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THE PERCEPTIONS AND ATTITUDES OF DENTISTS TOWARDS CONE-BEAM COMPUTED TOMOGRAPHY REPORTS

Diş Hekimlerinin Konik Işınlı Bilgisayarlı Tomografi Raporlarına Yönelik Algı ve Tutumları

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ABSTRACT

Objectives: Radiology reports are the most important method of communication between the clinician and the radiologist. In dentomaxillofacial radiology, cone-beam computed tomography (CBCT) reporting is a new subject. The purpose of this study was to evaluate the satisfaction and expectations of dentists from CBCT reporting as well as contributing to standardization and improvement in the quality of CBCT reports.

Materials and Methods: Dentists were invited to participate in the survey by e-mail. The participants filled out a survey with their demographic data and responded to 14 questions regarding CBCT reports. The responses regarding gender, age, title, institution, and department were analysed and compared with chi-square tests.

Results: In total, 185 dentists (97 females and 88 males) participated in the study. Participants reported that the adequacy level of the reports were mostly moderate (N:87; 47%) and that the source of adequate reports was university hospitals (N:91; 49.2%). Fifty-seven percent of the surveyors (N:106) reported that they needed a consultant radiologist in clinical practice on a part time basis. There was a statistically significant difference ($p<0.05$) between participants' genders, age groups, titles, and departments regarding the source of the adequate reports.

Conclusion: The results of this study showed that most of the dentists were not satisfied about the proficiency of CBCT reports. More than half of those surveyed thought that "not reading" the radiology reports might give them a legal liability. Most dentists wanted to consult with the radiologist before and after patient examinations.

Key words: Cone-beam computed tomography, dentistry, diagnostic imaging, medical writing, radiology, survey

ÖZ

Amaç: Radyoloji raporları klinisyen ve radyolog arasındaki en önemli iletişim yöntemidir. Diş hekimliği radyolojisinde, konik-ışınlı bilgisayarlı tomografi (KIBT) raporlaması yeni bir konudur. Bu çalışmanın amacı, KIBT raporlarından diş hekimlerinin memnuniyet ve beklentilerini değerlendirmek, aynı zamanda KIBT raporlarının kalitesinde iyileştirmeye ve raporların standardizasyonuna katkıda bulunmaktır.

Gereç ve Yöntemler: Diş hekimleri hazırlanan ankete e-posta yoluyla davet edildi. Katılımcılar, demografik bilgilerini ve KIBT raporlarıyla ilgili 14 sorudan oluşan bir anketi doldurdu. Cinsiyet, yaş, unvan, çalıştığı kurum ve branşlara göre verilen cevaplar analiz edilerek ki-kare testiyle karşılaştırıldı.

Bulgular: Çalışmaya toplam 185 diş hekimi (97 kadın ve 88 erkek) katıldı. Katılımcılar, raporların yeterlilik düzeyinin çoğunlukla orta düzeyde (N: 87; %47) olduğunu ve yeterli raporların kaynağının üniversite hastaneleri olduğunu belirtmiştir (N: 91; %49,2). Çoğu diş hekimi (N: 106; %57) klinik uygulamalarda yarı zamanlı olarak bir radyoloji uzmanına ihtiyaç duyduklarını bildirmiştir. Yeterli olarak görülen raporların kaynağı ile katılımcıların cinsiyetleri, yaş grupları, unvanları ve branşları arasında ilgili istatistiksel olarak anlamlı bir fark vardı ($p <0,05$).

Sonuç: Bu çalışmanın sonuçları, diş hekimlerinin çoğunun KIBT raporlarının yeterliliğinden memnun olmadıklarını göstermiştir. Ankete katılanların yarısından fazlası, radyoloji raporlarının "okunmamasının" kendilerine yasal sorumluluk doğurabileceğini düşünmüştür. Çoğu diş hekimi, hastaları incelemelerinden önce ve sonra radyoloji uzmanına danışmak istemiştir.

Anahtar Kelimeler: Konik-ışınlı bilgisayarlı tomografi, diş hekimliği, tanısal görüntüleme, raporlama, radyoloji, anket

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INTRODUCTION

Radiology reports are the most important method of communication between the clinicians and the radiologists.[1] They include findings, pre-diagnosis, conclusive diagnosis, definitive diagnosis, conclusions, and suggestions for further investigation. The reports reflect the knowledge, talent, and training level of the radiologists.[2-4] Furthermore, they are a critical legally-binding document.[5]

The remarks of the radiologist are shared with the clinician through the reports.[6] Effective communication allows the consultant to play the role of the radiologist and thus increase his or her value.[7] Radiology reports also contribute to the quality of patient treatment. Thus, the purposes of the reporting must be correctly defined and standardized.[8] The medical radiologists use two reporting formats, traditional free-text and structured reports.[9] Structured reports have become widely used in comparison to free-text.[5] These types of reports have templates or checklists.[6] Structured reports were found more effective than unstructured reports.[10] In recent years, alternative reporting types were suggested like contextual reporting which was specifically related with the disease or indication.[11] However, there has been no consensus with either clinicians or radiologists about radiology reporting.[1]

In dentomaxillofacial radiology, cone-beam computed tomography (CBCT) reporting is a relatively new area. Recently, the method has come to be commonly used in dental practice and reporting requirements have become necessary.[12] To the best of our best knowledge, there is little to no data of published research about the assessment of dentists' comments/expectations from CBCT reporting by dentomaxillofacial radiologists. Selim *et al*.[13] published a study about the satisfaction of dentists with dental radiology reports, not involve only CBCT. The other study about CBCT reporting was Peker *et al*'s study, which was conducted about the approaches of dentomaxillofacial and medical radiologist about reporting.[14]

The primary purpose of this study was to evaluate the expectations of dentists of CBCT reports, and secondary purpose of this study was to raise awareness of the standardization and the quality of CBCT reports in dentistry. The null hypothesis in this study; dentists are not satisfied with CBCT reports.

MATERIALS AND METHODS

Before starting the study, Ethical Approval was received from the Gazi University Ethics Board of the Institutional Ethics Committee (decision number, 77082166/604, 01/02; September 10, 2015). The validated questionnaires for the study were prepared by three dentomaxillofacial radiologists with least five years of experience. Some questions used in previous studies were modified, and new questions were added with the consensus of the dentomaxillofacial radiologists.[1] Then, the prepared questionnaires consisting of 15 questions were checked by an expert in linguistics, and minor changes were made. After that, the questionnaires were reviewed by five blinded dentomaxillofacial radiologists and, upon their suggestion, one question was removed. Finally, the questionnaires comprised of 14 questions was ratified. In the invitation letter and on the entrance page of the survey, it was stated that the survey covered only dentists who used CBCT. Dentists who use CBCT scans were invited to the survey via www.surveey.com, a web-based survey tool. The participation was voluntary, and all respondents were clearly advised that participation was anonymous and that the confidentiality of the responses were guaranteed. The responders entered their demographic data and answered 14 questions (Table 1) about CBCT reports.[1] Demographic variables included gender, age, title, institution, department, and frequency of CBCT request.

Table 1: Demographic variables, survey questions and distribution of views on CBCT reports (N=185)

Variable		N	%
Demographics			
Gender	Female	97	52.4
	Male	88	47.6
Age group	22-30	86	46.5
	30-50	76	41.1
	50-75	23	12.4
Title	Research assistant	62	33.5
	General dentist	53	28.6
	Specialist dentist	39	21.1
	Lecturer	31	16.8
Institution	Non-university	87	47.0
	University	98	53.0
Department	Surgical (specialist) dentist*	50	27.0
	Orthodontist	41	22.2
	Non-surgical (specialist) dentist**	41	22.2
	General dentist	53	28.6
The questions related with CBCT reports			
Frequency of request	A few times in week	46	24.9
	A few times in month	63	34.1
	A few times in year	76	41.1
Adequacy level	Very good	18	9.7
	Moderate	87	47.0
	Inadequate	80	43.3
Source of the adequate reports	Private imaging centre	47	25.4
	University hospital	91	49.2
	Equal rate from all institutes	47	25.4
Does "not reading" the reports give you a legal liability?	Yes	108	58.4
	No	18	9.7
	No idea	59	31.9
Do you write a clinical information/history on the request paper?	Yes	82	44.3
	Partially	62	33.5
	No	41	22.2
Reaction against long report	I read only the conclusions section	72	38.9
	I read all the contents	78	42.2
	I read only findings and the conclusions section	35	19.2
Report sequence	It should be written starting with the most important lesion	112	60.5
	Pathological lesions should be written in standard format (on the anatomical localization line)	73	39.5
Should each lesion be described in detail? (e.g. in the case of many similar lesions such as numerous periapical lesions)	Yes	105	56.8
	No, after describing the biggest/the most important one, it is enough to point out that there are similar lesions	80	43.2
Is it necessary to include the "recommendations" section in the report?	Yes, it helps the clinician	50	27.0
	No, the clinician can decide which examination needs	71	38.4
	Not sure	64	34.6
Is it necessary to use radiological terms in the report? (e.g. irregular remodelling or subchondral sclerosis of temporomandibular joint)	Exactly, it's necessary	120	64.9
	It is adequate for the lesion to be expressed clearly by the clinician (e.g. lesion, calcification…)	65	35.1
Should the location of lesion be marked on the radiograph?	No, anatomical location of the lesion should be indicated only in the report	51	27.6
	The lesion should be marked on the radiograph.(e.g. with arrow)	26	14.1
	It is enough to write the section numbers of lesion in the report	52	28.1
	Both pointing out the cross-section number and signing the lesion should be better	56	30.3
Obtaining the report	The report should be given to the patient or patient's relatives	39	21.1
	The report should be given to patient, at the same time it should be sent to clinician by e-mail	123	66.5
	The report should be given to patient, at the same time it should be sent to clinician by e-mail, mail, courier or hospital information system	23	12.4
How should images be presented with the report?	CD/DVD	128	69.2
	Both CD/DVD and negative film	57	30.8
Do you want to consult with the radiologist before and after patient examinations?	Yes	106	57.3
	No	79	42.7

*Oral & maxillofacial surgeon and periodontist **Endodontist, prosthodontist and paediatric dentist

The responses regarding gender, age, title, institution, and department were analysed and compared with chi-square tests. During interpretation, α=0.01 and α=00:05 levels were been considered. Analyses were performed using IBM SPSS 22.0 (SPSS, Inc., Chicago, IL, USA).

RESULTS

In total, 185 dentists participated in the survey. The female-male ratio (52.4%-47.6%) was close. The majority of the responders were in the 22-30 age group (N:88; 46.5%), and most of the dentists were research assistants (N:62; 33.5%). The distribution of responses of the participants to the questions regarding CBCT reports are shown in Table 1.

Most of the responders (N:108; 58.4%) thought that "not reading" the radiology reports may give them legal liability. The source of adequate reports was university hospitals (N:91; 49.2%). Forty-four percent of the surveyors (N:82) said that they wrote clinical information in the report requests. A majority of the dentists (N:112; 60.5%) thought that the most important lesion should be written at the beginning of the conclusion section of the reports, not on the anatomical localization line. Fifty-seven percent of the participants (N:105) stated "yes" to the question of whether each lesion should be written in details. Only 27% (N:50) of the participants thought that there should be a recommendations section in the reports.

Most of the dentists (N:120; 64.9%) remarked that it is necessary to use radiological terms in the reports. Two-thirds of the participants (N:123; 66.5%) wanted the reports to be available to patients at the same time by e-mail. Most of the participants (N:128; 69.2%) said that the images should only be presented by CD/DVD. A little more than half (N:106; 57.3%) wanted the radiologist to be a consultant before and after the radiological examination. Details are shown in Table 1.

There was a statistically significant difference ($p<0.05$) between males and females in the questions about the source of the adequate reports, opinions about the manner in which the most important lesions were indicated, and the request that radiologists be consultants (Table 2).

Table 2: Comparison of views on radiology reports by gender and age groups.

		Gender						Age groups							
		Female		Male				22-30		30-50		50-75			
		N	%	N	%	χ^2	P	N	%	N	%	N	%	χ^2	P
Adequacy level	Very good	8	8.2	10	11.4	.52	.772	9	10.5	6	7.9	3	13.0	1.45	.835
	Moderate	45	47.4	41	46.6			43	50.0	34	44.7	10	43.5		
	Inadequate	43	44.3	37	42.0			34	39.5	36	47.4	10	43.5		
Source of the adequate reports	Private imaging centre	17	17.5	30	34.1	7.33	.026*	16	18.6	20	26.3	11	47.8	23.53	.000**
	Equal rate from all institutes	25	25.8	22	25.0			13	15.1	27	35.5	7	30.4		
	University hospital	55	56.7	36	40.9			57	66.3	29	38.2	5	21.7		
Does "not reading" the reports give you a legal liability?	Yes	53	54.6	55	62.5	2.69	.260	52	60.5	38	50.0	18	78.3	6.11	.191
	No	6	8.2	10	11.4			8	9.3	9	11.8	1	4.3		
	No idea	36	37.1	23	26.1			26	30.2	29	38.2	4	17.4		
Do you write a clinical information on the request paper?	Yes	45	46.4	37	42.0	.37	.832	41	47.7	34	44.7	7	30.4	4.04	.401
	Partially	31	32.0	31	35.2			30	34.9	22	28.9	10	43.5		
	No	21	21.6	20	22.7			15	17.4	20	26.3	6	26.1		
Reaction against long report	I read only the conclusions section	39	40.2	33	37.5	.83	.660	33	38.4	35	46.1	4	17.4	6.86	.144
	I read all the contents	38	39.2	40	45.5			36	41.9	30	39.5	12	52.2		
	I read only findings and the conclusions section	20	20.6	15	17.0			17	19.8	11	14.5	7	30.4		
Report sequence	It should be written starting with the most important lesion	59	60.8	53	60.2	.01	.934	51	59.3	53	69.7	8	34.8	9.13	.010*
	Pathological lesions should be written in standard format	38	39.2	35	39.8			35	40.7	23	30.3	15	65.2		
Should each lesion be described in detail?	Yes	50	51.5	55	62.5	2.26	.133	40	46.5	48	63.2	17	73.9	7.71	.021
	No	47	48.5	33	37.5			46	53.5	28	36.8	6	26.1		
Necessity of "recommendations" section	Yes	30	30.9	20	22.7	1.64	.440	25	29.1	20	26.3	5	21.7	2.62	.623
	No	36	37.1	35	39.8			28	32.6	32	42.1	11	47.8		
	Not sure	31	32.0	33	37.5			33	38.4	24	31.6	7	30.4		
Necessity of radiological terms	Exactly, it's necessary	64	66.0	56	63.6	0.11	.739	58	67.4	51	67.1	11	47.8	3.35	.188
	It is adequate for the lesion to be expressed clearly by the clinician	33	34.0	32	36.4			28	32.6	25	32.9	12	52.2		
Marking lesion on the radiograph	Anatomical location of the lesion should be indicated only in the report	20	20.6	31	35.2	9.33	.025*	20	23.3	24	31.6	7	30.4	5.53	.478
	The lesion should be marked on the radiograph	38	39.2	18	20.5			32	37.2	20	26.3	4	17.4		
	It is enough to write the section numbers of lesion in the report	12	12.4	14	15.9			11	12.8	12	15.8	3	13.0		
	Both pointing out the cross-section number and signing the lesion should be better	27	27.8	25	28.4			23	26.7	20	26.3	9	39.1		
Obtaining the report	The report should be given to the patient or patient's relatives	17	17.5	22	25.0	4.23	.120	12	14.0	20	26.3	7	30.4	a	
	The report should be given to patient, at the same time it should be sent to clinician by e-mail	71	73.2	52	59.1			63	73.3	46	60.5	14	60.9		
	The report should be given to patient, at the same time it should be sent to clinician by e-mail, mail, courier or hospital information system	9	9.3	14	15.9			11	12.8	10	13.2	2	8.7		
Presentation of the images	CD/DVD	65	67.0	63	71.6	.45	.500	57	66.3	58	76.3	13	56.5	3.88	.143
	Both CD/DVD and negative film	32	33.0	25	28.4			29	33.7	18	23.7	10	43.5		
Do you want to consult with the radiologist?	Yes	63	64.9	43	48.9	4.88	.027*	55	64.0	41	53.9	10	43.5	3.79	.157
	No	34	35.1	45	51.1			31	36.0	35	46.1	13	56.5		

** P<.05; ** P<.01; a: Chi-square test not performed*

There was a statistically significant difference ($p<0.05$) between the age groups regarding the source of the adequate reports, whether the description of the lesions should be in the conclusions sections, and whether all lesions should be described in detail (Table 2).

Statistically significant differences ($p<0.05$) were found between titles of the participants regarding the source of the adequate reports, whether the description of all lesions should be in detail, the terminology used in the report, and the request for consultant radiologist before and after the examination (Table 3). Statistically significant differences ($p<0.05$) were found between titles and institutions of the participants regarding the source of the adequate reports, description of all lesions in detail, the terminology used in the report, and the request of consultant radiologist before and after the examination (Table 3).

Table 3: Comparison of views on radiology reports by titles and institutions

		Title										Institution					
		Research assistant		General dentist		Specialist dentist		Lecturer				Non-university		University			
		N	%	N	%	N	%	N	%	χ^2	P	N	%	N	%	χ^2	P
Adequacy level	Very good	6	9.7	3	5.7	3	7.7	6	19.4	8.80	.185	6	6.9	12	12.2	4.10	.129
	Moderate	32	51.6	20	37.7	21	53.8	14	45.2			37	42.5	50	51.0		
	Inadequate	24	38.7	30	56.6	15	38.5	11	35.5			44	50.6	36	36.7		
Source of the adequate reports	Private imaging centre	11	17.7	23	43.4	9	23.1	4	12.9	16.57	.011*	53	37.5	14	14.3	14.48	.001**
	Equal rate from all institutes	13	21.0	13	24.5	11	28.2	10	32.3			21	24.1	26	26.5		
	University hospital	38	61.3	17	32.1	19	48.7	17	54.8			33	37.9	58	59.2		
Does "not reading" the reports give you a legal liability?	Yes	39	62.9	32	60.4	23	59.0	14	45.2	4.09	.664	54	62.1	54	55.1	.94	.624
	No	6	9.7	4	7.5	5	12.8	3	9.7			8	9.2	10	10.2		
	No idea	17	27.4	17	32.1	11	28.2	14	45.2			25	28.7	34	34.7		
Do you write a clinical information on the request paper?	Yes	31	50.0	16	30.2	20	51.3	15	48.4	8.23	.221	34	39.1	48	49.0	1.83	.400
	Partially	17	27.4	23	43.4	10	25.6	12	38.7			32	36.8	30	30.6		
	No	14	22.6	14	26.4	9	23.1	4	12.9			21	24.1	20	20.4		
Reaction against long report	I read only the conclusions section	20	32.3	21	39.6	16	41.0	15	48.4	4.18	.652	34	39.1	38	38.8	.97	.615
	I read all the contents	27	43.5	21	39.6	18	46.2	12	38.7			39	44.8	39	39.8		
	I read only findings and the conclusions section	15	24.2	11	20.8	5	12.8	4	12.9			14	16.1	21	21.4		
Report sequence	It should be written starting with the most important lesion	35	56.5	35	66.0	22	56.4	20	64.5	1.59	.662	52	59.8	60	61.2	.04	.840
	Pathological lesions should be written in standard format	27	43.5	18	34.0	17	43.6	11	35.5			35	40.2	38	38.8		
Should each lesion be described in detail?	Yes	28	45.2	30	56.6	29	74.4	18	58.1	8.34	.039*	57	65.5	48	49.0	5.14	.023*
	No	34	54.8	23	43.4	10	25.6	13	41.9			30	34.5	50	51.0		
Necessity of "recommendations" section	Yes	19	30.6	11	20.8	12	30.8	8	25.8	4.37	.627	21	24.1	29	29.6	1.32	.517
	No	21	33.9	21	39.6	18	46.2	11	35.5			37	42.5	34	34.7		
	Not sure	22	35.5	21	39.6	9	23.1	12	38.7			29	33.3	35	35.7		
Necessity of radiological terms	Exactly, it's necessary	42	67.7	30	56.6	25	64.1	23	74.2	3.01	.391	53	60.9	67	68.4	1.12	.290
	It is adequate for the lesion to be expressed clearly by the clinician	20	32.3	23	43.4	14	35.9	8	25.8			34	39.1	31	31.6		
Marking lesion on the radiograph	Anatomical location of the lesion should be indicated only in the report	15	24.2	12	22.6	13	33.3	11	35.5	16.61	.055	23	26.4	28	28.6	5.43	.143
	The lesion should be marked on the radiograph	27	43.5	10	18.9	10	25.6	9	29.0			21	24.1	35	35.7		
	It is enough to write the section numbers of lesion in the report	9	14.5	9	17.0	3	7.7	5	16.1			12	13.8	14	14.3		
	Both pointing out the cross-section number and signing the lesion should be better	11	17.7	22	41.5	13	33.3	6	19.4			31	35.6	21	21.4		
Obtaining the report	The report should be given to the patient or patient's relatives	11	17.7	14	26.4	8	20.5	6	19.4	9.26	.160	22	25.3	17	17.3	2.06	.356
	The report should be given to patient, at the same time it should be sent to clinician by e-mail	42	67.7	36	67.9	28	71.8	17	54.8			56	64.4	67	68.4		
	The report should be given to patient, at the same time it should be sent to clinician by e-mail, mail, courier or hospital information system	9	14.5	3	5.7	3	7.7	8	25.8			9	10.3	14	14.3		
Presentation of the images	CD/DVD	43	69.4	31	58.5	32	82.1	22	71.0	5.92	.116	58	66.7	70	71.4	.49	.484
	Both CD/DVD and negative film	19	30.6	22	41.5	7	17.9	9	29.0			29	33.3	28	28.6		
Do you want to consult with the radiologist?	Yes	44	71.0	26	49.1	15	38.5	21	67.7	13.24	.004**	39	44.8	67	68.4	10.44	.001**
	No	18	29.0	27	50.9	24	61.5	10	32.3			48	55.2	31	31.6		

** P<.05; ** P<.01; a: Chi-square test not performed*

Statistically significant differences ($p<0.05$) were found between the participants' departments regarding the source of the adequate reports, whether a clinical information/history of the patient should be sent to the radiologist before the radiological examination, the terminology used in the report, and the presence of the images at the report (Table 4).

Table 4: Comparison of views on radiology reports by departments.

		Departments									
		Surgical (specialist) dentist***		Orthodontist		Non-surgical (specialist) dentist****		General dentist			
		N	%	N	%	N	%	N	%	χ^2	P
Adequacy level	Very good	5	10.0	3	7.3	8	19.5	2	3.8	a	
	Moderate	25	50.0	17	41.5	25	61.0	20	37.7		
	Inadequate	20	40.0	21	51.2	8	19.5	31	58.5		
Source of the adequate reports	Private imaging centre	14	28.0	3	7.3	8	19.5	22	41.5	22.88	.001**
	Equal rate from all institutes	9	18.0	17	41.5	7	17.1	14	26.4		
	University hospital	27	54.0	21	51.2	26	63.4	17	32.1		
Does "not reading" the reports give you a legal liability?	Yes	30	60.0	22	53.7	23	56.1	33	62.3	a	
	No	8	16.0	2	4.9	4	9.8	4	7.5		
	No idea	12	24.0	17	41.5	14	34.1	16	30.2		
Do you write a clinical information on the request paper?	Yes	33	66.0	16	39.0	18	43.9	15	28.3	15.89	.014*
	Partially	10	20.0	14	34.1	14	34.1	24	45.3		
	No	7	14.0	11	26.8	9	22.0	14	26.4		
Reaction against long report	I read only the conclusions section	17	34.0	13	31.7	21	51.2	21	39.6	4.21	.648
	I read all the contents	22	44.0	20	48.8	14	34.1	22	41.5		
	I read only findings and the conclusions section	11	22.0	8	19.5	6	14.6	10	18.9		
Report sequence	It should be written starting with the most important lesion	27	54.0	29	70.7	21	51.2	35	66.0	4.84	.184
	Pathological lesions should be written in standard format	23	46.0	12	29.3	20	48.8	18	34.0		
Should each lesion be described in detail?	Yes	34	68.0	19	46.3	21	51.2	31	58.5	4.96	.174
	No	16	32.0	22	53.7	20	48.8	22	41.5		
Necessity of "recommendations" section	Yes	12	24.0	13	31.7	14	34.1	11	20.8	3.91	.690
	No	22	44.0	15	36.6	12	29.3	22	41.5		
	Not sure	16	32.0	13	31.7	15	36.6	20	37.7		
Necessity of radiological terms	Exactly, it's necessary	39	78.0	27	65.9	24	58.5	30	56.6	6.11	.106
	It is adequate for the lesion to be expressed clearly by the clinician	11	22.0	14	34.1	17	41.5	23	43.4		
Marking lesion on the radiograph	Anatomical location of the lesion should be indicated only in the report	12	24.0	14	34.1	13	31.7	12	22.6	9.09	.429
	The lesion should be marked on the radiograph	17	34.0	14	34.1	13	31.7	12	22.6		
	It is enough to write the section numbers of lesion in the report	7	14.0	7	17.1	4	9.8	8	15.1		
	Both pointing out the cross-section number and signing the lesion should be better	14	28.0	6	14.6	11	26.8	21	39.6		
Obtaining the report	The report should be given to the patient or patient's relatives	9	18.0	9	22.0	7	17.1	14	26.4	10.89	.092
	The report should be given to patient, at the same time it should be sent to clinician by e-mail	32	64.0	23	56.1	32	78.0	36	67.9		
	The report should be given to patient, at the same time it should be sent to clinician by e-mail, mail, courier or hospital information system	9	18.0	9	22.0	2	4.9	3	5.7		
Presentation of the images	CD/DVD	34	68.0	36	87.8	28	68.3	30	56.6	10.65	.014*
	Both CD/DVD and negative film	16	32.0	5	12.2	13	31.7	23	43.4		
Do you want to consult with the radiologist?	Yes	28	56.0	24	58.5	27	65.9	27	50.9	2.16	.540
	No	22	44.0	17	41.5	14	34.1	26	49.1		

** P<.05; ** P<.01; **** Oral & maxillofacial surgeon and periodontist; ****** Endodontist, prosthodontist and paediatric dentist *a: Chi-square test not performed*

DISCUSSION

Dentomaxillofacial radiology is one of eight dental specialities in our country. There are about 300 members in the national dentomaxillofacial radiology association. Only dentomaxillofacial radiologist and medical radiologists are authorized for CBCT reporting. Recently, due to revisions in legal regulations for the medical sciences, some new medico-legal issues have occurred, and available requirements have become more important.[15] The radiology reports are the first reference documents used in forensic cases to determine whether the standard of attention was met.[16] The clinicians' opinions about reporting have been investigated in several studies, and all the studies were related to medical radiologists.[1,17,18] To the best of our

knowledge, this is the first study of the approaches and opinions of dentists regarding the reporting of CBCT, specially. In this study, the questionnaires were prepared, some questions were modified from previous studies, and some new questions confirmed by blinded dentomaxillofacial radiologists were added.[1]

Age, gender, occupation, tooth brushing habits, etc. are questions with certainty and do not require a scale because these kinds of questions are tangible, and their answers are very accurately known to people with. Intangible structures that cannot be determined by a single question require a measuring instrument which is usually behavioural and intellectual.[19] For this reason, validity and reliability studies were not performed, and there was no need for them. Also, the aim of this study was not to create a scale. We aimed to evaluate the expectations of dentists of CBCT reports and to attract attention to standardization and to the quality of the reports in dentistry.

Sistrom *et al*.[20] declared that medical radiology residents receive verbal instruction only one hour per year, approximately. It has been reported that 98% of medical radiology residents did not have any education in report writing, and 78% of them wrote reports with the guidance of a senior resident.[21] McLoughlin *et al*.[22] reported that radiologists do not pay much attention to clinicians' requests regarding reporting.

In a recent study from Australia, Selim *et al*.[13] evaluated the satisfaction level of dentists from dental radiology reports, not only CBCT reports. In that country, there are limited numbers of dentomaxillofacial radiologists in that country, dental radiology reports were prepared by medical radiologists more than dentomaxillofacial radiologists. Dentomaxillofacial radiologists' reporting satisfaction level was higher than medical radiologists'. Most general dentists (93.1%) and specialist dentists (85.9%) preferred the reports to be written by dentomaxillofacial radiologist, beside medical radiologists.[13] It was also stated that most dentists complained about the deficiencies of details and dental view in medical radiology reports.[13]

The results of our study showed that very few dentists thought the radiology reports were very good. In the study of Selim *et al*.[13] from Australia, the researchers found that majority (80.2%) of general dentists and most (58.6%) of specialist dentists were not satisfied about dental radiology reports (Selim). In a study from Turkey, Dogan *et al*.[1] evaluated medical doctors' expectations of radiology reports and demonstrated that the reports were found to be adequate by most (60%) of the doctors. The results of our study (9.7% satisfaction rate) were compatible with Selim *et al*.'s dentists-oriented survey, whereas opposite to the study of Dogan *et al*.'s medical doctors-oriented survey.

The most important request of that clinicians make of radiologists is to provide clinical information, but it is often inadequate or unreadable.[1] Dogan *et al*.[1] reported that 53.5% of the clinicians provided adequate clinical information while 41.5% only wrote a short note, and 5% did not write any clinical information because of their extremely busy schedule. In this study, the results were closer to each other, but the percentage of dentists who did not write clinical information was higher (22.2%) than in the previous report.[1] This condition may possibly be because dentists do not care as much about writing clinical information as do medical doctors.

Dogan *et al*.[1] reported that 46% of the doctors just read the conclusions section, and, with long reports, only 39% read the entire report. They also reported that most of the participants (72%) preferred a detailed report.[1] Likewise, Naik *et al*.'s[23] study found that most of the participants preferred standardized detailed reports. In the present study, the rate of dentists who just read the conclusion section

(38.9%) and the rate of those who read the entire report (42.2%) were found to be close to each other for long reports.

It was determined that most clinicians (70.5%) wanted a recommendations section in the reports.[1] Yesildere *et al*.[17] emphasized that the doctors wanted the medical radiologist to write recommendations at the end of the report, but not to verbally inform the patients about the treatment options or the next step. Plumb *et al*.[24] reported that clinicians have adopted additional imaging recommendations from radiologists at very high rates but have indicated that additional imaging decisions should be made by themselves. The stated reason that doctors believed this that radiology specialists did not have enough clinical knowledge about patients.[17,24] In this study, only 27% of the dentists wanted recommendations in the reports.

In the previous study, most clinicians (56%) want to include expressions that they use among themselves such as calcification, necrosis, and haemorrhage rather than radiological terms like Wesmark sign, hypointense, etc.[1] The present study yielded a different result; most of the participants (64.9%) wanted to see radiological terms in the reports. According to the study by Dogan *et al*.[1], most clinicians do not want patients to read reports, and international medical terms provide better communication between doctors.

Regarding the question of marking the location of the lesions, the results of the previous study demonstrated that 73% of doctors preferred the lesion location to be marked; a similar rate of our dentists had the same opinion (72.4%).[1] The proportion of those who preferred to write the cross-sectional number of the lesions was 14% in doctors and 28.1% in dentists.[1] In the study by Dogan *et al*.[1], the doctors in universities preferred the images as CD/DVD while 37% of the doctors in public hospitals wanted negative films. In our study, most of the general dentists preferred the choice of CD/DVD. Likewise, orthodontists preferred report presentation in the CD/DVD format at a statistically higher rate than other dentists. It was determined that most clinicians exchange ideas with the radiologists before and after imaging. In Dogan *et al*.'s[1] study, only 16.5% of the medical doctors thought that they did not need the help of the radiologists. In our study, 42.7% of the dentists did not want the radiologist to be a consultant before and after the radiological examination.

This study differs from previous studies in the literature regarding radiological reporting. Related studies focused on the opinions of medical doctors, but there was no data about dentists. However, there were some limitations in the present study. This study is a subpopulation survey and the views expressed in the study may differ from general dentists' views. The survey was performed in only one country, so the opinions of the dentists and their way of reporting may be different in other countries. It is recommended that further studies be undertaken in different countries and with larger survey groups.

CONCLUSIONS

The results of this study showed that most of the dentists were not satisfied with the adequacy of CBCT reports and the source of adequate reports was university hospitals. Most dentists thought that "not reading" the radiology reports may give them legal liability and wanted the radiologist to consult before and after the examination. The results of this study may help dentomaxillofacial radiologists to improve their reports.

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REFERENCES

1. Dogan N, Varlibas ZN, Erpolat OP. Radiological report: expectations of clinicians. Diagn Interv Radiol 2010; 16:179–185.

2. Summers JB, Kaminski J. Reporting instruction for radiology residents. Acad Radiol 2004; 11:1197.

3. Berlin L. Radiology reports. AJR Am J Roentgenol 1997; 169:943–946.

4. Kahn CE Jr, Langlotz CP, Burnside ES, et al. Toward best practices in radiology reporting. Radiology 2009; 252:852–856.

5. Turkish Society of Radiology Qualification Board, Standards and Guide Committee, Traditional Radiology Report Written Guideline Document No. 001:2008.

6. Reiner BI, Knight N, Siegel EL. Radiology reporting, past, present, and future: the radiologist's perspective. J Am Coll Radiol 2007; 4:313-319.

7. Gunderman R, Ambrosius WT, Cohen M. Radiology reporting in an academic children's hospital: what referring physicians think. Pediatr Radiol 2000; 30:307-314.

8. Smith PC, Rodrigo AG, Bublitz C, et al. Missing clinical information during primary care visit. JAMA 2005; 293:565-571.

9. Reiner BI, Siegel EL, Knight N. The evolution of the radiology report and the development of speech recognition. In: Reiner BI, Siegel EL, Weiss DL. Electronic reporting in the digital medical enterprise. Great Falls, VA: Society for Computer Applications in Radiology, 2003:1-7.

10. Marcovici PA, Taylor GA. Journal Club: Structured radiology reports are more complete and more effective than unstructured reports. AJR Am J Roentgenol 2014; 203:1265-1271.

11. Mamlouk MD, Chang PC, Saket RR. Contextual Radiology Reporting: A new approach to neuroradiology structured templates. AJNR Am J Neuroradiol 2018. doi: 10.3174/ajnr. A5697. [Epub ahead of print]

12. European Society of Radiology (ESR). Good practice for radiological reporting. Guidelines from the European Society of Radiology (ESR). Insights into Imaging 2011; 2:93-96.

13. Selim D, Monsour P, Sexton C. Dento-maxillofacial radiology in Australia and dentist satisfaction with radiology reports. Aust Dent J 2018. doi: 10.1111/adj.12642. [Epub ahead of print]

14. Peker I, Ucok O, Kayadugun A. Approaches of dentomaxillofacial and medical radiologists about reporting. Cumhuriyet Dent J 2018; 21:32-39.

15. Srinivasa Babu A, Brooks ML. The malpractice liability of radiology reports: minimizing the risk. Radiographics 2015; 35:547-554.

16. Dunnick NR, Langlotz CP. The radiology report of the future: a summary of the 2007 Intersociety Conference. J Am Coll Radiol 2008; 5:626-629.

17. Yesildere FB, Eren CS, Oren E, Erdogan N. Assesment of the clinicians' expectations from the radiology reports and overall satisfaction with the radiology department in our hospital. Tepecik Egit Hast Derg 2010; 20:131-141.

18. Bosmans JM, Schrans D, Avonts D, De Maeseneer JM. Communication between general practitioners and radiologists: opinions, experience, promises, pitfalls. JBR-BTR 2014; 97:325-330.

19. DeVellis RF. Scale development: theory and applications. 3rd ed. Los Angeles: Sage Pub, 2014:11-12.

20. Sistrom C, Lanier L, Mancuso A. Reporting instruction for radiology residents. Acad Radiol 2004; 11:76-84.

21. Howl-Whitney LJ. Radiology reports: are structured systems the answer? RSNA 2013. Diagnostic Imaging, Practice Management [serial on the Internet]. 2013 Dec 10. Available from: http://www.diagnosticimaging.com/rsna-2013/radiology-reports-are-structured-systems-answer.

22. McLoughlin RF, So CB, Gray RR, Brandt R. Radiology reports: how much descriptive

detail is enough? AJR Am J Roentgenol 1995; 165:803-806.

23. Naik SS, Hanbidge A, Wilson SR. Radiology reports: examining radiologist and clinician preferences regarding style and content. AJR Am J Roentgenol 2001; 176:591-598.

24. Plumb AA, Grieve FM, Khan SH. Survey of hospital clinicians' preferences regarding the format of radiology reports. Clin Radiol 2009; 64:386-396.

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