Yazışma adresi
Correspondence address

Rıdvan AKYOL
Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Nuh Naci Yazgan University, Kayseri, Turkiye.

ridvanakyol10@gmail.com

(iD) **Rıdvan AKYOL**
Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Nuh Naci Yazgan University, Kayseri, Turkiye

(iD) **Fatma AKKOCA**
Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Dokuz Eylul University, İzmir, Turkiye

Evaluation of Cone Beam Computed Tomography Videos on YouTube

YouTube'daki Konik Işınlı Bilgisayarlı Tomografi Videolarının Değerlendirilmesi

ABSTRACT

Objectives:

Cone beam computed tomography (CBCT) is an imaging modality that plays an important role in dental practice. However, it is unclear whether videos with adequate and accurate information are available on a platform such as YouTube. The aim of this study was to determine whether CBCT videos posted on YouTube are indeed a valuable source of information.

Material and Methods

During the data collection process, we analyzed Google Trends searches using the keywords "*cone beam computed tomography (in Turkish)*", "*dental tomography (in Turkish)*", and "*tooth tomography (in Turkish)*" over the last 5 years. Then, 168 videos were analyzed as a result of searches on YouTube with these keywords. Among these videos, 48 were included in the study according to certain criteria. The number of view, viewing times, number of like, interaction index and viewing rate of the included videos were calculated. The upload source of the videos was categorized as clinic, dentist, educational channel, commercial, professional organization and TV channel. According to the upload source of the videos, the image quality, sound quality, narrator, purpose of the video, usefulness scoring and Global Quality Scale were evaluated.

Results

The average number of views of the analyzed videos was determined as 1559.95, while the standard deviation value was determined as 2435.30. The average interaction index was 1.58, and the standard deviation value was 1.77. The average view rate was 377.55, and the standard deviation value was 956.88. Significant relationships were found between the upload source of the videos and the duration of the video, the number of subscribers of the channel that uploaded the video, and the number of likes ($p = 0.016$, $p = 0.021$, $p = 0.030$, respectively). In addition, when the videos were evaluated in terms of their usability levels, significant relationships were found between the duration of the video, the number of likes, and the interaction index ($p = 0.001$, $p = 0.009$, $p = 0.015$, respectively).

Conclusion

This study reveals that CBCT videos posted on YouTube are generally of low quality and not informative. This highlights the need for reliable sources of information for dentists, patients, and future dentists.

Key Words

Cone beam computed tomography, Social media, Radiology

ÖZ

Amaç

Konik ışınlı bilgisayarlı tomografi (KIBT), diş hekimliği pratiğinde önemli rol oynayan bir görüntüleme yöntemidir. Ancak, YouTube gibi bir platformda bu konuda yeterli ve doğru bilgilere sahip videoların bulunup bulunmadığı belirsizdir. Bu çalışmanın amacı, YouTube'da yayınlanan KIBT videolarının gerçekten değerli bir bilgi kaynağı olup olmadığını belirlemektir.

Gereç ve Yöntemler

Çalışmanın veri toplama sürecinde, "*konik ışınlı bilgisayarlı tomografi*", "*dental tomografi*" ve "*diş tomografisi*" anahtar kelimeleri kullanılarak Google Trends aracılığıyla son 5 yılda yapılan aramalar incelenmiştir. Ardından, YouTube'da bu anahtar kelimelerle yapılan aramalar sonucunda 168 video incelenmiştir. Bu videolar arasından belirli kriterlere göre 48 video çalışmaya dahil edilmiştir. Dahil edilen videoların izlenme sayısı, izlenme süresi, beğeni sayısı, etkileşim indeksi ve izlenme oranı hesaplanmıştır. Videoların yüklenme kaynağı, klinik, diş hekimi, eğitim kanalı, ticari, mesleki örgüt ve TV kanalı olarak kategorize edilmiştir. Videoların yüklenme kaynağına göre görüntü kalitesi, ses kalitesi, dış ses, videonun amacı, kullanışlılık skorlaması ve Global Kalite Skalası çerçevesinde değerlendirilmiştir.

Bulgular

Analiz edilen videoların ortalama izlenme sayısı 1559.95 olarak belirlenirken, standart sapma değeri 2435.30 olarak belirlenmiştir. Etkileşim indeksi ortalaması 1.58, standart sapma değeri ise 1.77'dir. İzlenme oranı ortalaması 377.55 olup, standart sapma değeri 956.88'dir. Videoların yüklenme kaynağı ile videonun süresi, videoyu yükleyen kanalın abone sayısı ve beğeni sayısı arasında anlamlı ilişkiler bulunmuştur (sırasıyla p = 0.016, p = 0.021, p = 0.030). Ayrıca, videoların kullanışlılık düzeyleri açısından değerlendirildiğinde, videonun süresi, beğeni sayısı ve etkileşim indeksi arasında anlamlı ilişkiler saptanmıştır (sırasıyla p = 0.001, p = 0.009, p = 0.015).

Sonuç

Bu çalışma, YouTube'da yayınlanan KIBT videolarının genellikle düşük kalitede olduğunu ve bilgilendirici olmadığını ortaya koymaktadır. Bu durum, diş hekimleri, hastalar ve diş hekimi adayları için güvenilir bilgi kaynaklarına olan ihtiyacı vurgulamaktadır.

Anahtar Sözcükler

Konik ışınlı bilgisayarlı tomografi, Sosyal medya, Radyoloji

INTRODUCTION

In dental practice, cone beam computed tomography (CBCT) is an essential diagnostic imaging technique. X-rays are used in this radiography procedure to obtain three-dimensional images of the patient's oral and maxillofacial areas (1). Depending on the acquisition device brand and field of view, the radiation dosage of a CBCT scan is lower than that of a computed tomography (CT) scan (2,3). CBCT is commonly used in dentistry for implant surgery, impacted tooth extraction, cyst and tumor operation, ort- hognathic surgery, mandibular and maxillary fracture, and a variety of other dental treatments (1). The relevance of CBCT for implant surgery is that it gives comprehensive volumetric vision of the area where the implant will be put. Important characteristics such as jawbone quality, density, and shape may be studied in this manner (4). Another advantage of CBCT is that it is possible to obtain information about the location and relationships of sensitive areas such as anatomical structures and nerves. These detailed images are of great importance to determine the optimal position of the implant and to minimize the risk of complications during the surgical procedure (5).

YouTube is the world's largest video sharing platform, that many people use to access and learn information. Dental students, dentists, researchers, and other interested people can easily share medical information with each other on this platform due to its anonymous accessibility and fluent interface (6). YouTube is frequently used in healthcare for patient information and education purposes. Therefore, researchers have investigated the quality of content on YouTube on a variety of health topics, such as dental anxiety, dental implant failure, and digital dentistry (7-9).

The aim of this analysis is to determine whether these YouTube videos are indeed a valuable source of information for dentists and other interested individuals. Our primary null hypothesis is that the informative capacity of existing YouTube videos about CBCT for dentists and patients is low. Our secondary null hypothesis is that the information content quality of these videos will vary depending on the source that uploaded them.

MATERIAL and METHODS

Ethical approval was received from the Nuh Naci Yazgan University Scientific Research and Publication Ethics Committee on July 20, 2023, with decision number 2023/007-003 to examine YouTube videos in this study. The study was conducted in accordance with the princip- les of the Declaration of Helsinki. The study is a descriptive type of research and was designed as a retrospective analysis of video recordings.

Since the videos analyzed in the study will be in Turkish, searches made in Turkish on Google Trends were taken into consideration. During the data collection process (16-17 August 2023), Google Trends was searched for the last 5 years using the keywords *"cone beam computed to-*

mography (konik ışınlı bilgisayarlı tomografi)”, “dental tomography (dental tomografi)” and *“tooth tomography (diş tomografisi)”*. According to Google data, the average of *“dental tomography”* and *“tooth tomography”* search-es were found to be close. However, searches for the keyword *"cone beam computed tomography"* were minimal (Figure 1).

Turkey ▾   Last 5 years ▾   All categories ▾   Youtube search ▾

Interest Shown Over Time ⑦

● Dental tomography   ● Tooth tomography   ● Cone beam computed tomography
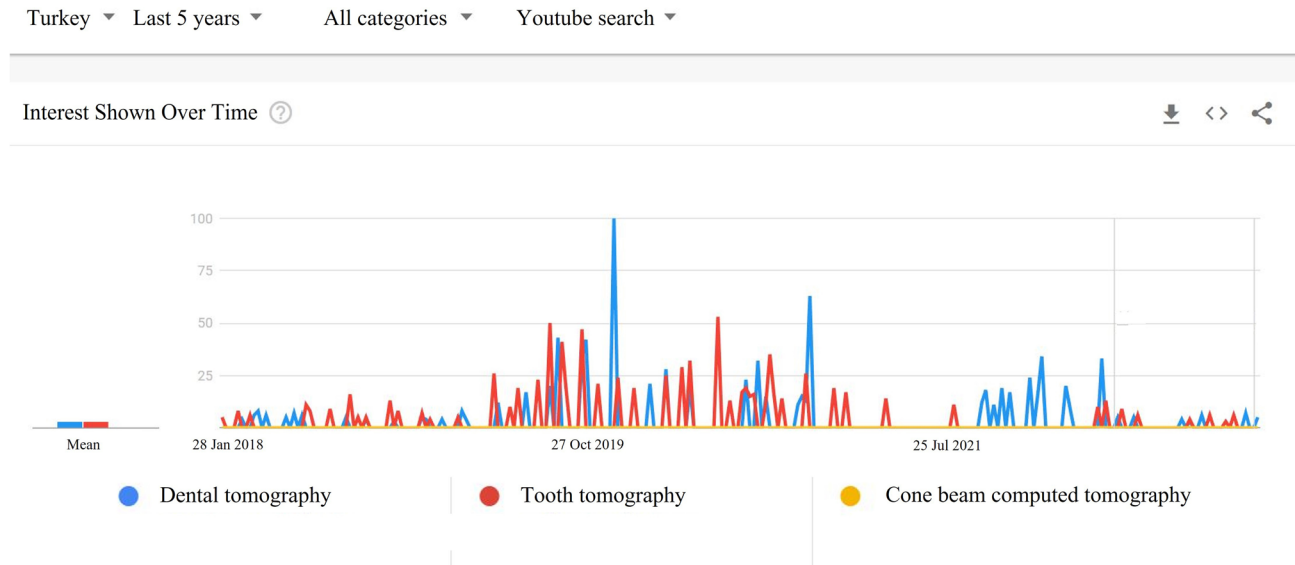
Figure 1. Interest shown over time of keywords in Google Trends for the last 5 years

Since there was no clear dominance of any one keyword over the others, separate searches were performed for each of the three keywords. All videos in these searches were included in the study. However, the same videos were evaluated only once.

YouTube search and viewing histories have been deleted so that previous searches and videos have watched do not affect the result. Search results were sorted according to the number of views, and a watchlist was created for 168 videos on YouTube. When these videos were analyzed, 120 videos were excluded from the study. The scheme showing the exclusion criteria for the videos is shown in detail in Figure 2.

IDENTIFICATION *n*=168

All videos identified by searching:
(cone beam computed tomography, dental tomography, tooth tomography)
n=168

EXCLUDED *n*=120

Irrelevant (*n*=40)   Advert (*n*=42)
No narration (*n*=19)   Language is not Turkish (*n*=6)
Other dental treatments (*n*=12)   YouTube shorts (*n*=1)
Duplication (*n*=0) Comment closed video (*n*=0) No sound or title (*n*=0)

INCLUDED *n*=48
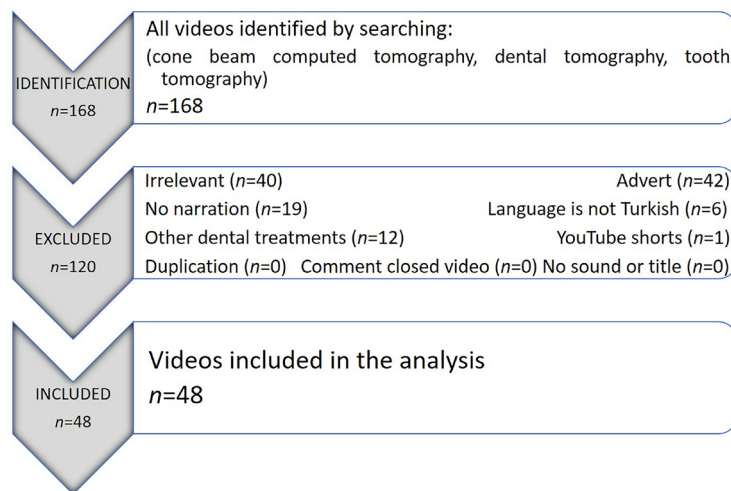
Videos included in the analysis
n=48

Figure 2. Diagram showing the identification of videos in the study group

The number of views, video duration (minute), time after uploading (day), number of subscribers of the uploading channel, number of likes, number of dislikes, number of comments, number of positive comments, number of negative comments, number of comments asking questions related to the topic, interaction index, and viewing rate were calculated for the 48 videos included. In addition, the content quality of the videos was also evaluated separately according to the global quality scale (GQS) score (10) and the usefulness score11 inspired by previous studies (Table 1).

The interaction index was calculated by subtracting the number of dislikes from the number of likes, dividing this result by the total number of views, and then converting it to a percentage. The viewing rate was determined by dividing the number of views by the number of days since the video was uploaded, and then converting this result to a percentage (12).

In addition, the analyzed videos were evaluated under different parameters according to the uploading source, pur-

Table 1. Definitions of global quality score and usefulness score

GQS Score	GQS Description	Usefulness Score		Score
1	Poor quality, poor flow of video, most information missing, not at all useful for patients	Description		1
		Device features		1
2	Generally poor quality and poor flow, some information listed but many important topics missing, of very limited use to patients	Intended use		1
		Principle of operation of the device		1
3	Moderate quality, suboptimal flow, some important information adequately discussed but others poorly discussed, somewhat useful for patients	Comparison with CT		1
		Patient positioning		1
4	Good quality and generally good flow, most of relevant information listed but some topics not covered, useful for patients	Radiation protection measures		1
		Reporting-results		1
5	Excellent quality and flow, very useful for patients	Total score: 0-2: Not Useful 3-4: Slightly Useful	5-6: Moderately Useful 7-8: Very Useful	

GQS: Global quality scale, CT: Computed tomography

pose, audio quality, image quality, and narrative type. The list of these evaluation criteria is given below:

1. According to the uploading source: Clinics, dentists, education channels, commercial, professional organizations and television channels. Clinic; information videos of polyclinics or dental hospitals, dentists; information videos of a doctor who work on own clinic, education channel; lecture videos on dentistry education, videos of online symposiums and conferences, commercial; videos that include product promotion and usage of products marketed by companies that aim to popularize their brand and gain customers, professional organizations; videos uploaded by organizations such as the chamber of dentists to keep their colleagues up to date, TV channels, videos that include an interview, panel discussion or public service announcement made on TV channels to inform the public about the subject.

2. According to purpose: Education, patient information, and general information presentation. Education; videos that include lessons and presentations that will contribute to the professional development of dentistry students and dentists, patient information; videos that inform individuals about the subject in the simplest way, general information presentation; videos that provide a wide range of information from the technical features of the device to its use.

3. According to sound quality: Good, moderate, and poor. Good; audio quality that is clear and free of distortion and background noise, allowing viewers to understand the content, moderate; audio quality that is generally clear, but sometimes has slight distortions or background noise that do not significantly interfere with the ability to understand

the content, poor; audio quality that is loud, distorted, or muffled, allowing viewers to understand the information presented.

4. According to image quality: 1080p, 720p, 480p, and 240p.

5. By type of narration: Narration by a healthcare professional and narration using an external voice. Healthcare professional; explanations made by a dentist, specialist dentist or radiologist appearing in person on the screen, external voice; narrations mounted in the background of a video, explaining and about the content of the video.

Review of videos
The videos were independently reviewed by two separate oral and maxillofacial radiologists (R.A. - F.A.). Both observers made a final decision together when there was disagreement on parameters with categorical values. Furthermore, descriptive numerical values were determined and recorded by only one observer (F.A.).

Statistical analysis
IBM SPSS Statistics v.22 software package (IBM Corp., Armonk, NY) was used for statistical analysis. The mean, standard deviation, minimum, and maximum values were indicated for descriptive statistics. The Shapiro-Wilk test was used to evaluate the normal distribution of the data. The chi-square test was used for statistical analysis of categorical variables. The Kruskal-Wallis test was preferred for comparing multiple quantitative values. Cohen's Cappa Coefficient was used to assess inter-observer agreement in the reliability of categorical data. The threshold value for statistical significance was accepted as $P < 0.05$.

RESULTS

In the study, the Cohen Kappa Coefficient in the parameters with categorical variables evaluated by the observers was as follows: GQS score; 0.91, usefulness score; 0.88, audio quality; 0.85, the narrator; 0.98, purpose of the video; 0.92.

All values showed perfect agreement. Results regarding the general characteristics of the analyzed videos are shown in Table 2.

The analysis of the prominent features according to the source uploading the video is presented in Table 3.

Table 2. Characteristics of the analyzed YouTube videos ($n = 48$)

	Mean	Sd	Q1	Median	Q3	Max	Min
Viewed number	1559.95	2435.30	179.5	729	1750	11000	6
Video duration (minute)	17.02	32.28	0.54	2.69	11.23	130	0.21
Time after uploading (day)	738.77	614.02	365	365	1095	2920	21
Number of subscribers	6586.95	20366.32	124.25	1285	2880	123000	1
Number of likes	39.93	143.78	1	4	16.5	904	0
Number of dislikes	0	0	0	0	0	0	0
Number of comments	2.16	6.31	0	0	1	34	0
Number of positive comments	0.41	1.51	0	0	0	10	0
Number of negative comments	0.04	0.20	0	0	0	1	0
Number of questioned comments	0.89	3.19	0	0	0	18	0
Interaction index	1.58	1.77	0.25	1.24	2.39	9.04	0
Viewing rate	377.55	956.88	48.23	87.94	301.36	6222.22	1.64

n: Number, Sd: Standard deviation, Q1: Quartile 25%, Median: Quartile 50%, Q3: Quartile 75%, Max: Maximum, Min: Minimum

Table 3. Evaluation of the general characteristics of the video according to the source that uploaded the video

	Clinic (n=16)	Dentist (n=5)	Education Channel (n=9)	Commercial (n=11)	Professional Organization (n=5)	Television Channel (n=2)	p
Mean±Sd (Q1-Median-Q3)							
Viewed number	937.81±1501.06 (51-270-1100)	4338.4±4876.97 (223-2400-7900)	880.66±580.78 (729-729-1000)	2038.72±3002.89 (121-769-3600)	1450.8±733.62 (1000-1600-1600)	287.5±129.4 (196-288-379)	0.260
Video duration (minute)	2.52±4.52 (0.52-1.21-2.59)	4.56±3.51 (2.35-4.21-4.58)	33.86±46.46 (0.45-0.54-56.03)	6.21±7.62 (0.53-3.20-10.57)	75.51±36.06 (73-77-98)	1.64±0.56 (1.24-1.64-2.04)	0.016a *
Time after uploading (day)	627.87±761.75 (225-365-730)	680.0±673.82 (330-365-730)	1013.88±540.69 (365-1460-1460)	743.63±522.72 (365-730-1095)	577.0±493.84 (365-365-365)	912.5±258.09 (730-913-1095)	0.242
Number of subscribers	8089.93±30647.23 (12-127-1133)	15741.6±28729.65 (79-1290-10800)	2492.22±801.21 (2170-2170-3470)	4893.27±10486.35 (380-2870-2880)	2081.6±1216.78 (1120-2500-3150)	10681.5±14875.4 (163-10682-21200)	0.021a *
Number of likes	5.25±8.37 (1-2-6)	104.0±197.55 (4-11-46)	9.88±12.56 (1-3-23)	93.0±269.82 (1-6-10)	39.0±29.93 (15-31-47)	3.0±1.41 (2-3-4)	0.030a *
Interaction index	1.31±1.39 (0.25-0.71-2.43)	1.77±1.52 (0.58-1.35-2.37)	0.91±0.97 (0.14-0.30-1.45)	2.08±2.93 (0.10-0.56-3.45)	2.51±0.79 (1.94-2.71-2.94)	1.28±1.06 (0.53-1.28-2.04)	0.317
Viewing rate	493.31±1532.29 (26.80-73.29-213.73)	800.52±973.77 (131.51-148.67-1506.85)	130.3±120.22 (49.93-68.49-262.19)	284.52±402.35 (28.22-91.32-493.15)	370.91±272.98 (151.78-438.36-438.36)	34.9±24.05 (17.90-34.91-51.92)	0.173

n: Number, Sd: Standard deviation, Q1: Quartile 25%, Median: Quartile 50%, Q3: Quartile 75%, a: Kruskal-Wallis test, *: p<0.05

The duration of videos uploaded by professional organizations was found to be statistically significantly longer (p = 0.016). In the comparative analysis of uploading sources, statistically significant differences were found in terms of the number of subscribers (p = 0.021) and the number of likes (p = 0.030). Videos uploaded by dentists had the highest values in these two parameters. In terms of the number of views, videos uploaded by dentists also had the highest values, but this did not show a statistically significant difference (p = 0.260).

Based on our content quality scoring, Table 4 presents the data evaluating the overall characteristics of the videos. Considering this data, it is observed that videos classified as *"very useful"* have a longer duration, which is statistically significant ($P < 0.001$).

Table 4. Evaluation of general characteristics of videos according to usefulness scores

	Very Useful (n=6)	Moderately Useful (n=5)	Slightly Useful (n=8)	Not Useful (n=29)	p
Mean±Sd (Q1-Median-Q3)					
Viewed number	1432.0±808.72	2552.8±4212.78	1935.37±3716.27	1311.68±1888.55	0.589
	(638-1350-2200)	(103-1000-1600)	(185-496-1550)	(169-729-1000)	
Video duration (minute)	86.87±35.96	20.18±30.15	4.52±3.85	5.47±12.42	<0.001a*
	(77-88-112)	(3.21-4.05-17.57)	(2.14-3.12-7.30)	(0.49-1.17-2.35)	
Time after uploading (day)	480.83±193.47	588.2±548.06	448.12±316.97	898.27±699.54	0.355
	(365-365-730)	(365-365-730)	(258-365-548)	(365-730-1460)	
Number of subscribers	2054.66±1174.13	2013.0±1364.67	16357.75±24102.04	5617.89±22674.29	0.177
	(1170-2025-3150)	(1120-2870-2880)	(538-2880-28750)	(39-1170-2170)	
Number of likes	35.5±28.6	191.4±398.51	61.0±159.63	8.93±16.56	0.009*
	(15-28-47)	(6-15-31)	(3-5-8)	(1-2-9)	
Interaction index	2.34±0.87	3.98±3.34	1.54±1.53	1.03±1.22	0.015a*
	(1.41-2.49-2.94)	(1.64-1.94-5.83)	(0.43-0.95-2.74)	(0.14-0.46-2.08)	
Viewing rate	339.64±239.27	439.08±546.48	349.38±497.61	382.55±1192.02	0.084
	(151.78-301.37-438.36)	(68.49-290.48-438.36)	(32.79-179.68-424.66)	(40.37-68.49-131.51)	

n: Number, Sd: Standard deviation, Q1: Quartile 25%, Median: Quartile 50%, Q3: Quartile 75%, a: Kruskal-Wallis test, *: p<0.05

The number of likes for *"moderately useful"* videos showed the highest value, which is statistically significant (p = 0.009). Likewise, in terms of engagement index, *"moderately useful"* videos have higher values, with a significant difference (p = 0.015).

According to the determined content quality score, there was a statistically significant difference between the sources uploading the video (p = 0.003). Videos uploaded by professional organizations had the highest percentage of uploading sources where the content quality was *"very useful"*. The GQS scoring revealed similar findings and a statistically significant difference was observed between the groups (p = 0.035) (Table 5).

Table 5. Evaluation of global quality score and usefulness scores according to the source that uploaded the videos

	Clinic (n=16)	Dentist (n=5)	Education Channel (n=9)	Commercial (n=11)	Professional Organization (n=5)	Television Channel (n=2)	p
n (%)							
Usefulness Score							
Very Useful	0 (0.0)	0 (0.0)	2 (22.22)	1 (9.09)	3 (60.0)	0 (0.0)	
Moderately Useful	1 (6.25)	0 (0.0)	0 (0.0)	2 (18.18)	2 (40.0)	0 (0.0)	0.003a*
Slightly Useful	1 (6.25)	2 (40.0)	0 (0.0)	4 (36.36)	0 (0.0)	1 (50.0)	
Not Useful	14 (87.5)	3 (60.0)	7 (77.77)	4 (36.36)	0 (0.0)	1 (50.0)	
GQS Score							
1	1 (6.25)	1 (20.0)	1 (11.11)	0 (0.0)	0 (0.0)	1 (50.0)	
2	11 (68.75)	3 (60.0)	5 (55.55)	4 (36.36)	0 (0.0)	1 (50.0)	0.035a*
3	4 (25.0)	1 (20.0)	1 (11.11)	5 (45.45)	1 (20.0)	0 (0.0)	
4	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.09)	2 (40.0)	0 (0.0)	
5	0 (0.0)	0 (0.0)	2 (22.22)	1 (9.09)	2 (40.0)	0 (0.0)	

n: Number, GQS: Global quality scale, a: Chi-square test, *: p<0.05

Table 6 presents the qualitative characteristics of the videos according to the sources that uploaded them. According to this table, statistically significant differences were observed in all parameters except audio quality. The most significant differences were found for all sources uploading videos, where the image quality was predominantly 1080p (p = 0.001) and the narration was mostly performed by healthcare professionals (p = 0.013). A statistically significant difference was also found between the groups in the evaluation of the videos according to the purpose of the videos ($P < 0.001$) (Table 6).

Table 6. Evaluation of the features of the videos according to the source that uploaded the videos

	Clinic (n=16)	Dentist (n=5)	Education Channel (n=9)	Commercial (n=11)	Professional Organization (n=5)	Television Channel (n=2)	p
n (%)							
Image Quality							
1080p	16 (100.0)	4 (80.0)	8 (88.88)	10 (90.90)	3 (60.0)	1 (100.0)	
720p	0 (0.0)	1 (20.0)	1 (11.11)	0 (0.0)	2 (40.0)	0 (0.0)	0.001^{a*}
480p	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.09)	0 (0.0)	0 (0.0)	
240p	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	
Audio Quality							
Good	3 (18.75)	0 (0.0)	2 (22.22)	2 (18.18)	0 (0.0)	0 (0.0)	
Moderate	9 (56.25)	2 (40.0)	6 (66.66)	7 (63.63)	5 (100.0)	1 (50.0)	0.478^{a}
Poor	4 (25.0)	3 (60.0)	1 (11.11)	2 (18.18)	0 (0.0)	1 (50.0)	
The Narrator							
Healthcare Professional	15 (93.75)	5 (100.0)	9 (100.0)	6 (54.54)	5 (100.0)	2 (100.0)	0.013^{a*}
External Voice	1 (6.25)	0 (0.0)	0 (0.0)	5 (45.45)	0 (0.0)	0 (0.0)	
Purpose of the Video							
Education	0 (0.0)	2 (40.0)	9 (100.0)	1 (9.09)	5 (100.0)	0 (0.0)	
Patient Information	16 (100.0)	3 (60.0)	0 (0.0)	9 (81.81)	0 (0.0)	2 (100.0)	<0.001 ^{a*}
General Information	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.09)	0 (0.0)	0 (0.0)	

n: Number, Sd: Standard deviation, ^{a}: Chi-square test, *: p<0.05

DISCUSSION

YouTube has become a platform that facilitates many patients searches for information about healthcare services. In particular, the process of searching for information about medical imaging technologies such as dental tomography can help patients better understand their treatment process. However, the quality, accuracy, and reliability of videos on YouTube can be a significant issue.

Despite a substantial body of research examining the quality and educational value of online videos on various dental radiology topics (10,11), to our knowledge, there are no academic studies that specifically address the content and quality of YouTube videos about CBCT. Previous investigations have evaluated the quality of YouTube videos on artificial intelligence in dental radiology (13), assessed the safety of dental X-rays through content analysis of English and Chinese YouTube videos (14), and explored the use of social media platforms such as WhatsApp and Instagram as educational tools in oral radiology (15,16). These studies highlight the potential of online and social media platforms for dental information; however, they do not specifically focus on CBCT. Consequently, there is a significant gap in the literature regarding the evaluation of YouTube videos about CBCT. To ascertain whether these videos are useful educational tools for dentists and other interested people, a qualitative analysis is required.

Today, patients often prefer dental implants for the rehabilitation of missing teeth. Dental implants are therefore frequently searched for on search engines and video platforms. Patients researching dental implants learn that implant surgery is planned with CBCT in the preparation phase. After this stage, patients start to search for information about CBCT. Unfortunately, it was reported in the results of our research that there are not enough informative videos for patients who are looking for the technique, duration, cost, radiation dose, and answers to all kinds of questions in their minds on these channels. Dentists and dental students frequently use these outlets to learn about

CBCT. What this article has shown, nevertheless, is that there are not many videos that offer thorough and in-depth material that meets their educational and professional demands. Most of the videos reviewed were of low quality and lacked scientific accuracy and presentation skills. In addition, the majority of the videos covered only one technical topic and did not include other topics. Cesur Aydın *et al*. (13) evaluated the popularity, content, and educational quality of artificial intelligence in dental radiology in YouTube videos. As a result, a limited number of reliable and high-quality video content on this topic on YouTube was mentioned. Uzel *et al*. (17) investigated whether pediatric dentistry education videos on YouTube could be used as a source of information and found that there were no Turkish videos on the platform that could support the education of dentistry students.

Previous studies (18-20) have evaluated YouTube videos showing how to take periapical radiographs in the context of Oral and Maxillofacial Radiology, evaluated YouTube videos describing anatomical structures on panoramic radiographs, and evaluated YouTube videos on preparation and positioning procedures during the shooting phase of panoramic radiographs. However, as mentioned earlier, to the best of our knowledge, there are no articles on CBCT videos. Based on Google Trends data, as mentioned in the methodology section of the study, the keyword "cone beam computed tomography" was the least searched term. This indicates a low proportion of searches for the correct name of the device in question. Even the video with the highest number of views among the videos analyzed reached a relatively low audience of 11.000 viewers. Likewise, the number of subscribers, likes, and comments of the channels that uploaded the video is also low, indicating less engagement than standard videos on a platform like YouTube. These findings suggest that the public is not paying enough attention to this issue and is therefore not well-informed about it.

The highest number of views was reached if the video was uploaded by dentists. Although this does not constitute a significant difference, it is higher than other uploading sources. This may be due to the fact that videos uploaded by dentists contain more accurate information. When looking at the video duration, it is expected that the videos uploaded by professional organizations will be longer, followed by education channels. It is usual for education channels and professional organizations to provide much more detailed information about CBCT. When looking at the number of subscribers to the source that uploaded the videos and the number of likes on the videos, the dentists group stands out at a level that creates a significant difference. In addition to the interpretation of the number of views, it can also be said that dentists are the group that the videos generally address. Another reason for the high number of subscribers to dentists' channels may be that other people who want to get information on this subject trust dentists' videos more.

When the descriptive data of the videos were evaluated according to information quality, it was observed that the duration of very useful videos was significantly higher. This suggests that longer videos are informative enough to include more technical details about the device. Although there is no statistically significant result in terms of the number of views, the lowest number of views is for the non-useful videos. There is no significant relationship between the number of subscribers of the channel uploading the videos, the number of likes, the interaction index, and the viewing rate of the videos, and the quality level of the videos. Videos on any topic can be uploaded to YouTube uncontrollably without checking the accuracy and authenticity of the videos. Yeung et al. compared English and Chinese videos on YouTube about the safety of x-rays in dentistry. The study's findings showed that YouTube videos contained misinformation, most notably a Chinese video claiming that x-rays in dental radiology were non-ionizing radiation (14).

In this study, the GQS and usefulness scores aim to evaluate the educational value and information content of the videos. Significant differences were found in GQS and usefulness scoring assessments, according to the sources that uploaded the videos. Videos uploaded by professional organizations were found to be of the highest quality in terms of both GQS and usefulness scoring. This may be due to the fact that these videos were prepared by experts in the field. Dentists tend to provide simple and understandable information to inform patients. Likewise, clinical accounts have published videos on the use of CBCT to obtain three-dimensional images during the construction of implants. Videos from commercial sources are often focused on product promotion. These videos discussed product features and used marketing strategies. However, it was observed that videos uploaded from commercial sources may not be objective and may have limitations in terms of information content quality. Television channels

offer videos that appeal to a wide audience. However, it was observed that detailed information on specific topics, such as CBCT was not available on these channels. The poor content quality of the videos uploaded by educational channels suggests that these channels have limitations in terms of information content and educational quality. These scorings include some subjective factors due to the nature of the assessment. Although high rates of agreement between observers (Cohen kappa coefficient) attempt to reduce this problem, the criteria used for scoring need to be understood and objective assessment methods need to be developed. As a result of these results, our first null hypothesis is partially rejected. The second null hypothesis is accepted.

Hassona *et al.* (12) investigated whether YouTube could be a source of information for oral cancers. In this study, no significant relationship was found between the length of the videos, interaction index and viewing rate and their usefulness levels. In our study, there was a significant difference between the length of the videos, interaction index, and their usefulness levels. This may be due to the greater interest in this area due to the use of CBCT before implant planning or in cases such as oral cancer, cyst, and tumors.

It is usual that the vast majority of videos are in 1080p quality due to the ability of many devices today, including cell phones, to record high-quality video. However, in terms of sound quality, the videos are inadequate. Therefore, it may be recommended that in future videos, the narrator pay attention to the use of a microphone or record in an environment with less external noise. In terms of the narrators of the videos, healthcare professionals are statistically significantly higher. However, the fact that the ratio of healthcare professionals and external voices is close to each other in commercial videos may be due to the fact that videos with product promotion content do not need healthcare professionals. When evaluated according to the purpose of the video, it is seen that videos uploaded by education channels and professional organizations are more education-oriented. Other sources, on the other hand, uploaded videos aiming to inform patients. This creates a significant difference between the sources.

People may face serious difficulties when discovering inaccuracies in the contents and problems with scientific validity in social media videos. On the basis of inadequate information, patients in particular may generate mistaken expectations for their course of treatment, which could have a negative influence on their ability to make true decisions. Furthermore, it is possible that students will learn false information if these videos are used in dental education. To reduce these hazards, it is imperative that online dental video contents be accurate, as evidenced by the body of existing literature.

The limitations of this study can be listed as follows: Video uploads on the platform: Given that thousands of videos are uploaded to a platform such as YouTube every day, it can be considered a limitation that this data may change during the study period. That is, the results of the study are based on videos available during the data collection period and may not include later videos.

Language limitation: It can be stated that only Turkish videos were evaluated in the study. This means that videos in other languages were not included in the study. Therefore, it should be taken into account that the results obtained due to language limitations may be limited in terms of generalizability.

Search and ranking algorithms: Even if the content of the videos includes CBCT, if the phrase CBCT is not included in the video title or description, the video may not be included in the study group. The fact that internet users also use other search engines or video platforms may prevent Google Trends data from reflecting the characteristics of the general population. Another reason that may prevent the results from being generalized is that the algorithms of a site like Google, which is constantly updated, can change over time. For this reason, our perspective should be broader in the evaluation phase of such studies.

These constraints may restrict the study's breadth and the generalizability of its findings. Researchers should consider these constraints when evaluating the study's reliability and validity, as well as when interpreting the data and drawing inferences.

CONCLUSION

Although YouTube is a great platform for video material, it lacks sufficient quality content on CBCT. Due to the need for patients, dentists, and future dentists for reliable sources to learn more about CBCT, there is a need to publish more explanatory videos on CBCT.

Ethics Committee Approval

Ethical approval was received from the Nuh Naci Yazgan University Scientific Research and Publication Ethics Committee on July 20, 2023, with decision number 2023/007-003.

Author contribution statement

Study Idea/Hypothesis: R.A., F.A.; Study Design: R.A., F.A.; Data Collection: R.A., F.A.; Literature Review: R.A., F.A.; Statistical Analysis and Interpretation of Results: R.A., F.A.; Article Writing: R.A., F.A.; Critical Review: R.A., F.A.

Conflict of Interest

The authors declare that they have no conflict of interest.

Financial Disclosure

The author declared that this study has received no financial support.

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