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ORIGINAL RESEARCH ARTICLE

Evaluation of Endodontic Retreatment Videos on the Youtube Platform: Quality and Content Analysis

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Abstract

Purpose: To evaluate the educational quality of Turkish endodontic retreatment videos on the YouTube platform.
Materials and Methods: 12 keywords were used to scope videos related to endodontic retreatment on YouTube platform. The study included a total of 34 videos out of 240. Three researchers scored the videos according to the Global Quality Scale (GQS) and Modified DISCERN criteria. In addition, the following parameters were used to evaluate the video characteristics: video duration, upload date, number of subscribers, views, likes and comments, and uploader type. These parameters were collected for each video to assess their general visibility and audience engagement. Spearman correlation analysis was employed to examine the relationship between video characteristics and quality scores.
Results: Longer videos were observed to have higher values in terms of both GQS and DISCERN scores. According to the DISCERN scale, the vast majority of videos do not include reliable sources of information. There was a positive correlation between quality scores and video duration, number of likes, and subscription counts. A moderate positive relationship was found between the total DISCERN score and video duration. No statistically significant relationship was observed between other video characteristics and DISCERN scores.
Conclusions: It was concluded that the quality level of videos published on YouTube varies, and due to inadequate sources of information, attention should be paid to provide accurate information in the field of endodontic retreatment. Future research could make a more comprehensive assessment by comparing the quality of health videos on different topics.

Keywords: DISCERN; GQS; Patient information; Root canal retreatment; YouTube

Introduction

Root canal treatment (RCT) is a common dental procedure that accounts for approximately 3.1% to 9.4% of dental treatments in Turkey.[1,2] The main goal of endodontic treatment is to prevent pain, infection, and tooth loss by chemo-mechanically preparing the root canal system, preventing microleakage, and cleaning the root canal system of microorganisms and potentially infected pulp tissue, thus reducing the likelihood of endodontic pathology occurring or recurring.[3] These goals cannot always be achieved in primary root canal treatment, and endodontic failure may occur in the short or long term. Clinical and radiographic criteria are employed to evaluate whether root canal treatment is successful. If these criteria are not met, root canal treatment is considered unsuccessful. When optimum conditions are provided, root canal treatment is 96% successful.[4]

In the presence of resistant endodontic lesions or treatment failure, nonsurgical retreatment or surgical methods are possible treatment options. In the surgical approach, apical resection is performed, and the cavity prepared at the apex is filled retrogradely.[5] Retreatment—secondary root canal treatment—involves the removal of restorative materials and previous root filling to re-access the entire root canal system, especially the apical region.[6] Preoperative periapical status, the size of the apical lesion (if present), radiographic quality of primary root canal treatment, procedural errors from previous treatment, intraoperative errors, and the level of training and experience of the operators are some of the factors that affect the prognosis of retreatment.[7]

Retreatment procedures may seem challenging to some clinicians and even patients because they involve more factors that may negatively affect success compared to primary endodontic treatment. The difficulty of the retreatment procedure depends on multiple factors, such as anatomic variations, limited access to the canal system due to previous treatment, bacterial biofilm development, and difficulty in removing dentinal debris. Retreatment requires advanced techniques, special instruments, and a

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deep understanding of endodontic anatomy. However, with adequate equipment and meticulous planning and execution, the 69% periapical healing rate in retreatment is even lower than those in primary treatment in the case of apical periodontitis. [8–10] Nonsurgical endodontic retreatment is less invasive than surgery, and the post-treatment period is more predictable. There is less likelihood of damage to anatomical areas such as nerve extensions, adjacent teeth, and sinus cavities. However, since the removal of existing restorative and prosthetic restorations is recommended in retreatment procedures, nonsurgical retreatment may be more costly than surgical retreatment. Despite the advantages, there may be cases where microorganisms cannot be completely removed from the root canal system with this approach, or complete obturation may not be possible, and therefore surgical intervention is necessary. [11]

Historically, healthcare professionals, professional associations, and regulatory bodies have been responsible for providing information and counseling to patients. There is a lack of evidence as to where patients seek information about endodontic treatment. Patients are increasingly turning to alternative sources of information, with 45% of patients seeking information from a healthcare professional prior to their appointment. [12,13]

Recently, it has become normal to search for internet sources on healthcare-related topics. Among many online platforms, YouTube stands out on health topics, as it provides information in both visual and audio formats. Founded in 2005, it is one of the largest video-based sharing platforms worldwide and the second largest search engine in the world. It has 2.5 billion monthly active users, with over one billion hours of video watched daily worldwide. [14–16] Due to COVID-19, access to healthcare has been limited, and platforms like YouTube are used more. [17] While the technological revolution has made information so readily available today, it is a major disadvantage in the healthcare community that there is no control over its quality, reliability, and objectivity, which is a concern because patients sometimes base their decisions on this unverified information. For dental professionals, YouTube is a valuable tool for sharing case studies, demonstrating new techniques, and providing continuing education resources. Dentists can follow recognized experts in the field and watch tutorials on complex procedures, which is especially useful for professionals looking to improve their skills or learn about emerging technologies.

YouTube is frequently visited by dentistry students and dentists, as well as patients, and the curiosity of patients about dental treatments cannot be ignored. Before dental appointments, many patients try to ease their anxiety or prepare themselves by researching the treatments they will undergo. [18] Channels featuring dentists who provide clear, patient-friendly explanations can demystify procedures and help patients understand what to expect during their appointments. For example, many dentists create videos that explain how dental procedures are performed, offer post-procedure care tips, and address common misconceptions about dental health. Patients who watch these videos can feel more informed, which can reduce the fear and uncertainty that often accompany dental visits. However, while YouTube is a valuable source, it also presents challenges in terms of the accuracy and reliability of information. Most of these videos have not been peer-reviewed, and there are concerns about the scientific validity, reliability, and accuracy of their content, which may present inaccurate and potentially misleading information. [17] Therefore, both dental professionals and patients should be critical of YouTube content and ensure that the information they consume comes from reputable sources, such as licensed practitioners or professional dental organizations.

Videos are available on various endodontic procedures, such as rubber-dam placement, access cavity preparation, root canal treatment, and regenerative endodontic treatmen. [15,19–22] There are also many videos about endodontic retreatment on the platform. According to our literature search, no study has evaluated their content, accuracy, and quality. Therefore, the aim of this study was to evaluate the quality and content of retreatment-related videos on the YouTube platform. The null hypothesis of this research was that the quality of YouTube videos on nonsurgical endodontic retreatment is sufficient for patients.

Material and Methods

Data collection

Publicly available data was employed in this study. Ethical approval was not obtained from the research ethics committee because no human or animal samples were included in the study. The authors followed the PRISMA flowchart for the video selection process. [23] (Figure 1)

A pre-screening of the videos was performed to determine which videos would be included. The pre-screening was performed by clearing the cookies and cache of the browser used, using the default settings and default filter on YouTube. The following keywords were used to search for the videos on the platform:

- Endodontic retreatment,
- Retreatment,
- Orthograde retreatment,
- Root canal treatment renewal,
- Re-endodontic treatment,
- Second root canal treatment,
- Repeated root canal treatment,
- Painless root canal treatment,
- Retreatment complications,
- Retreatment advantages,
- Retreatment disadvantages,
- Root canal treatment failure.

Data collection for these videos was conducted on 31.08.2024. Search filters were left as default, and videos were ranked according to "Relevance".

Although there is no current consensus examining the total number of videos that users tend to watch while searching on YouTube, studies have ranged from 10 to 60 videos for each search term. [3,24,25] Therefore, based on a similar study conducted before and the consensus of researchers, it was decided to include the first 20 videos for each search term to reflect the search habits of the average person. [22] A total of 240 videos were screened by two endodontic PhD students and one endodontist. Exclusion criteria included commercial ads suggested by YouTube, videos in any language other than Turkish, videos longer than 10 minutes, videos with poor visual and audio quality, videos unrelated to the search terms, and videos that were repetitive, i.e., identical. Based on these criteria, 206 of the 240 videos were excluded from the study. All preliminary research was checked by another member of the research team for reliability and comparability. Links to all 240 videos included in the preliminary study were stored.

Video assessment

The quality of the videos was assessed by three researchers using the Modified DISCERN score and the Global Quality Score (GQS). The Modified DISCERN score assesses clarity, reliability, and bias using a range of criteria and a scale of 1 to 5, with 1 being no criteria met and 5 being complete success. The overall quality of the videos was also assessed using the 5-point GQS, with a maximum score of 5, indicating great reliability and high educational quality. This evaluation tool, although non-validated, has been commonly employed for the assessment of the content quality and usefulness of online resources, with 1 being low quality and not beneficial, and 5 being excellent content that is very beneficial to patients. A fourth member of the research team was set to re-evaluate videos with differences in scores to verify reliability.

Table 1. Descriptive statistics of video characteristics

Variables	Mean	Standard Deviation	Median	Minimum	Maximum
Length (Sec)	142.21	135.67	91.0	17	564
Likes	62.09	84.27	32.0	1	403
Views	14,903.65	24,933.76	3,621.5	38	100,026
Comments	41.34	92.44	3.0	0	389
Subscriber Count	16,860.06	32,989.35	6,835.0	7	130,000
Days Since Upload	1,245.50	787.45	1,096.0	212	3,406
Average GQS Score	2.7	1.2	2.7	0.3	5.0
Total DISCERN Score	2.1	1.1	2.5	0.0	3.0

Table 2. Frequency distribution of questions forming the DISCERN Score

	No	Yes	Total
DISCERN	n (%)	n (%)	n (%)
Q1: Are the goals clear and achievable?	8 (23.5)	26 (76.5)	34 (100.0)
Q2: Are reliable sources of information used?	34 (100.0)	0 (0.0)	34 (100.0)
Q3: Is the information presented balanced and unbiased?	6 (17.6)	28 (82.4)	34 (100.0)
Q4: Are additional sources of information listed for patient reference?	34 (100.0)	0 (0.0)	34 (100.0)
Q5: Does it point out areas of uncertainty?	16 (47.1)	18 (52.9)	34 (100.0)

Each video was assessed for the following characteristics: video duration, number of views, viewer ratings (likes, dislikes, and number of comments), number of subscribers, and days since upload date. The source of the videos was categorized into one of 3 groups based on the uploaded YouTube channel:

- dentist/endodontist,
- clinic,
- others.

Statistical Analysis

Descriptive statistics, independent group comparisons, and distribution analyses were used for the distribution rates between these video features and quality scores. Descriptive statistics were reported with mean, standard deviation, median, minimum, and maximum values for video duration, number of views, number of comments, number of subscribers, and publication time variables. (Table 1)

The distribution of video characteristics according to the type of uploading channel was evaluated using the Kruskal–Wallis test. The relationship between video characteristics and quality scores was analyzed using Spearman correlation analysis. Unless otherwise specified, $p < 0.05$ was considered statistically significant.

Results

The frequency distribution of the questions forming the DISCERN score was examined, and the highest "Yes" rate was observed in the question, "Is the information presented balanced and unbiased?" (Q3) with 82.4%. All answers given to the question, "Are additional information sources listed for patient reference?" (Q4) and "Are reliable information sources used?" (Q2) were "No." (Table 2)

The evaluation of video characteristics distribution according to the channel on which the videos were published yielded a significant difference between the groups in terms of the subscriber count variable ($p=0.005$). No statistically significant difference was found in other variables. (Table 3) A positive significant relationship was found between the average GQS score and video duration ($r=0.64$, $p<0.001$) and subscriber count ($r=0.34$, $p=0.046$). No significant correlation was observed for other variables. (Table 4, Figure 2)

A moderate positive correlation was observed between the total DISCERN score and video duration ($r=0.46$, $p=0.007$). No statistically significant correlation was observed between other video characteristics and DISCERN score. (Table 5, Figure 3)

The distribution of video features according to the channels on which the video was broadcasted was presented in Table 3. It was observed that the videos of doctors were liked the most, followed by the videos in the other category, and the videos of clinics were liked the least. Although the difference is not significant, it is close to significance ($p=0.092$). When the subscriber numbers were examined, it was observed that the viewers do not prefer to subscribe to clinics but subscribe to those in the other category the most, and then to physicians. The difference between the groups was significant ($p<0.01$). There was a positive correlation between the average GQS score and the video duration ($r=0.64$, $p<0.0001$). The average GQS score increases as the duration does. There was no relationship between the total DISCERN score and the number of likes, views, comments, subscribers, and the time since publication ($p>0.05$).

In addition, there was a positive correlation between the video duration and the number of likes ($r=0.40$, $p<0.05$), and the number of likes increases as the duration does. A similar relationship was observed between the duration and the number of subscribers ($r=0.39$, $p<0.05$).

While the number of likes increases as the views increase ($r=0.90$, $p<0.001$), a similar correlation was observed between the number of comments and the number of likes ($r=0.71$, $p<0.001$).

There is a positive correlation between the total DISCERN score and video duration ($r=0.46$, $p<0.01$). DISCERN score increases as duration increases.

Discussion

Since social media and the internet have become more popular in recent years, many patients use these platforms to research their conditions and available treatment options.[26] This study assessed the comprehensibility and content quality of nonsurgical retreatment videos on YouTube, one of the earliest internet knowledge sources. YouTube was created in 2005 and is now a subsidiary of Google and one of the most widely used internet platforms. As the second most-visited website, it allows users to watch, rate, like, share, comment, upload videos, and subscribe to other users. Due to its ease of access and user-friendly interface, its popularity has grown rapidly. Moreover, the COVID-19 crisis necessitated the increasing share of educational videos for patients, dentists, and dental students to continue dental tutelage.

None of the videos in the current study included all the aspects required to comprehend the process completely from a patient per-

Table 3. Distribution of video features according to the broadcast channel

	Broadcast Channel									
	Dentist/Endodontist (n=18)			Clinic (n=12)			Others (n=4)			
	Median	Min	Max	Median	Min	Max	Median	Min	Max	p-value*
Length (Sec)	108	17	564	58	35	291	224	48	310	0,166
Likes	49	6	211	11	1	403	20	1	127	0,092
Views	4.894	69	100.026	3.280	133	88.108	1.148	38	29.864	0,327
Comments	3	0	287	3	0	389	3	0	89	0,955
Subscriber Count	10.200	35	10.200	417	7	120.000	77.400	1.200	130.000	**0,005**
Days Since Upload	1245	212	3406	822	223	2142	795	694	2949	0,512
Average GQS Score	2.8	0.3	5.0	2.2	1.0	4.0	3.2	1.0	4.0	0.378
Total DISCERN Score	3.0	0.0	3.0	2.0	0.0	3.0	3.0	0.0	3.0	0.648

*Kruskal-Wallis test. A p-value < 0.05 was considered statistically significant. Statistically significant correlations are shown in bold.
Abbreviations: Min, minimum; Max, maximum; sec, seconds; p, p-value; n, number of observations.

Table 4. Spearman correlation between mean GQS score and video characteristics

Variables	Length (sec)	Likes	Views	Comments	Subscriber Count	Days Since Upload
Average GQS	**0.64(p<.0001)**	0.11(p=0.555)	-0.05(p=0.777)	0.19(p=0.305)	0.34(p=0.046)	-0.19(p=0.291)
Length (Sec)		**0.40(p=0.023)**	0.17(p=0.35)	0.33 (p=0.066)	0.39(p=0.023)	-0.25(p=0.160)
Likes			**0.90(p<.0001)**	**0.71(p<.0001)**	0.20(p=0.27)	0.33(p=0.065)
Views				**0.72(p<.0001)**	0.04(p=0.81)	0.43(p=0.013)
Comments					0.08(p=0.645)	0.25(p=0.165)
Subscriber Count						-0.11(p=0.525)

A p-value < 0.05 was considered statistically significant. Statistically significant correlations are shown in bold. Abbreviations: sec, seconds; p, p-value.

Table 5. Spearman correlation between total DISCERN score and video characteristics

Variables	Length (sec)	Likes	Views	Comments	Subscriber Count	Days Since Upload
Total DISCERN Score	**0.46 (p=0.007)**	0.06 (p=0.761)	-0.08 (p=0.634)	-0.05 (p=0.773)	0.1 (p=0.568)	0.03 (p=0.877)
Length (Sec)		**0.40 (p=0.023)**	0.17 (p=0.35)	0.33 (p=0.066)	**0.39 (p=0.023)**	-0.25 (p=0.160)
Likes			**0.9 (p<0,001)**	**0.71 (p<0,001)**	0.2 (p=0.27)	0.33 (p=0.065)
Views				**0.72 (p<0,001)**	0.04 (p=0.81)	**0.43 (p=0.013)**
Comments					0.08 (p=0.645)	0.25 (p=0.165)
Subscriber Count						-0.11(p=0.525)

A p-value < 0.05 was considered statistically significant. Statistically significant correlations are presented in bold. Abbreviations: sec, seconds; p, p-value.

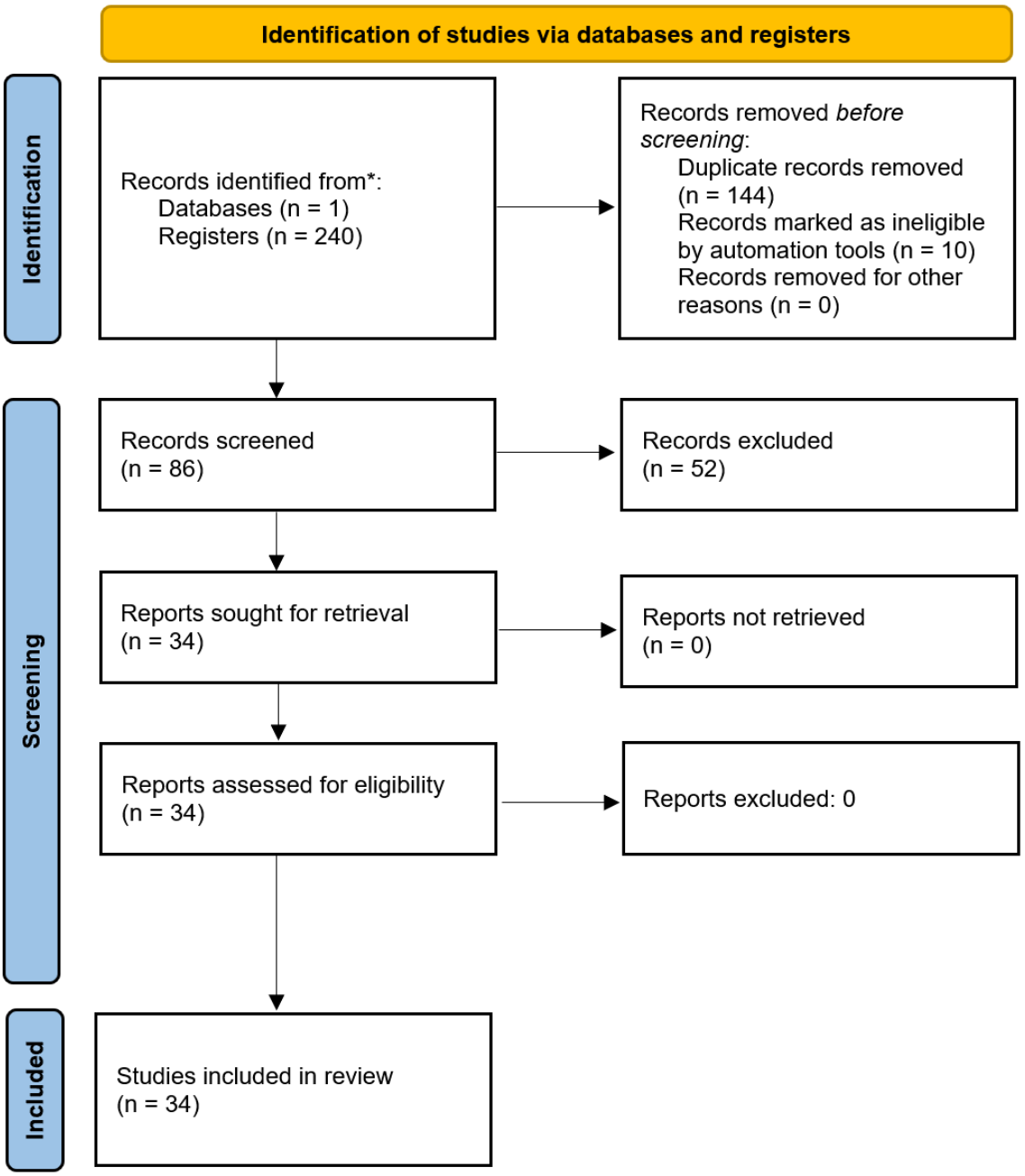

Figure 1. Flowchart of inclusion and exclusion process

spective. There was a complete consensus on these issues among the observers. Patient satisfaction is correlated with the amount of information acquired prior to the treatment, mostly about the stages and complications.[27] Regarding this, as seen in Table 2, the DISCERN score rate concerning question 3, "Is the information presented balanced and unbiased?" was mostly "Yes" with 82.4%. Most of the videos only fully responded to questions 1 and 3. This may be because the given information must be comprehensible enough for the viewers, since too detailed and complicated material can confuse them more.

YouTube is a free platform where users can share any information without any peer review. While the videos are available for anyone to watch without knowing if the material is evidence-based, resulting in influencing the patients' future therapy decisions based on inadequate data, creating a dilemma. According to Nason et al.[28], 33% of people are convinced that popular websites have the most accurate health-related information. In the present study, DISCERN questions regarding additional and reliable information sources for patient reference were all answered "No" by the researchers. Even though information shared by dental professionals on social platforms can be correct, medical professionals approach different therapies with different strategies. This causes the need to look for scientific evidence regarding why information varies from one professional to the other. On the other hand, channels owned by people other than dental professionals can share videos about any subject involving endodontics. Giving reliable references can ease the viewer's mind and lead them to a better understanding of their situation.

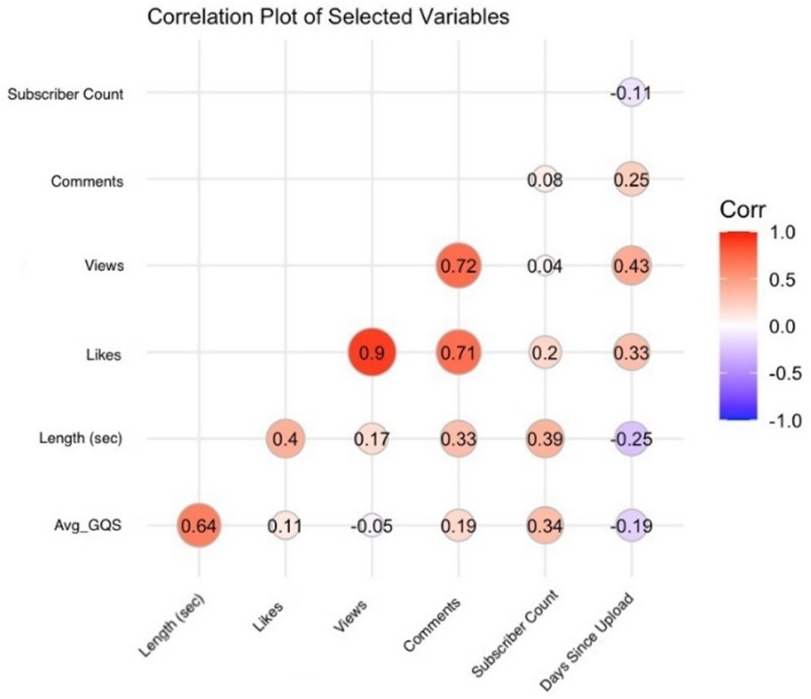

Figure 2. Correlation between mean GQS score and video characteristics

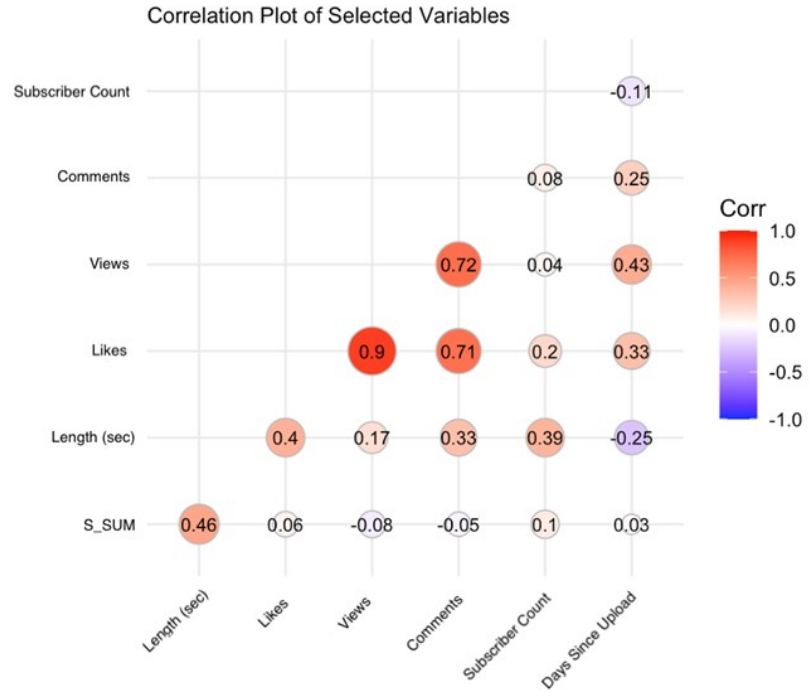

Figure 3. Correlation between total DISCERN score and video characteristics

According to a different study[22], 46% of the videos that dentists or other experts posted were about root canal therapy. 88% of the videos in our study were uploaded by a dentist, an endodontic specialist, or a dental clinic. Considering the sensitivity of the topic, it makes sense that most videos are uploaded by dental professionals. The completeness of the videos did not differ substantially by

source, even though professionals uploaded a larger percentage of the videos reviewed in our study. However, videos posted by dentists/specialists were liked more than videos uploaded by other channels. This may because videos included by the same professionals came up on the preliminary search more frequently than clinics, and these professionals might be renowned in their area of specialty and watched commonly by dentists, dental professionals, dental students, and patients. Since the default search filter is "Sort by Relevance" on YouTube, it is more likely that these channels have higher subscriber numbers, likes, and interactions on their videos.

The length of the videos is another crucial point to mention. As the duration of the videos increases, more thorough information can be provided to the viewers by the publisher. In the present study, a positive correlation was found between video duration and number of likes, views, and comments. The duration of videos ranged from 0.17 to 9.24 minutes, views from 38 to 100026, likes from 1 to 403, and comments from 0 to 389. Even though it seems like a practical aspect to educate the viewers, it must be kept in mind that they may find it challenging to concentrate on long videos. In our study, multiple videos of the same publisher were included, whose content included mostly procedures explaining the steps of nonsurgical retreatment, which have various comments and likes. According to Khilnani et al [29], to effectively communicate correct information to the intended audience, the length of the video should be adjusted by the topic's intricacy and content. However, the length of a video intended for use as a teaching aid should be chosen based on the learning objective. Since nonsurgical retreatment is a difficult treatment to fully grasp, it may be better for the video to be longer so the information given is greater.

Nonetheless, it should be assumed that certain videos, even if they are incomplete or short, do contain accurate and useful content because it would be unrealistic to expect every video to fully cover every facet and step of nonsurgical retreatment. The majority of the videos created by professionals mostly convey enough information for the patients to understand. Since they are open to the public, creators on these platforms must be aware that they have ethical responsibilities towards the public. YouTube is an active platform where videos and comments can be deleted at any time, so it must be kept in mind that publishers might delete hateful or constructive comments. That is why we included 20 videos for each search term, lest one or more of those may get deleted.

More than 30% of people who watch YouTube consider these websites an accurate source of health information. [28] This study had some limitations since YouTube is an active website where videos could be altered in time. Videos other than Turkish videos were not included in the study, which was a geographical limitation. To be precise, there are more spoken languages than Turkish all over the world, like English, Chinese, or Spanish. This indicates that most of the videos about endodontic retreatment might have been neglected. [30]

The videos' accuracy and reliability were assessed using the completeness score. The GQS, a 5-point rating system, was employed to assess the instructional value, flow, and quality of the video. [27,31] The lack of channels governed by universities or professional organizations among the uploaders may be the cause of the low scores, even if the GAS values fluctuate in the earlier research. [31–33] It was impossible to label channels in terms of age, country, intention, or profession. That is another limitation that can be further investigated. Another limitation of this study was that only 34 videos were analyzed. Future research analyzing all videos about endodontic retreatment on YouTube must be evaluated, as it is a subject most researchers focus on.

Conclusion

This study suggests that videos about nonsurgical retreatment on YouTube are of moderate-to-high quality according to GQS and the modern DISCERN scale. These videos cannot be grouped as neither fully accurate nor reliable. Although the content and quality of the uploaded videos were found to be beneficial regarding treatment, there is still a lack of content with references that must be shared. Publicly available videos may lack accuracy, completeness, and quality. Patients are encouraged to consult subject-matter specialists for the most accurate information. Therefore, endodontists and dentists should create and share more comprehensive videos to increase awareness of nonsurgical retreatment.

Ethical Approval

Ethical approval was not required for this study.

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Draft of the manuscript : D.I. , T.O. , B.O.
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Conflict of Interest

The authors declare that they have no conflict of interest.

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