an asymptomatic, vital tooth with deep dentin caries. What do you do when performing caries removal in the area close to the pulp?				
I remove all of the carious dentin. In the case of pulp exposure, I perform direct pulp capping .	I remove all of the carious dentin. In the case of pulp exposure, I perform endodontic treatment .	I remove carious tissue with an excavator but leave some caries if the pulp is likely to become exposed. Then, I perform stepwise caries removal (leave the caries and cover it with temporary filling; after a few weeks/months, I remove the caries completely).	I remove carious tissue with an excavator but leave some caries if the pulp is likely to be exposed. Then, I restore the tooth permanently.	
35.2% (n = 217)	17.7% (n = 109)	28.5% (n = 176)	18.6% (n = 115)	
You detect a radiolucency close to the pulp and suspect it to be caries. The restoration was performed six months ago and is clinically intact; the tooth is vital and asymptomatic. How much do you agree with the statements below?				
a. The restoration must be renewed.				
Strongly Disagree	Disagree	Agree	Strongly agree	Not specified
39.5% (n = 244)	53.6% (n = 331)	4.4% (n = 27)	2.3% (n = 14)	0.2% (n = 1)
b. The restoration should not be intervened upon, but the patient should be followed.				
Strongly Disagree	Disagree	Agree	Strongly agree	Not specified
2.8% (n = 17)	4.5% (n = 28)	32.1% (n = 198)	60% (n = 370)	0.6% (n = 4)

Table 5. Summarized results of comparison among gender, years of experience, and responses regarding deep carious lesion management

	Pulpal floor hardness	Preferred clinical approach for 20-year-old patient with a vital and asymptomatic tooth	Opinions regarding intervention or monitoring of a newly restored tooth with radiolucency underneath
Mean Age	p < 0.001	p = 0.040	p = 0.033
Year of experience	p < 0.001	-	p = 0.037
Gender	-	p = 0.002	p < 0.001

The table demonstrates only the data with statistically significant results (p < 0.05).

Questionnaire 2 was answered by 65 schools (89% response rate). There was no statistically significant difference between years of dental education and responses regarding caries removal methods (p > 0.05).

The majority of dentists (89.3%, n = 551) responded that the cavity floor should be hard and that dentin should be finely chopped using a bur (Table 2). Most of the respondents to Questionnaire 2 preferred and advised complete caries removal (78.5%, n = 51).

Approximately two-thirds of the dentists agreed or strongly agreed that elimination of all cariogenic microorganisms (66.5%, n = 410) is essential to the prevention of caries progression. However, 58.5% (n = 38) of department heads disagreed or strongly disagreed with the elimination of all cariogenic microorganisms as being essential to the prevention of caries progression, and 78.5% (n = 51) of faculty representatives believed that in properly sealed cavities

the progression of residual caries can be stopped (Table 3). Table 3 demonstrates that 61.5% of faculty representatives agreed or strongly agreed that caries lesions in the area close to the pulp can be left in clinical applications for educational purposes in undergraduate programs, and 64.6% of the respondents encourage undergraduate students to choose less invasive methods, followed by the monitoring of patients. Also, the findings show that current caries removal methods exist within the scope of education in 95.4% of institutions (Table 3).

Table 4 and Table 5 summarize the results of Questionnaire 1 regarding responses to questions about the preferred treatment in a clinical scenario of a 20-year-old subject with a deep caries lesion in an asymptomatic tooth restored six months prior with radiolucency on the pulpal floor. Accordingly, 35.2% (n = 217) of respondents preferred complete caries removal, and 17.7% (n = 109) preferred performing

Table 6. Number and percentage of dentists predicting two-year survival rates of several treatment methods performed on a 20-year-old patient with deep caries lesion and vital pulp

	Survival Rate Results of Questionnaire 1						Survival Rate Results of Questionnaire 2%					
	0–20	21–40	41–60	61–80	81–100	Not specified	0–20	21–40	41–60	61–80	81–100	Not specified
Incomplete excavation close to pulp	20.7 (n = 128)	27.4 (n = 169)	23.7 (n = 146)	15.9 (n = 98)	7.6 (n = 47)	4.7 (n = 29)	3.1 (n = 2)	3.1 (n = 2)	16.9 (n = 11)	30.8 (n = 20)	44.6 (n = 29)	1.5 (n = 1)
Indirect capping	5.5 (n = 34)	12.6 (n = 78)	25.9 (n = 160)	21.2 (n = 131)	32.4 (n = 200)	2.3 (n = 14)	1.5 (n = 1)	4.6 (n = 3)	7.7 (n = 5)	18.5 (n = 12)	67.7 (n = 44)	0 (n = 0)
Direct capping	20.9 (n = 129)	24.3 (n = 150)	26.4 (n = 163)	18.6 (n = 115)	7.9 (n = 49)	1.8 (n = 11)	9.2 (n = 6)	15.4 (n = 10)	30.8 (n = 20)	32.3 (n = 21)	10.8 (n = 7)	1.5 (n = 1)
Root canal treatment	4.1 (n = 25)	4.9 (n = 30)	23.5 (n = 145)	14.1 (n = 87)	51.4 (n = 317)	2.1 (n = 13)	6.2 (n = 4)	10.8 (n = 7)	10.8 (n = 7)	26.2 (n = 17)	40 (n = 26)	6.2 (n = 4)

direct pulp capping and endodontic treatment in case of pulp exposure (Table 4). A smaller percentage of respondents (28.5% [n = 176]) preferred stepwise removal, and 18.6% (n = 115) accepted incomplete excavation and restoration of the tooth as an option to avoid pulp exposure. In contrast, the results of Questionnaire 2 revealed that most department heads recommended less invasive procedures, such as incomplete excavation (44.6%, n = 24), stepwise caries removal (27.7%, n = 18), or direct pulp capping (26.2%, n = 17) for the same clinical scenario.

There was a statistically significant difference regarding treatment preference between genders (p = 0.002) in the results of Questionnaire 1 (Table 5). Of the respondents who accepted stepwise removal, 58% (n = 102 of 176) were female, while 64.2% (n = 70) of the respondents who preferred performing root canal treatment (n = 109) after complete removal were male. Another significant difference was found between the mean ages of participants with respect to the same question (p = 0.040; Table 5). Relatively older dentists (mean age = 41.8) preferred complete caries removal and initiating endodontic treatment even if pulp exposure was likely. The results regarding radiographic examination of a vital, asymptomatic molar tooth restored six months prior with a radiolucency close to pulp were as follows: only 41 of the 617 respondents agreed or strongly agreed with replacing the restoration, while the majority (93.2%, n = 575) decided on continuing to monitor it (Table 4). There were statistically significant differences within the groups of genders, age, and years of experience regarding answers given to this question (p < 0.05; Table 5). Of the 41 respondents who selected replacement of the restoration, 27 were male (p < 0.001). The mean age and years of experience of the proponents of continuing monitoring were 49.9 (p = 0.033) and 27.2 (p = 0.037), respectively.

The answer ratios related to Questionnaire 1 and Questionnaire 2 regarding the prediction of two-year survival rates and possible treatment approaches applicable for carious tissue removal close to the pulp in a 20-year-old subject are demonstrated in Table 6. Half of the respondents (51.4%, n = 317) of Questionnaire 1 predicted the survival rate of endodontic treatment as being between 81% and 100%. According to the results of Questionnaire 2, the highest survival rates were predicted for indirect capping (67.7%, n = 44) and incomplete caries removal close to the pulp (44.6%, n = 29) for the same question.

DISCUSSION

Dental caries continues to be one of the most prevalent diseases in society, so its treatment holds an important place in dental education. The aim of the present study was to evaluate Turkish dentists' opinions and clinical preferences regarding the treatment of deep dentin caries and link those preferences with the existing curriculum of dental schools. For the last decade, clinical research has tended to promote current caries removal approaches like stepwise removal and selective removal due to their successful survival rates. Franzon et al. compared the restoration success rates of selective and complete caries removal methods after a period of 24 months and found no differences between these techniques;¹⁰ further, their study suggested that selective caries removal provides noteworthy clinical advantages over complete caries removal, including a lower incidence of pulp exposure and a shortened intervention time. Likewise, Maltz et al. compared the success rates of selective removal and stepwise removal methods and reported that reopening a cavity and performing a second excavation for preserving pulp vitality was not necessary because the selective

removal approach showed a significant improvement in terms of maintaining pulp vitality.¹¹

The results of Questionnaire 1 indicate that the majority of Turkish dental practitioners prefer traditional complete removal of deep dentin caries, as they believe that residual caries and microorganisms may progress and cause pulpal complications. Nonetheless, according to the study results of Questionnaire 2, most dental schools encourage undergraduate students to apply incomplete caries removal in the treatment of deep carious lesions. Furthermore, 78.5% (n = 51) of faculty representatives believe that in properly sealed cavities, the progression of residual caries can be stopped. However, in a study investigating approaches for the treatment of carious tissues among faculty members at U.S. dental schools, the majority of the respondents also reported that the cavity floor must appear hard in order to assess satisfactory caries removal.²¹

The present study has revealed that dentistry education in Turkey focuses on current caries removal approaches in theoretical and internship clinical practices, as the findings show that contemporary caries removal methods are applied within the scope of education in 95.4% of institutions. Furthermore, 64.6% of all faculty representatives encourage undergraduate students to apply less invasive methods and monitor the patients during clinical internship practices.

Schwendicke et al.¹⁶ reported that direct pulp capping was commonly preferable, as a high percentage of dentists were prone to perform complete caries removal but avoided root canal treatment. In contrast, in the present study, 51.4% of dentists accepted endodontic treatment as the most successful treatment option. In the present study, the success and reliability of stepwise excavation or selective caries removal methods were considered doubtful by most respondents, as in previous studies.^{16,18} However, faculty representatives considered the highest survival rates (81%–100%) to be in the procedures of indirect pulp capping (67.7%, n = 44) and incomplete caries removal (44.6%, n = 29).

The present study has found a relationship between age, professional experience, and deep caries treatment approaches. The mean age of respondents (43.1 years) and years of experience (14.6 years) were significantly lower in the group advocating that the cut-off condition of the cavity floor should be hard. However, most of the relatively older clinicians (mean age 43.1 years) answered that they preferred complete excavation of the carious lesion and initiation of endodontic treatment. In contrast, younger dentists preferred to avoid treating soft caries lesions close to the pulp to avoid pulp exposure. Despite this trend, there was no difference between years of experience and preference

of complete or selective caries removal methods. According to these results, it could be suggested that while relatively experienced physicians have different views on the treatment of deep caries with respect to younger specialists due to changes in the dental education curriculum over time, these two groups can agree on certain points thanks to continuous dentistry education and clinical experience. These findings contrasted partially with those of a study performed by Weber et al., which reported that younger dentists preferred less invasive caries removal methods.¹⁵

In the present study, older clinicians, irrespective of their experience, were found to be proponents of endodontic treatment in the management of deep caries, believing it to be the most successful treatment option. Another significant effect of age and experience was found in questions in which the participants were asked to evaluate the radiograph of a tooth with radiolucency underneath a recently performed restoration. The dentists who strongly disagreed with continued monitoring of the restoration without any intervention presented the highest mean age (49.9 years) and experience (27.2 years). This conflicting result regarding age could be attributed to continuous learning on the part of older dentists. Thus, it could be suggested that the results of Questionnaire 1 reveal the importance of continuous learning programs in updating professional knowledge and clinical attitudes.

Significant relations were also detected between dentists' gender and preference for invasive or preventative approaches. Of the male respondents, those who disagreed or strongly disagreed with monitoring the patient were 67.9% (n = 19) and 82.4% (n = 14), respectively (p < 0.001) (Table 4). These findings are similar to the results of certain previous studies,^{18,23,24} while contrary to other studies.^{16,20}

Using web-based surveys is a popular and often recommended method for data collection because of their ease of use, low cost, low time consumption, and accuracy.²⁵ Although recent similar questionnaire studies^{16,18–20,26} showed response rates ranging between 32% and 72.8%, the low response rate of dentists to Questionnaire 1 was a major limitation to this study (3.1%, n = 617). This low rate can be explained by the fact that in previous studies, the surveys were sent to randomly selected, smaller populations, whereas in the present study, the survey was sent to all dentists registered in the TDA. The questions were based on current academic findings, which may have seemed unusual and difficult to accept for the nonrespondents. Additionally, the nonrespondents may have been hesitant to present their opinions on current techniques that had not been taught in most undergraduate programs in the past.

CONCLUSION

Despite today's curriculum encouraging the application of less invasive caries removal techniques, most of the dentists surveyed prefer more invasive treatment options. Interestingly, relatively older dentists tend to prefer less invasive treatments in some approaches. Thus, it could be concluded that continuous education could update dentists' clinical treatment attitudes and improve their clinical practice.

CONFLICT OF INTEREST

None.

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