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Is YouTube™ an Adequate Source of Information Regarding Endocrowns? A Content-Quality Analysis

YouTube™ Endokuronlarla İlgili Yeterli Bir Bilgi Kaynağı mıdır? İçerik-Kalite Analizi

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ABSTRACT

Objectives: This study aimed to evaluate the content quality and adequacy of information related endocrowns on YouTube™.

Materials and Methods: Using the keyword "endocrown", we searched YouTube™; consequently, 193 videos were included in the study. Only 49 videos met the inclusion criteria and were evaluated for the quality of information using the Video Information Quality Index (VIQI) and Global Quality Scale (GQS).

Results: Most of the videos were uploaded by healthcare professionals (79.2%). Overall, 21% and 28% of the videos were classified as high-content (HC) and low-content (LC) videos. The commonest topic included the types of materials (75.5%), and the least mentioned topic (22.4%) included psychological and psychosocial effects. The HC group showed significantly higher GQS and VIQI scores. A positive correlation was noted between the total content (TC) and VIQI ($p<0.001$) and GQS ($p<0.001$) scores.

Conclusions: The quality of video content about ECs on YouTube™ was found to be insufficient. While most videos include indications for ECs, there are very few videos that mention the complications of ECs.

Keywords: *Dental, Esthetics, Education, Root canal treatment*

ÖZET

Amaç: YouTube sağlıkla ilgili pek çok video içermektedir. "Endokuron" YouTube™'da sıklıkla aranan bir kelimedir. Ancak YouTube™'un endokronlar hakkında bilgi arayan kişiler için yararlı olup olmadığı belirsizdir. Bu çalışma, YouTube™'daki endokronlar ile ilgili bilgilerin içerik kalitesini ve yeterliliğini değerlendirmeyi amaçlamıştır.

Gereç ve Yöntemler: "Endokuron" anahtar kelime olarak kullanıldı ve YouTube™'da arama yapıldı. Sonuç olarak çalışmaya 193 video dahil edildi. Bu videolardan yalnızca 49 video dahil edilme kriterlerini karşıladı ve Video Bilgi Kalitesi İndeksi (VIQI) ve Küresel Kalite Ölçeği (GQS) kullanılarak bilgi kalitesi açısından değerlendirildi. Videolar düşük ve yüksek içerik gruplarına ayrıldı. İstatistiksel analizde Shapiro-Wilk, Mann-Whitney U ve Pearson ki-kare testleri kullanıldı.

Bulgular: Videoların çoğu (%79,2) sağlık çalışanları tarafından yüklenmiştir. Genel olarak videoların %21'i ve %28'i yüksek içerikli ve düşük içerikli videolar olarak sınıflandırıldı. En sık konu materyal türleri (%75,5) olurken, en az bahsedilen konu ise psikolojik ve psikososyal etkileri (%22,4) oldu. Yüksek içerikli grubun GQS ve VIQI puanları önemli ölçüde daha yüksekti. Toplam içerik ile VIQI ($p<0,001$) ve GQS ($p<0,001$) puanları arasında pozitif korelasyon görüldü.

Sonuç: Endokuronlarla ilgili YouTube™ videolarının içeriği yeterli bir bilgi kaynağı olarak değerlendirilemez. Çoğu video endokuronlara ilişkin endikasyonları içerirken ve az sayıda videoda komplikasyonlardan bahsedilmekteydi.

Anahtar Kelimeler: *Dental, Estetik, Eğitim, Kök kanal tedavisi*

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Introduction

Prosthetic rehabilitation of endodontically treated teeth (ETT) with severe coronal damage is a complex treatment procedure due to impaired resistance and retentive properties.[1] Endocrowns (EC) constitute a good treatment method due to their mechanical performance and aesthetic benefits in the treatment of ETT with insufficient structural integrity. In literature, these restorations have been described as bonded overlay restoration with anchorage using the internal portion of the pulp chamber.[2] ECs constitute a relatively easy and inexpensive treatment method that is generally recommended for molars.[3] Compared to traditional post-core retained restorations, the risk of infection is minimized since no procedure is performed in the root canal.[4,5] However, ECs have some limitations. Problems with retention are observed with ECs when the depth of the pulp chamber is less than three mm or the cervical margin is less than six mm.[6] Materials, such as resin composite, nanoceramic resins, lithium disilicate ceramic, zirconia-reinforced ceramic, and hybrid and feldspathic ceramics have been recommended in the production of ECs.[2,7]

YouTube™ (www.YouTube™.com; Google®, San Bruno, California) is one of the largest video-sharing platforms on the internet with almost two billion users. It provides free access to videos for people around the world so that they can search for any information that they are seeking.[9] People benefit from visual presentations during their learning; consequently, YouTube™ has become an alternative educational platform that is used by educators to improve the learning process.[10] In comparison to other social media platforms, on average, YouTube™ users visit the site nine times daily, thus ranking it the second most-visited website worldwide.[11]

As more health-related videos are uploaded daily, the importance and potential effects of these videos have become more apparent.[12] The ease of access helps persons achieve health information literacy. Although individuals trust their clinicians, it is human nature to look for a second opinion.[9] Digital information raises the question of whether it helps or hinders clinical care.[13] In recent years, the number and frequency of uploading health-related videos to YouTube™ has increased considerably, and researchers focus on its importance and potential impact.[12] As an alternative education platform, its use among educators or easy access to information by internet users are very important advantages, but researchers argue that the lack of a standardization for uploading YouTube™ videos will cause serious information pollution.[12,14] Individuals, company or groups can easily upload misleading content on YouTube™.[14] The viewers are unaware of the accuracy, biases, or quality of information. Therefore, uploaders need to be careful about the quality of the content to avoid misleading the viewers.[15] There are various studies in the literature on the quality and relevance of health-related content and whether this open access platform is beneficial and adequate.[12,14,15]

To the best of our knowledge, no study has investigated YouTube™ videos as a source of information on ECs. Therefore, in this study, we aimed to evaluate the quality and adequacy of YouTube™ videos related to ECs.

Materials and Methods

In this study, internet-based videos were evaluated cross-sectionally. To search for the keyword "endocrown" on YouTube™, the Google Trends website data (Google® Trends 2022) was evaluated for a period of one year until June 13.2022. The objective was to examine the content, as well as the quality and sufficiency of information in videos related ECs. To avoid any restrictions due to user history and cookies of the device were cleared. The search criterias have been limited to the "last five years" and "worldwide" settings have been chosen to get more comprehensive results. The resultant videos were included in a playlist on YouTube™ for consistency.

In this study, a total of 193 videos were evaluated. In the literature, it was reported that YouTube™ users generally (95%) focus on the first three pages of search results and detected that a user does not need to watch more than the "first 60 to 200" videos.[16,17] Therefore, the search results in this study were limited to the first 193 videos.

The exclusion criteria were as follows: no audio/no subtitles, languages other than English, not related, >30min, duplicates. Multi-part videos were counted as a single one.

Video characteristics such as time since upload date, country origin, duration minutes, number of likes/dislikes, and comments were recorded. The interaction level of the viewers was calculated based on the interaction index and viewing rate, according to previous study.[18]

The content evaluation of the videos were made on the following subjects: (1) definition of endocrowns,

(2) indications (3) contraindications (4) type of cavity preparation (5) advantages/disadvantages (6) complications, (7) impression technique, (8) materials, (9) manufacturing technique, (10) cement, (11) clinical survival, (12) restoration satisfaction, (13) aesthetic expectation, (14) eating performance, (15) psychological and psychosocial impact. Each content's existence was scored as one point, for a total of 15 points which was determined as TC score of the video. Videos rated as 8-15 points were identified HC, 0-7 points as LC videos. While determining the video contents, the evaluation criteria of previous studies on endocrowns were taken into account.[3,4] In addition, it was evaluated as content on topics frequently mentioned in YouTube™ videos related ECs.

Content assessment of the videos was performed independently by two reviewers to measure the cross-review reliability. (GY, YEH). The intraclass correlation coefficient (ICC) was above 90% both between observers and within observers in the evaluation of GQS and VIQI scores.

The analysis of the videos included the target audience (professional, layperson, or both) as well as the source of upload, which could help the viewer gather knowledge (Healthcare professionals, hospital/university, commercial and other). The general quality of the videos was evaluated using the Video Information and Quality Index. The VIQI scale consists of four evaluation criteria, with videos scored on a five point Likert scale for each: information flow, accuracy of information, quality, and precision. Additionally, assesment of the audio-visual quality and the educational quality of videos was evaluated using the Global Quality Scale criteria (Table 1).[19]

Table 1. Global Quality Scale (GQS)

Score	Description
1	Poor quality, poor flow of the video, most information missing, not helpful for patients
2	Generally poor quality and poor flow, some information listed but many important topics but of limited use to patients
3	Moderate quality, suboptimal flow, some important is adequately discussed but others poorly discussed, somewhat useful for patients
4	Good quality generally good flow, most relevant information is covered, useful for patients
5	Excellent quality and flow, very useful for patients

The videos that caused the disagreements of the researchers were watched again and resolved by consensus. Institutional review was not required because the study included only publicly available data and did not involve human subjects.

Number Cruncher Statistical System 2020 was used for statistical analysis. Shapiro-Wilk test, Mann-Whitney U, Pearson Chi-square, and Fisher-Freeman-Halton exact tests were used. Statistical significance was determined as $p<0.05$. Inter-observer reliability was measured by Cronbach's alpha statistic.

Results

The initial search results included 193 videos; of them, 144 videos were excluded for the following reasons: no audio (37.5%; n=54), not in English (46.5%; n=67), > 30 min (9.7%; n=14), or not related to the topic (6.3%, n=9). Most of the videos were released in each USA and India (14.3%) followed by Saudi Arabia and Egypt (8.2%). Of the videos observed, 2% were sourced from Turkey (Table 2).

Table 2. Country origin

Country origin	n	%
Other	7	14.3
USA	7	14.3
Germany	1	2.0
Saudi Arabia	4	8.2
Australia	1	2.0
Bosnia	1	2.0
France	1	2.0
India	7	14.3
Iran	1	2.0
Israel	1	2.0
Switzerland	2	4.1
Italy	1	2.0
Egypt	4	8.2
Nepal	1	2.0
Peru	2	4.1
Singapore	1	2.0
Turkey	2	4.1
UK	2	4.1
Ukraine	3	6.1

Table 3 presents the demographics characteristic of videos. Videos obtained showed a mean length of 5.77 minutes on ECs. Other video features such as uploaders, target audience, contents are summarized in Table 4. In the HC group, VIQI, GQS, and TC scores were higher in all subcategories than in the LC group.

Table 3. Descriptive analysis of the YouTube videos

Country origin	Min	Max	Mean	SD	Median
Video characteristics					
Number of views	5.00	383416.00	20911.41	61478.97	4356.00
Number of likes	0.00	891.00	111.28	182.53	46.00
Number of dislikes	0.00	0.00	0.00	0.00	0.00
Number of comments	0.00	519.00	22.61	78.54	2.00
Duration in minutes	0.10	26.62	5.77	5.74	3.62
Number of days since upload	128.00	5002.00	1119.24	952.05	849.00
Interaction index	1.00	891.00	132.99	192.40	75.00
Viewing rate	0.07	12292.91	1055.49	2079.54	320.29
Total content score	0.00	15.00	7.41	4.61	6.00
GQS	1.00	5.00	2.65	1.44	2.00
VIQI Content assessment					
Flow	1.00	5.00	3.10	1.46	3.00
Information accuracy	1.00	5.00	3.04	1.52	3.00
Quality	1.00	5.00	2.67	1.49	2.00
Precision	1.00	5.00	2.88	1.59	3.00
Total score	4.00	20.00	11.69	5.76	11.00

Table 4. Distribution of YouTube video uploaders, target audience, and contents in high- and low-content video groups

	High content (n=21)	Low content (n=28)	Total (n=49)	p
	n (%)	n (%)	n (%)	
Source of upload				a0.908
Healthcare professionals	17 (85)	21 (75)	38 (79.2)	
Hospital/University	2 (10)	5 (17.9)	7 (14.6)	
Commercial	0 (0)	1 (3.6)	1 (2.1)	
Other	1 (5)	1 (3.6)	2 (4.2)	
Target audience				b0.215
Professionals	9 (42.9)	17 (60.7)	26 (53.1)	
Professionals+Layperson	12 (57.1)	11 (39.3)	23 (46.9)	
Content				
Definition of Endocrowns	14 (66.7)	4 (14.3)	18 (36.7)	b<0.001*
Indications	18 (85.7)	6 (21.4)	24 (49)	b<0.001*
Contraindications	15 (71.4)	3 (10.7)	18 (36.7)	b<0.001*
Type of cavity prep	20 (95.2)	16 (57.1)	36 (73.5)	b0.003*
Advantages/disadvantages	16 (76.2)	3 (10.7)	19 (38.8)	b<0.001*
Complications	14 (66.7)	3 (10.7)	17 (34.7)	b<0.001*
Impression technique	20 (95.2)	15 (53.6)	35 (71.4)	b0.001*
Materials	19 (90.5)	18 (64.3)	37 (75.5)	b0.035*
Manufacturing technique	19 (90.5)	17 (60.7)	36 (73.5)	b0.020*
Cement	20 (95.2)	11 (39.3)	31 (63.3)	b<0.001*
Clinical survival	13 (61.9)	2 (7.1)	15 (30.6)	b<0.001*
Restoration satisfaction	19 (90.5)	7 (25)	26 (53.1)	b<0.001*
Aesthetic expectation	19 (90.5)	7 (25)	26 (53.1)	b<0.001*
Eating performance	14 (66.7)	0 (0)	14 (28.6)	b<0.001*
Psychological and psychosocial impact	11 (52.4)	0 (0)	11 (22.4)	b<0.001*

aFisher-Freeman-Halton exact te, bPearson chi-square test *p<0.05

Most of YouTube™ videos on ECs were uploaded by healthcare professionals (79.2%, n=38). The target audience of the most of analyzed videos was professionals (53.1%, n=26) rather than hospitals/universities (14.6%). The definition of EC and materials was the most mentioned topic (75.5%) followed by the manufacturing technique (73.5%), type of cavity preparation (73.5%), and impression technique (71.4%). The least common content was the psychological and psychosocial impact of ECs (22.4%). There was a statistical relationship in all content sub dimensions according to the content level (p<0.05). In the HC group, the incidence rates of all categories were significantly higher (Table 4). Of the videos, 21 (52.4%) were classified as HC, and 28 (69.0%) as LC (Table 4).

There was a statistical difference between the HC and LC groups in terms of the GQS scores, total VIQI, and subgroup scores; higher scores were noted in the HC group than in the low-content group (p<0.001), (Table 5).

Table 5. Comparison of variables between high-content and low-content videos

	High content (n=21)	Low content (n=28)	p
	Median (Q1, Q3)	Median (Q1, Q3)	
Video characteristics			
Number of views	6246 (1165, 10552)	1763 (142.5, 13498.5)	0.467
Number of likes	64 (5, 161)	31 (1.8, 150)	0.346
Number of dislikes	0 (0, 0)	0 (0, 0)	0.999
Number of comments	3 (0, 9)	0.5 (0, 15.5)	0.548
Duration in minutes	4.5 (2.57, 7.28)	3.23 (1.56, 5.95)	0.391
Number of days since upload	836 (431, 1582)	905.5 (449.5, 1457.5)	0.904
Interaction index	97 (17, 190)	68.5 (17, 200)	0.764
Viewing rate	660.43 (47.25, 1112.41)	155.78 (6.48, 547.38)	0.157
GQS	4 (3, 5)	2 (1, 2)	<0.001*
VIQI Content assessment			
Flow of information	4 (4, 5)	2 (1, 3)	<0.001*
Information accuracy	4 (4, 5)	2 (1, 3)	<0.001*
Quality	4 (3, 5)	2 (1, 2)	<0.001*
Precision	4 (3, 5)	1 (1, 3)	<0.001*
Total score	16 (15, 18)	8 (4, 10)	<0.001*

Mann-Whitney U test, results are reported as median (first quartile, third quartile). *p<0.05

Correlations between all parameters such as TC score, VIQI, GQS score, and video demographics are presented in Table 6. A statistically significant positive relationship was noted among the TC score and GQS (r=0.778, p<0.001) and VIQI (r=0.739, p<0.001) scores. Additionally, a statistically significant correlation was observed among GQS scores, VIQI (r=0.823, p<0.001), and duration of the videos (r=0.324 p=0.023). The number of views, likes, comments, and duration minutes demonstrated a correlation with VIQI scores (r=0.289, p=0.047; r=0.297, p=0.040; r=0.387, p=0.007; r=0.420, p=0.003). No correlation was observed among the TC score, VIQI, and GQS scores, video demographics, interaction index, and viewing rate (p>0.05).

Table 6. Pearson correlation coefficient scores between total content score, GQS, VIQI, and YouTube demographics

	Total content		GQS		VIQI	
	r	p	r	p	r	p
Total content	1.000	-	0.778	<0.001*	0.739	<0.001*
GQS	0.778	<0.001*	1.000	-	0.823	<0.001*
VIQI	0.739	<0.001*	0.823	<0.001*	1.000	-
Number of views	0.065	0.657	0.200	0.167	0.289	0.047*
Number of likes	0.110	0.453	0.163	0.264	0.297	0.040*
Number of dislikes	-	-	-	-	-	-
Number of comments	0.148	0.310	0.250	0.083	0.387	0.007*
Duration	0.147	0.315	0.324	0.023*	0.420	0.003*
Number of days since upload	-0.083	0.571	0.075	0.607	0.142	0.336
Interaction index	0.028	0.860	0.106	0.510	0.250	0.114
Viewing rate	0.172	0.237	0.225	0.119	0.271	0.063

Spearman correlation coefficient **p<0.01

Discussion

Many people search for more information about dental treatments and prefer YouTube™ instead of scientific platforms that professionals actively use.[5] YouTube™ is one of the most preferred video-based social media platforms due to its ease of use and accessibility on computers, tablets, and mobile phones. This platform contains numerous educational videos, but some of the information in these videos can be outdated and incorrect.[20] Unfortunately, this results in patients receiving incorrect information about treatment options and procedures. Studies have evaluated the accuracy and quality of YouTube™ videos previously.[15,16,21] The current study is the first to investigate the accuracy and quality of YouTube™ videos regarding ECs. According to the results of the study, YouTube™ is not an adequate and appropriate source of information about ECs.

In this study, YouTube™ videos were categorized into HC and LC videos. According to their results, most YouTube™ videos had low content.[15,22,23] Consistent with these results, the proportion of LC videos was also higher in this study.

It is thought that reviewing and auditing the content quality of videos on YouTube™ will contribute positively to Pearson's professional experience and knowledge about different treatment options for severely damaged teeth after endodontic treatment. With advances in technology, the methods of individual access to information are changing. In this virtual age where the use of mobile phones, tablets, and computers has increased significantly, social media platforms with fast and easy access are the first choice of information.[24] Previous studies have indicated that sharing information on YouTube™ will be more effective in increasing the knowledge of people compared to other communication methods.[15,24] The results of the study revealed that the videos uploaded on the use of EC in the root canal treated teeth with multiple material loss have insufficient information content.

None of the videos included in this study had all the video demographics. The definition of EC, materials used, manufacturing technique, type of cavity preparation, and impression technique were the most mentioned topics. In contrast, the least mentioned content was the psychological and psychosocial effects of ECs. The reason for these topics being the most mentioned topics is believed to be that the videos are uploaded by health professionals, such as dentists/specialists (79.2%). To evaluate the psychosocial effects of the treatment, the videos in which the individuals expressed their opinions should also be uploaded.[21] Another topic that was rarely mentioned in the study was the clinical survival rate of ECs. Data on the clinical survival rate of these restorations are rare, and the available data are limited to retrospective and prospective cohort studies.[25] Further mention of this topic in YouTube™ videos will contribute to the literature regarding the survival rate and long-term success of ECs.

Consistent with previous studies, it was observed that HC videos had higher total VIQI and GQS scores than low-content videos in this study.[15,26] These results indicated that the flow of information, accuracy, and the general quality of videos were rated higher. Furthermore, a positive correlation was noted among the TC, GQS scores, and VIQI. The positive relationship among the GQS scores and TC indicates that the video content is diverse, and the information flow is better.

Previous studies have reported that viewers' interest in videos decreases in cases of very long videos.[15,26] In this study, the mean duration of videos was 5.77 minutes, while the median duration of HC and LC videos were 4.5 and 3.23 minutes. However, no statistically significant differences were detected among the groups. It can be concluded that whether the content of the video is high or low is not related to the duration of the video.

YouTube™ users actively communicate with each other using parameters such as likes, dislikes, and comments regarding their positive/negative thoughts or experiences about the videos.[15] This study evaluated their demographic characteristics. Accordingly, a statistically significant difference was not detected in the likes, dislikes, number of comments, interaction index, or viewing rate. However, these parameters may vary with the interactions between advertisements and followers of social media.

In this study according to results, the number of YouTube™ videos about ECs was insufficient and should be increased in terms of quality. Healthcare professionals need to play an active role in sharing content on YouTube™ to convey accurate and up-to-date information to patients.

The first limitation of this study was the short duration of data collection. Additionally, viewers' interests, video viewing times, and search results

can change, which makes it difficult to follow video streams and sequences.

Conclusions

Although there was a wide variety of videos regarding ECs on YouTube™, most of them were inadequate in terms of content quality. Most of the videos about ECs discussed the production materials, manufacturing technique, type of cavity preparation required, and cementation, while few videos mentioned the psychological and psychosocial effects, clinical survival, and definition of ECs. Furthermore, most videos were uploaded by healthcare professionals. Considering the widespread use of social media, the clinical survival of ECs, and the requirement for long-term follow-up, providing accurate and useful professional information regarding ECs on YouTube™ is critical.

Conflict of interest

None of the authors of this article has any relationship, connection or financial interest in the subject matter or material discussed in the article.

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