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Assessment of knowledge level and attitudes of dental students about digital radiography and cone beam computed tomography (CBCT)

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ABSTRACT

Assessment of knowledge level and attitudes of dental students about digital radiography and cone beam computed tomography (CBCT)

Background: The aim of this study is to evaluate the level of knowledge and attitudes about digital radiography and Cone Beam Computed Tomography (CBCT) of Marmara University 4th and 5th grade students as a result of their education.

Methods: In our study, a questionnaire consisting of 16 questions was applied to 100 4th and 100 5th grade students totally 200 students who are educated in Marmara University Faculty of Dentistry. Besides the knowledge level of the students, their attitudes were evaluated.

Results: In our study, there was statistically significant difference between the responses given to "What source or sources do you know about CBCT?", "How much do you think CBCT will be used in routine dental practice in the near future?", "In which cases do you prefer to use CBCT in your future clinical life?", "Would you prefer to use CBCT in your future professional clinical life?", "According to you, in what year of dental training should CBCT be taught?" between 4th and 5th grade students ($p<0.05$).

Conclusion: It seems that their 5th grade had more information about CBCT and more positive attitudes at the same time due to the high rate of their participation in one year of experience, courses and seminars. Additional classes can be given on these subjects in the classes at the faculties and at the same time participation in the seminars can be encouraged in order to increase the knowledge level of the 4th grade and to get more accurate information about CBCT.

KEYWORDS

Cone Beam Computed Tomography, Digital Radiography

ÖZ

Diş hekimliği öğrencilerinin dijital radyografi ve konik işinli bilgisayarli tomografi (kibt) hakkindaki bilgi düzeyinin ve tutumlarinin değerlendirilmesi

Amaç: Bu çalışmanın amacı Marmara Üniversitesi 4. ve 5. sınıf öğrencilerinin almış oldukları eğitimler sonucunda dijital radyografi ve Konik Işınlı Bilgisayarlı Tomografi (KIBT) hakkındaki bilgi düzeylerinin ve tutumlarının değerlendirilmesidir.

Gereç ve Yöntemler: Çalışmaya diş hekimliği 4. ve 5. sınıf öğrencileri dahil edildi. Katılımcılara, dental radyolojik tetkiklerle ilgili temel bilgilerin sorulduğu 11'i çoktan seçmeli, 8'i iki seçimli (Doğru ya da Yanlış) sorulardan oluşan bir anket uygulanmıştır.

Bulgular: 4. ve 5. sınıflar arasında "KIBT hakkında bilgiyi hangi kaynak ya da kaynaklardan edindiniz?", "KIBT'ı yakın gelecekte rutin diş hekimliği uygulamalarında ne ölçüde kullanılacağını düşünüyorsunuz?", "Gelecekteki klinik yaşamında hangi vakalarda KIBT kullanımını tercih edersin?", "Gelecekteki profesyonel klinik yaşamında KIBT kullanımını tercih eder misin?", "Size göre diş hekimliği eğitiminin hangi yılında KIBT üzerine eğitimi verilmelidir ?" sorularına verilen yanıtlar arasında istatistiksel olarak anlamlı fark bulunmuştur ($p<0.05$).

Sonuç: 5. sınıfların almış oldukları bir senelik fazla tecrübe, ders ve seminerlere katılımlarındaki yüksek oran nedeniyle KIBT hakkında daha fazla bilgi ve aynı zamanda daha pozitif bir yaklaşımları olduğu görülmüştür. 4. sınıfların da bilgi düzeylerinin yükseltilebilmesi ve KIBT hakkında daha doğru bilgiye ulaşabilmeleri amacıyla fakültedeki derslerinde bu konular hakkında ek dersler verilebilir ve aynı zamanda bilgi düzeylerini arttırmaları amacıyla seminerlere katılımlar teşvik edilebilir.

ANAHTAR KELİMELER

Konik Işınlı Bilgisayarlı Tomografi (KIBT), Dijital Radyografi

INTRODUCTION

Radiology science manifests a continuous development in order to improve image quality and to reduce patient radiation dose. Conventional radiography is replaced with digital radiography (DR) due to emerging radiographic technologies. [1-4]

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Dental radiographic imaging is a significant tool to achieve an accurate diagnosis. The main advantages of digital intraoral radiography systems are time saving, reduction of radiation dose, removal of errors in image formation process, image enhancement, data storage, communication with other practitioners and easier viewing of the patient's images on a monitor. Although digital radiographic systems are offered as an alternative to conventional radiography, it may take time to achieve the desired level of use.[5,6]

CBCT is an imaging technique, which is available to dentists for examining hard tissues in the dental and maxillofacial areas. This technique gives a three-dimensional portrayal of anatomy and pathology.[7] CBCT is based on volumetric tomography technique which uses a 2D detector combined with a single 360° scan providing 3D x-ray beam. The projection data are used for generating a 3D volumetric data set to provide reconstructed images in coronal, sagittal and axial planes which are referred as orthogonal planes.[8]

The studies conducted portrays that CBCT technology was useful in maxillofacial radiology, especially for evaluation of hard tissues. [9-12] CBCT scanners for the oral and maxillofacial region were pioneered by the studies of Arai et al.[13] and Mozzo et al.[14] in the late 1990s. Since then, this new imaging technique has been addressed by different research groups in the region of the mouth and jaws. [13-15] In the study of Shah and Venkatesh[16], the knowledge levels and attitudes of dentistry students about CBCT were evaluated. According to the study, more than half of the students emphasized that the use of CBCT will become more widespread in the near future and they want to use CBCT technology in their future careers. In a study by Peciuliene et al. [17], 2879 Lithuanian were invited to select a single category of answers that best accommodate their clinical attitudes. Recently graduated dentists stated that they used digital radiographs more than other participants. The aim of this study is to evaluate the knowledge and attitudes of fourth and fifth grade students about digital radiography and CBCT in Marmara University Faculty of Dentistry.

MATERIALS AND METHODS

The study protocol of the study was approved by Marmara University Medical Faculty Non-Interventional Clinical Research Ethics Committee on 04/05/2018 with the protocol number 09.2018.376. This research was carried out in Marmara University, Faculty of Dentistry, Department of Oral and Maxillofacial Radiology. In this study, the study group of Marmara University Faculty of Dentistry consists of 100 4th grade and 100 5th grade students. A questionnaire consisting of 16 questions was used to evaluate participants' knowledge and attitudes about digital radiography and CBCT.

Statistical Analysis

Descriptive statistics were used to define continuous variables (average, standard deviation, minimum, median, maximum). Chi-Square test (or Fisher's Exact test, where appropriate) was used to examine the relationship between the categorical variables. The statistical significance level was determined as 0.05. The analyzes were performed using the MedCalc Statistical Software version 12.7.7 (MedCalc Software bvba, Ostend, Belgium; http://www.medcalc.org; 2013).

RESULTS

The study population consisted of 40 (20.0%) male students and 160 (80.0 %) female students and 100 (50%) students were in 4th and 100 (50%) students were in 5th grade.

A significantly higher proportion of the fifth-year students answered the question " From which source or sources did you get information about CBCT?" as "from seminars" and "from the internet" (Fisher's Exact p <0.05) (Table 1).

Table 1. Evaluation of digital radiography and CBCT knowledge level and attitudes according to grades.

		4th grade		5th grade		P-values
		N	%	N	%	
Gender	Male	22	22.0	18	18.0	0.596
	Female	78	78.0	82	82.0	
Do you have any knowledge about CBCT?	Yes	99	99.0	99	99.0	1.00
	No	1	1.0	1	1.0	
From which source or sources did you get information about CBCT?	Lectures	94	94.0	93	93.0	1.00
	Seminars	8	8.0	49	49.0	<0.001
	Internet	16	16.0	31	31.0	0.019
	Other	2	2.0	5	5.0	0.445
Is it necessary for you to have the CBCT unit at your faculty?	Yes, required	97	100.0	97	99.0	1.00
	No, not necessary	0	0	1	1.0	
To what extent do you think CBCT will be used in routine dental practice in the near future?	No idea	8	8.2	9	9.2	0.045
	In all areas of dentistry	27	27.8	41	41.8	
	Specific dental interventions	58	59.8	48	49.0	
	Will not be used extensively	4	4.1	0	0.0	
According to you, in which year of training of dentistry should be taught on CBCT?	No training needed	1	1.0	1	1.0	<0.001
	Pre-clinical period (1-2-3th grade)	31	32.0	14	14.3	
	During the clinical period (grade 4-5)	59	60.8	57	58.2	
	During the PhD / specialization period	6	6.2	26	26.5	
Do you prefer to use CBCT in future professional clinical life?	No idea	32	33	14	14.3	0.001
	Yes	63	64.9	84	85.7	
	No	2	2.1	0	0.0	
Which cases would you prefer to use CBCT in future clinical life?	Implant cases	60	60.0	78	78.0	0.009
	Impacted tooth extraction	57	57.0	72	72.0	0.038
	Evaluation of patients with cysts and tumors	59	59.0	80	80.0	0.002
	Orthodontic cases	32	32.0	39	39.0	0.374
CBCT has a lower dose than the panoramic radiographs in use	No idea	26	27.4	25	25.5	0.311
	Agree	44	46.3	55	56.1	
	Disagree	25	26.3	18	18.4	

Indicate your reason or reasons for using digital radiography techniques	Relatively low radiation dose	80	80.0	85	85.0	0.457
	Easy and fast to maintain	57	57.0	63	63.0	0.741
	Lack of film processing	90	90.0	82	82.0	0.153
	Lack of wastage due to lack of film process	81	81.0	72	72.0	0.182
	The absence of artifacts due to the film bath process	84	84.0	85	85.0	1.00
	Allow film adjustments and measurements	82	82.0	81	81.0	1.00
	Easy archiving of films	87	87.0	91	91.0	0.499
	Other	1	1.0	0	0.0	1.00
Film quality in digital techniques is satisfactory	Strongly agree	11	11.0	18	18.0	0.347
	Agree	66	66.0	65	65.0	
	Neither agree nor disagree	22	22.0	15	15.0	
	Disagree	1	1.00	2	2.0	
Do you think using digital techniques increases film repetition?	No idea	14	14.0	22	22.0	0.050
	Yes	28	28.0	37	37.0	
	No	58	58.0	41	41.0	
In which applications do you use digital intra-oral radiographs?	Surgical treatments	70	70.0	74	74.0	0.637
	Endodontic treatments	93	93.0	97	97.0	0.331
	Periodontal treatments	64	64.0	75	75.0	0.124
	Prosthetic treatments	68	68.0	64	64.0	0.654
	Restorative treatments	88	88.0	91	91.0	0.645
	Other	6	6.0	1	1.0	0.118
Fisher's Exact p						

Among 4th and 5th grade students, a significantly higher proportion of 5th grade students answered “In all areas of dentistry” and a significantly higher proportion of 5th grade students replied as “specific dental interventions” to the question “ To what extent do you think CBCT will be used in routine dental practice in the near future?” (Fisher's Exact p <0.05) (Table 1) (Figure 1). Moreover, a significantly higher proportion of 4th grade students answered “During the clinical period (grade 4-5)” to the question “According to you, in which year of training of dentistry should be taught on CBCT?” (Fisher's Exact p <0.05) (Table 1).

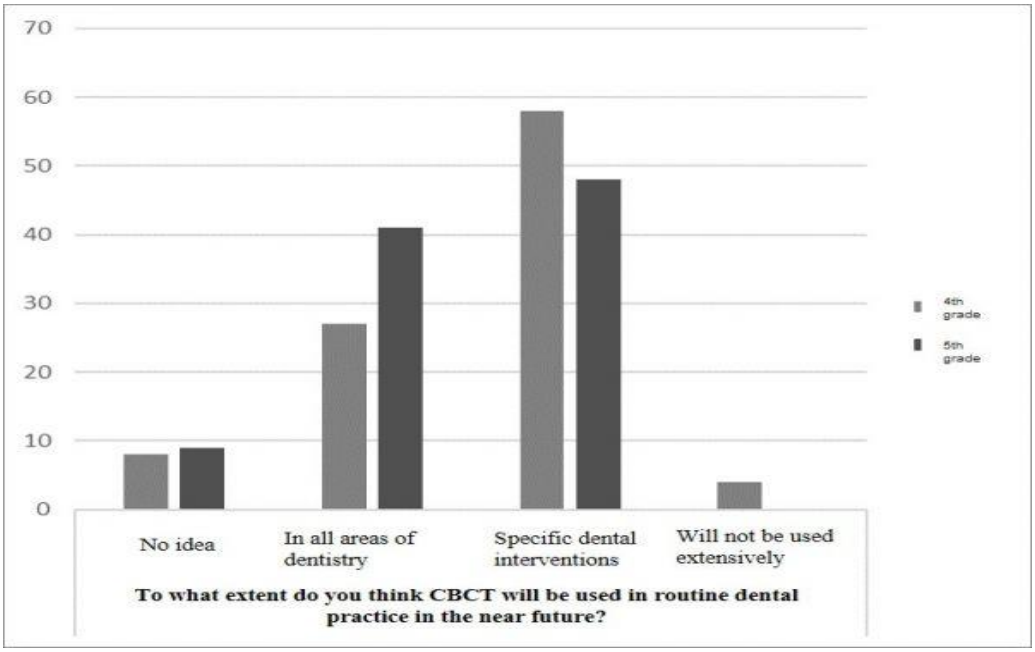

Figure 1. To what extent do you think CBCT will be used in routine dental practice in the near future?

Among 4th and 5th grade students, a higher proportion of 5th grade students answered “Yes” to the question “Do you prefer to use CBCT in future professional clinical life?” (Fisher's Exact p <0.05) (Table 1). A significantly higher proportion of 5th grade students answered “Implant cases”, “Evaluation of patients with cysts and tumors” and “Which cases would you prefer to use CBCT in future clinical life?” (Fisher's Exact p <0.05) (Table 1) (Figure 2). In men, a significantly higher proportion of 4th grade students answered “Lack of film processing" to the question “Indicate your reason or reasons for using digital radiography techniques” (Fisher's Exact p <0.05) (Figure 3). In women, a significantly higher rate of 4th grade students disagreed with the statement “Do you think using digital techniques increases film repetition?” when compared with 5th grades (Fisher's Exact p <0.05).

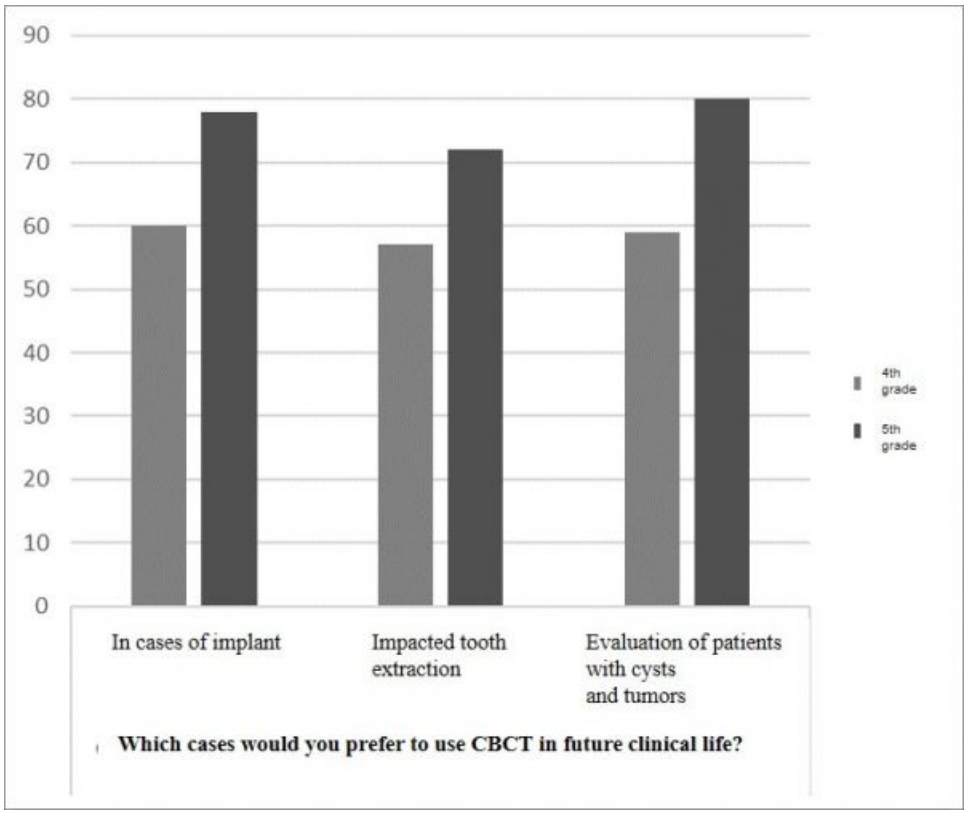

Figure 2. Which cases would you prefer to use CBCT in future

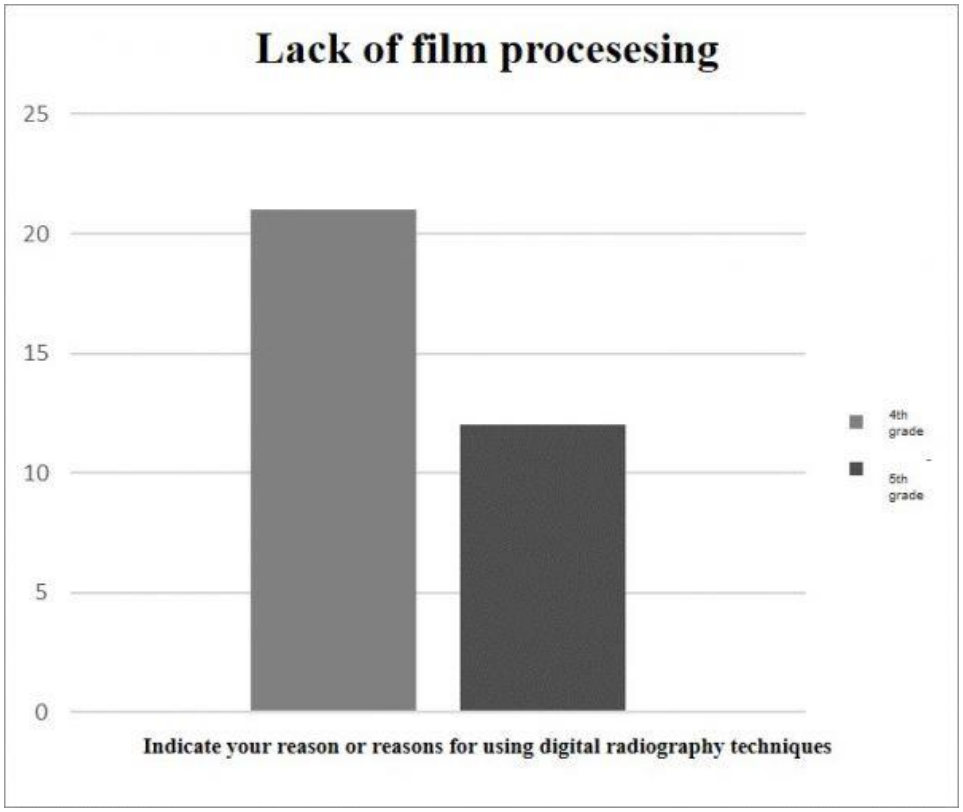

Figure 3. Indicate your reason or reasons for using digital radiography techniques (men)

DISCUSSION

This study used a questionnaire to assess the knowledge level and attitudes of dental students about digital radiography and CBCT. Digital radiography benefits include elimination of the developing process, easy to store images, shorter performance time and facility of electronic storage. [18,19]

In a study conducted among dentists, the most highly rated results were time saving (87%) and eliminating processing problems.[20] Peciuliene et al.[17] reported that dentists who have replied the questionnaire used digital radiography as a diagnostic tool at all times or frequently. Moreover, recently graduated dentists stated that they used digital radiographs more than other colleagues.

The question "Do you think the use of digital technique increases the repetition of film shots?" in the study conducted by Shah and Venkatesh [16] showed that there were no significant differences between the 4th and 5th grades. However, in our study the disagreement was 61.5% in 4th grade students and this rate was found to be 40.2% in 5th grades.

In the study of Shah and Venkatesh [16], the knowledge levels and attitudes of dentistry students about CBCT were evaluated. In their study, the question "To what extent do you intend to use CBCT in routine dental practice in the near future?" portrayed that there was no significant difference between the 4th and 5th grade responders. In our study, while 41% of the 5th grade respondents answered "in all areas of dentistry", this rate was 27% in the fourth grades.
In the same study, the ratio of the 5th grade students who responded "in the doctorate / specialization period" to the question "According to you, in which year of training of dentistry should be taught on CBCT? was found to be higher with 18.75% compared to the 4th grade students. Similarly, in our study, the ratio of the same response was found to be higher in 5th grades.

Moreover, in our study the percentage of 5th grade students (85.7%) those who agreed with the question "Do you prefer to use CBCT in future professional clinical life? was higher than the 4th grade students (64.9%). However, Shah and Venkatesh [16] concluded that there were no significant differences between the grades in their study.

The answers "Evaluation of patients with cysts and tumors", implant cases" and "impacted tooth extraction" to the question "Which cases would you prefer to use CBCT in future clinical life?" were found to be higher in the 4th grade students in a study.[16] However, in our study, it was found that the rate was higher in 5th grade students.

CONCLUSION

In conclusion, the present study shows that there is no statistically significant difference between 4th and 5th grade students in terms of digital radiography techniques preferred. Since 5th grade respondents have received more than one year of experience in and learn more about CBCT, because of the high rate of participation in courses and seminars, have been shown to have a more positive approach. In order to increase the level of knowledge of the 4th grades and all other students and to reach more accurate information about CBCT, additional courses can be given

in dental faculties, and at the same time, participation in seminars can be encouraged to increase their level of knowledge.

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