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Research Article

Maxillofacial Radiology Report Expectations

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Abstract

İntroduction: In dentistry, multiple imaging methods are used for diagnosis and treatment planning.

Objective: The aim of this study is to determine the expectations and preferences of final-year dental students, dentists, and dental specialists regarding the style and content of maxillofacial radiology reports in order to improve the quality of such reports.

Method: A multiple-choice survey consisting of nine questions has been prepared. A total of 168 general dentists and specialists working in university hospitals or state hospitals were divided into six groups based on whether they were specialists, final-year dental students, or clinicians and their work experience. The survey was administered to participants through face-to-face interviews. The results were analyzed for each group using Pearson's chi-square test and Fisher's exact test.

Results: Except for the third and ninth questions related to the identification of image artifacts and measurements on images for implant planning, no statistically significant differences were found between the six groups. Clinicians with at least 10 years of experience preferred more detailed radiological reports regarding image artifacts ($p<0.05$). Dentists with less than 10 years of experience preferred printed measurements on images for implant planning ($p<0.05$). There were also differences in the preferred imaging techniques that should be reported.

Conclusion: It has been determined that dentists and specialists prefer detailed, standardized radiology reports that include clinical information (especially localization, internal structure, lesion size, and relationship to anatomical landmarks), technical information, findings, conclusions, and recommendations for further imaging techniques. This study has provided important data for maxillofacial radiologists to write more effective reports.

Keywords: Maxillofacial radiology, report, standardization.

Introduction

By offering a comprehensive and unambiguous framework, standardized radiology reporting seeks to increase patient safety and accuracy. The radiology community's increasing focus on structured reporting, which is acknowledged globally, draws inspiration from research in other fields [1]. Referring clinicians may rate a specific aspect of the radiology workflow as low performing, but their overall satisfaction with radiology depends more on other aspects of the workflow, so it's critical to understand how each component of the radiology process map affects clinicians' overall satisfaction. The radiologist reports pertinent information about the image created and supports decision-making during the diagnosis, treatment, and communication processes. To solve complicated issues in the health care sciences, teamwork and shared methods are needed to find the best practice, standardize it, and then disseminate it to enhance patient care (2,3).

A useful management tool for understanding how a radiology practice is operating from the viewpoint of a crucial component—the professionals who refer patients for imaging and interventions—is the referral clinician survey. The outcomes of these surveys can be used to track performance and improvement over time, as well as to identify and prioritize improvement initiatives (3).

The radiology report is generally the key point of contact between maxillofacial radiologists and other dental specialties. Maxillofacial radiology reports may contain many elements: a description of the technique, examination of the image; lesion localization, size, border structure, normal anotomical landmarks and their relations and a differential diagnosis; and recommendations for further investigations. To date few studies have examined the attitudes of referring physicians to these elements but many questions remain open. As a speciality do dentists and specialists really need a radiology report in maxillofacial radiology? Are they convinced of clinical information wil improve the quality of the report? What are their preference for the report content? What can be left out of the report and what ought to be included (4)?

In this article, we report the results of a multiple-choice questionnaire about maxillofacial radiology report expectations. The purpose of our study was to improve the quality of reports in maxillofacial radiology imaging interpretation we aimed to assess the dentists and specialists expectations and preferences in terms of radiology report style and content. We also

analyzed maxillofacial radiology report preferences due to various imaging tecniques like. panoramic, extraoral projections, cone-beam computed tomography (CBCT), magnetic resonance imaging (MRI) and ultrasonography (USG).

Materials and Methods

After ethical approvel has taken from Ankara University Faculty of Dentistry Ethical Committee the questionnaire was applied to participants by face-to-face interview. A multiple-choice questionnaire, containing 9 questions, was formed. In the first section, participants were asked to enter demographic data. The second section consisted of 9 questions about the radiology report, for which participants were asked to indicate their preference. One-hundred and sixtyeight dentists and specialists, working either in a university hospital or a public hospital, were allocated into 6 groups according to be a speacialist or not, be a dentistry student or a clinician and work experience. Statistical analysis was performed by using SPSS 15.0 for Windows (SPSS, Chicago, Ill). Results were analyzed for each group using Pearson chi-square test and Fisher's exact test. P-value < 0.05 was considered as statistically significant.

A multiple-choice questionnaire, containing nine questions, was formed. The questionnaire was as follow;

Which imaging technique must be reported? (you can choose more than one technique): periapical radiography, occlusal radiography panoramic, extra-oral projections (cephalograms, TMJ projections), CBCT, MRI, and USG.

Do you give clinical information to radiologists when you refer a patient for imaging? Yes /No.

Which information must a radiology report contain? Anatomic landmarks, imaging artifacts, and all anomalies in the field of view.

What do you want to know about the lesion in the image? Location, size, border structure, internal structure, relationship with the anatomic landmarks, and differential diagnosis.

Must the artifacts or anatomic landmarks that seem like lesions be reported? Yes/No

Must the border of the lesion marked on the image? Yes/No

Must the probable diagnosis written in the report? Yes/No

Must the recommended imaging technique written in the report? Yes/No

For implant planning, measurements must be marked on the image in the report; there is no need to measure. Let the clinician do it himself.

We also asked participants about their years of experience and specialty.

One-hundred and sixty-eight dentists and specialists, working either in a university hospital or a public hospital, were allocated into six groups according to be a specialist or not, a dentistry student or a clinician, and work experience. Among the participants, the mean age was 25 (22-63) years, and the mean year of experience was seven (1-40) years. The questionnaire was applied to participants through face-to-face interviews. The statistical packet for SPSS (version 11.5) was used for statistical evaluation. Results were analyzed for each group using the Pearson chi-square test and Fisher's exact test. A p-value < 0.05 was considered statistically significant.

Results

One hundred and sixty-eight participants (52 male and 116 female) took the survey. The age range varied from 22-to-63 (mean 25) years, and years of occupational experience varied from 1-40 (mean 7) years. The number of participants who had under 10 years of experience was 54 (58.1%), and more than 10 years of experience was 39 (41.9%). Seventy-eight of the participants were specialist dentists, and 90 of the participants were dentists. Seventy-one participants were working at a university hospital, 18 were at public hospitals, one was at a private clinic, three were at a private hospital, and 75 were undergraduate dental students last year Table 1.

The questionnaire consisted of periapical radiography, occlusal radiography, panoramic radiography, extraoral techniques, cone beam computed tomography(CBCT), magnetic resonance imaging (MRI), and ultrasonography (US). Periapical radiography reporting preferences were significantly higher in participants who had under 10 years of occupational experience, undergraduate dental students, and dentists ($p<0.05$). There was no significant difference in occlusal radiography reporting among the three groups ($p>0.05$). 70.2% of the participants did not want occlusal radiographs to be reported. Panoramic radiography reporting preferences were also significantly higher in undergraduate dental students than postgraduates

and in dentists than specialist dentists ($p<0.05$). There were no significant differences between the six groups in reporting the extraoral techniques ($p>0.05$); they preferred the extraoral techniques to be reported. There were significant differences in CBCT reporting preference. CBCT report preference was higher in dentists specialist dentists ($p<0.05$). 88.7% of the participants preferred CBCT reported. There were no significant differences found between the groups about reporting MRI and US ($p>0.05$). Participants preferred MRI and US to be reported Table 2.

There were no significant differences found between the groups in giving clinical information ($p>0.05$). 67.9% of the participants declared that they gave clinical information before prescribing radiographic imaging.

When the participants were asked about the prescribing anatomic landmarks, imaging artifacts, and all anomalies in the field of view, clinicians with at least 10 years of experience preferred radiological reports more detailed about image artifacts ($p<0.05$). There were no significant differences found between the groups regarding prescribing anatomic landmarks and anomalies in the field of view ($p>0.05$). The participants preferred a detailed report about anatomic landmarks and anomalies in the field of view Table 3.

Questions four to seven addressed the types of content that would be preferred in a maxillofacial radiology report. Most of the participants who had under 10 years of occupational experience expected to know about the localization of the lesion 81.5%, lesion size 85.2%, border structure 81.5%, internal structure 68.5%, relationship with the anatomic landmarks 85.2% and differential diagnosis 61.1%. Dentists who had at least 10 years of occupational experience also preferred the localization of the lesion at 94.9%, lesion size at 97.4%, border structure at 87.2%, internal structure at 79.5%, relationship with the anatomic landmarks at 97.4% and differential diagnosis at 71.8%. There were no significant differences found between the groups regarding prescribing localization, size, border structure, internal structure, relationship with the anatomic landmarks, and the differential diagnosis of the lesion ($p>0.05$). Table 4.

Dentists who had experienced under 10 years preferred measurements printed in the report ($p<0.05$).

No statistically significant difference was found among the six groups except for the third and ninth questions, which were about the determination of the image artifacts and making measurements on the images for implant planning. Clinicians with at least 10 years of experience preferred radiological reports more detailed about image artifacts ($p<0.05$). Dentists who had experience under 10 years preferred measurements printed on the images for implant planning ($p<0.05$). There were also differences in the imaging technique preferences that should be reported. It has been determined that dentists and specialists preferred detailed, standardized radiological reports with clinical information (esp. localization, internal structure, size of the lesions, and relation with the anatomical landmarks), technique information, findings, conclusion, and recommendations for further imaging techniques. There were also differences between dentistry students and dentists. Dentists' preference reporting panoramic, CBCT, and USG significantly ($p<0.05$) more than dentistry students. In spite of dentists, dentistry undergraduate students preferred to give clinical information to radiologists ($p<0.05$).

Discussion

The ability of radiologists to evaluate examination images, identify normal and abnormal findings, incorporate these findings into their own medical knowledge base, arrive at a diagnosis or correctly ranked differential diagnosis, and sometimes recommend additional diagnostic tests is defined as radiological reporting. When imaging methods were examined individually, dentists with less than 10 years of experience participating in our study preferred to report panoramic radiography images (44.4%). This result suggests that more focus should be placed on this topic in the undergraduate education program. Dentists in both groups believe that CBCT, MRI, and ultrasound images should be reported. This result demonstrates that advanced imaging techniques are recognized as a specialty in maxillofacial radiology.

When asked what a radiology report should include, most participants stated that the report should indicate typical anatomical structures. This result suggests that undergraduate education should focus on the radiological appearance of normal anatomical structures (5, 6).

On the other hand, the technical details of the images taken can affect image quality. Therefore, including information such as the kVp, mA, and second values at which the image was obtained, the focal spot size of the device, the contrast and spatial resolution of the detec-

tor used, the pixel/voxel size, and any artifacts present in the image in the report will contribute to a more accurate interpretation of radiological images. While all participants expected artifacts to be written in the report, there was a statistically significant difference between those who thought that artifacts should not be included in the report ($p<0.05$). We accept that this difference may be due to misinterpretation of exposure parameters, focal spot size, and artifacts originating from detector characteristics.

There is no significant difference between the two groups in reporting anomalies in the imaging area ($p>0.05$); both groups believe that anomalies should be reported. When it comes to the localization of anomalies, their border structure, internal structure, relationship with anatomical formations, and differential diagnosis, there is no significant difference between the two groups ($p>0.05$), and both groups believe that this information about anomalies should be included in the report. In contrast to Selim et al., we found that dentists with more than 10 years of experience wanted slightly more detailed reports (7).

When asked about the measurements to be taken for implant planning, all participants preferred to view the measurements on the image, while physicians with less than 10 years of experience requested that the measurements also be included in the report. Most participants stated that they did not prefer to perform the measurements themselves. This preference also suggests that participants are aware of and recognize the competence of maxillofacial radiology specialists.

Dental imaging is a standard part of radiology applications as a targeted examination during the detection of other problems or in patients with dental or oral trauma. Although oral hygiene has improved and preventive measures have been taken in dentistry in recent years, resulting in improved dental health among the population, diseases of the teeth and supporting structures continue to significantly affect and limit the quality of life of affected patients. Early diagnosis of these diseases is also an important task for radiologists (8). The structural characteristics and details of the reports prepared for this purpose assist in making accurate diagnoses, preventing unnecessary treatments, and preventing potential legal disputes. In our country, the Oral Diagnosis and Maxillofacial Radiology Association (ODMFR) has prepared "Standard Radiology Reporting Forms" to ensure that diagnostic processes are carried out in a more effective, standardized, and reliable manner.

Conclusion

This study provided essential data for maxillofacial radiologists to write more effective reports. McLoughlin et al. concluded in 1994 that "The value of radiologists will depend on how much other people value us. We must be ever vigilant in assessing and responding to the needs of other physicians (9)" It is important that maxillofacial radiology reports contain information desired by referring physicians in a format preferred by them. Clinicians requested detailed reports about the lesion size, border structure, internal structure, relationship with the anatomic landmarks, and the differential diagnosis.

Table 1. Demographic profile of participants

	n	**%**
Male	52	31
Female	116	69
Working experience < 10 years	54	58.1
Working experience >10 years	39	41.9
Place of work		
Dental last year student	75	44.6
Private practice	1	0.6
Policlinic	3	1.8
Public hospital	18	10.7
University hospital	71	42.3
Situation		
Student	75	44.6
Dentist	93	55.4
Specialist	78	46.4
Not specialist	90	53.6

Table 2. Imaging methods to be reported

	≤10 years		>10 years		
Which imaging tecnique must be reported?	n	%	n	%	p*
Periapical radiography					
Yes	16	29.6	2	5.1	0.003
No	38	70.4	37	94.9	
Occlusal radiography					
Yes	17	31.5	6	15.4	0.076
No	37	68.5	33	84.6	
Panoramic radiography					
Yes	24	44.4	11	28.2	0.111
No	30	55.6	28	71.8	
CBCT					
Yes	50	92.6	39	100	0.136
No	4	7.4	0	0	
Ultrasonography					
Yes	43	79.6	36	92.3	0.092
No	11	20.4	3	7.7	

Table 3. Content of the radiology report

	≤ 10 years		**> 10 years**		
Report Content	n	%	n	%	p*
Anatomical landmarks					
Yes	34	63	22	56.4	0.366
No	20	37	17	43.6	
İmaging artefacts					
Yes	33	61.1	33	66.7	**0.014**
No	21	38.9	6	15.4	
Abnormalities on FOV					
Yes	51	94.4	38	97.4	0.637
No	3	5.6	1	2.6	

Table 4. Expectations from the radiology report regarding pathological lesions

	≤ 10 years		**> 10 years**		
İnformation about the lesion	n	%	n	%	p*
Localization					
Yes	44	81.5	37	94.9	
No	10	18.5	2	5.1	0.057
Size					
Yes	46	85.2	38	97.4	
No	8	14.8	1	2.6	0.074
Border structure					
Yes	44	81.5	34	87.2	
No	10	18.5	5	12.8	0.461
Internal structure					
Yes	37	68.5	31	79.5	
No	17	31.5	8	20.5	0.239
Relationship with the anatomic land-marks					
Yes	46	85.2	38	97.4	0.074
No	8	14.5	1	2.6	
Differential diagnosis					
Yes	33	61.1	28	71.8	
No	21	38.9	11	28.2	0.285

Table 5. Expectations for radiology images and reports in implant treatments

	≤ 10 years		**> 10 years**		
For implant planning measure-ments must…	n	%	n	%	p*
On the image					
Yes	41	75.9	28	71.8	
No	13	24.1	11	28.2	0.653
In the report					
Yes	39	72.2	13	33.3	
No	15	27.8	26	66.7	0.000
Let the clinician measure himself					
Yes	5	9.3	6	15.4	
No	49	90.7	33	84.6	0.367

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