

## Research Article



# YouTube as a source of information about rubber dam: quality and content analysis

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No potential conflict of interest relevant to this article was reported.

### Author Contributions

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## ABSTRACT

**Objectives:** This study aimed to evaluate the content, quality and demographics of YouTube videos about rubber dam as an information source for clinicians and dental students.

**Materials and Methods:** “Rubber dam,” “rubber dam application,” “dental isolation,” “rubber dam isolation,” and “dental dam” were determined as keywords for the detection of YouTube videos related to rubber dam. Seventy 3 videos were evaluated and a total of 34 videos met the inclusion criteria. All selected videos were evaluated according to 8 parameters. The videos were scored 1 if the videos contained information about the selected parameter, but if the videos did not contain enough information, they were scored 0. The data were statistically analyzed with the analysis of variance and *post hoc* Tukey test ( $p < 0.05$ ).

**Results:** We found that 41% of the videos have poor, 47% have moderate, and 12% have good information. There is a statistically significant difference in time between poor and good information content ( $p < 0.05$ ). There is a statistically significant difference between the poor and good information in the video information and quality index 1.

**Conclusions:** Rubber dam-related videos available on YouTube are generally moderately informed and insufficient. YouTube is currently not sufficient as a source of information for patients and clinicians at the moment. The YouTube platform should be developed and enriched with quality information on current and dental issues.

**Keywords:** Dental isolation; Education; Rubber dam; YouTube




## INTRODUCTION

The significance of oral microorganisms in the pathogenesis of endodontic diseases is well known [1,2]. The success of a root canal treatment depends on conducting powerful infection control to eliminate the present infection and prevent the root canal system from reinfection. To preserve the operating field from contamination, using a rubber dam is ideal [3].

Rubber dam, invented 150 years ago, remains ideal for tooth isolation during dental treatments [4]. In particular, during root canal treatment, the rubber dam offers several benefits for both patients and dentists [5]: It protects patients' airways, reduces aerosol contamination, offers an aseptic working area, and improves workflow [6]. Using rubber dams has thus become a standard of care and is mandatory during root canal treatments [7].

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Despite the many benefits of rubber dam, it is not commonly used in general dental practice [8]. However, rubber dam application is taught in every dental school as well as in many courses and online platforms [9]. One of these platforms is YouTube, an important dental education source, especially during the coronavirus disease 2019 (COVID-19) pandemic. Established in 2005, YouTube is one of the biggest video-sharing websites, with more than 65,000 videos uploaded every day [10,11]. It is commonly visited by dental students and dentists as well as patients. YouTube videos are free, searchable, accessible, and have users' comments under them. Moreover, these videos benefit the educational process, as visualizing information is useful while learning. However, these videos are not peer-reviewed, and there are concerns about the scientific validity, reliability, and accuracy of their content, which may offer inaccurate and potentially misleading information [12]. In light of this, many studies have analyzed the accuracy and quality of the information contained in these videos [10,13].

There are videos on several dentistry topics available, such as regenerative endodontic treatment, access cavity preparation, root canal treatment, and artificial intelligence in dental radiology [10,13-16]. Although there are many videos on rubber dams and their application, to our knowledge, no studies have evaluated their content, accuracy, and quality. We thus aimed to fill this research gap and evaluate the suitability of these videos to be a reliable information source for clinicians and dental students.

## MATERIALS AND METHODS

### Video selection

Since the data used in this study was obtained from a public platform, approval from the ethics committee was not required. The search terms used were selected from the terms used by dental students and clinicians on social media.

We created a YouTube account to store the videos included in the study. On October 4, 2022, we searched YouTube for videos related to rubber dam applications. We used the following terms to search the videos: "rubber dam," "rubber dam application," "dental isolation," "rubber dam isolation," and "dental dam."

Since most users watch the first 30 videos on a page, these were recorded to evaluate each term [14]. After removing the duplicates, we evaluated 73 videos and excluded those videos that met any of these criteria: 1) non-English, 2) advertisements, 3) containing only images or audio, 4) unrelated to the search terms, 5) longer than 20 minutes, and 6) about rubber dam applications in the primary teeth. We sorted the related videos using the "sort by relevance" option; no additional filters were used.

### Assessment of videos

A total of 34 videos met the inclusion criteria. They were analyzed, and the following parameters were recorded for each one: 1) duration (minutes); 2) number of likes; 3) number of views; 4) ownership; and 5) target audience.

We then evaluated the content of the videos according to the 8 parameters determined by Patel and Hamer [6]: 1) usage purposes; 2) presentation of rubber dam kit; 3) 1-step technique; 4) 2-step technique; 5) problems encountered during the application and their solutions; 6) multiple tooth isolation; 7) split-dam technique; and 8) rubber dam removal.

If a video had information about the selected parameter, it was scored 1; if not, it was scored 0. Two endodontists independently evaluated the videos, and if they could not reach a consensus, they consulted a third endodontist. Inter-researcher reliability analysis was performed using the Kappa statistic to determine the variability between the researchers.

Videos with a score between 0 and 2 points have poor information; those with a score between 3 and 4 have moderate information (they have some information which, though useful, is insufficient); those with a score between 5 and 6 have good information (they offer significant information and discuss some parameters well); and those with a score between 7 and 8 points offer excellent information (in addition to offering significant information, they discuss all the parameters).

We assessed the quality of the videos using the 4 evaluation criteria of the video information and quality index (VIQI): information flow (the fluency of the information given on the subject) (VIQI 1), information accuracy (VIQI 2), quality (videos including 1 point for each image, animation, interview, video captions, and summary) (VIQI 3), and precision (the level of coherence between the video's title and its content) (VIQI 4). To evaluate each criterion, we used a 5-point Likert scale.

### Statistical analysis

To conduct statistical analysis, we used IBM SPSS Statistics (v21; IBM Corp, Armonk, NY, USA). To compare data and video scores according to groups, we used the analysis of variance (ANOVA) test. For the pairwise comparison of significant data, we used the *post hoc* Tukey test. For all the tests, we set the statistical significance at  $p < 0.05$ .

## RESULTS

From the 73 selected videos, we excluded 39 because of the exclusion criteria. Then, to evaluate the information from the videos, we used 8 evaluation criteria. The inter-researcher reliability for usefulness scoring was significantly high (Kappa value = 0.887). This showed that the inter-observers were in close agreement.

We found that 41% of the videos have poor information, 47% have moderate information, and 12% have good information. No video has an excellent knowledge score. **Table 1** shows the descriptive statistical data of the videos. The videos received a mean of  $56,429.50 \pm 104,674.77$  views and a mean of  $741.94 \pm 1,723.56$  likes. The mean duration of the videos was  $6.06 \pm 4.40$  minutes. In addition, the mean of the total VIQI score was  $12.52 \pm 4.25$ .

**Table 1.** The descriptive statistics of the YouTube videos on rubber dams

Variables	No.	Mean $\pm$ SD	Min–Max
Time (in minute)	34	6.06 $\pm$ 4.40	0.27–18.06
Number of likes	34	741.94 $\pm$ 1,723.56	0–10,000
Number of views	34	56,429.50 $\pm$ 104,674.77	792–553,000
VIQI 1 (information flow)	34	3.02 $\pm$ 1.46	1–5
VIQI 2 (information accuracy)	34	3.47 $\pm$ 1.26	1–5
VIQI 3 (quality)	34	2.5 $\pm$ 1.48	1–5
VIQI 4 (precision)	34	3.52 $\pm$ 1.35	1–5
Total VIQI score	34	12.52 $\pm$ 4.25	4–20

SD, standard deviation; VIQI, video information and quality index.

**Table 2.** A usefulness scoring system and observation rate for videos about “rubber dam”

Scoring element	Score	Observation rate
Usage purposes	1	44.1%
Presentation of rubber dam kit	1	61.7%
1-step technique	1	50.0%
2-step technique	1	32.0%
Problems encountered during the application and their solutions	1	5.8%
Multiple tooth isolation	1	50.0%
Split-dam technique	1	8.8%
Rubber dam removal	1	35.2%
Total	8	-

The information that was most frequently mentioned in the videos was about the “presentation of rubber dam kit” (61.7%), followed by “1-step technique” (50.0%) and “multiple tooth isolation” (50.0%), and “usage purposes” (44.1%). The topics that were least frequently mentioned were “rubber dam removal,” “2-step technique” (32.0%), “split-dam technique” (8.8%), and “problems encountered during the application and their solutions” (5.8%) (Table 2).

There is a statistically significant difference in duration between videos with poor information content and good information content ( $p < 0.05$ ). The information content score was found to increase with videos with longer durations. However, no statistically significant difference was found between the information content score and the number of likes and views. Moreover, although insignificant, videos with good information content were found to have the highest number of likes and views. When we evaluated the VIQI, a statistically significant difference was found between poor and good information in the VIQI 1 (information flow). The information flow was found to increase with more information content. However, no statistically significant difference was found between the information content score and the other VIQI (Table 3).

## DISCUSSION

This study highlights the volume of information about rubber dam available on YouTube. During dental and endodontic treatments, the patients’ cooperation and knowledge of treatment are crucial. YouTube videos play an especially significant role in improving patients’ and clinicians’ information about endodontic treatments [15,17-19].

**Table 3.** The evaluation of the relationship between duration, the number of likes, the number of views, the video information and quality index (VIQI), and the information content

Variables	Poor			Moderate			Good			p value
	Mean ± SD	Minimum	Maximum	Mean ± SD	Minimum	Maximum	Mean ± SD	Minimum	Maximum	
Time	3.83 ± 3.31	0.27	10.49	6.98 ± 3.59	2.30	15.54	10.18 ± 7.10	3.16	18.06	0.015*
Number of likes	449.78 ± 561.09	5	1,900	519.25 ± 596.98	0	2,000	2,665.25 ± 4,897.68	59	10,000	0.056
Number of views	48,114.5 ± 77,520.47	2,278	287,000	39,835.75 ± 41,809.02	792	157,000	151,907.00 ± 267,952.02	2,402	553,000	0.149
VIQI 1 (Information flow)	2.35 ± 1.49	1	5	3.31 ± 1.3	1	5	4.25 ± 0.95	3	5	0.037*
VIQI 2 (Information accuracy)	2.92 ± 1.38	1	5	3.81 ± 0.98	1	5	4.00 ± 1.41	2	5	0.105
VIQI 3 (Quality)	2.21 ± 1.67	1	5	2.56 ± 1.31	1	5	3.25 ± 1.50	2	5	0.469
VIQI 4 (Precision)	3.00 ± 1.51	1	5	4.00 ± 1.21	1	5	3.50 ± 0.57	3	5	0.130

SD, standard deviation.

\* $p < 0.05$  significance convention.

YouTube is one of the largest and most visited video-sharing platforms; it is free, easily accessible, and has lots of educational videos. However, since the platform has no control mechanism, there is a high probability that its videos will contain inaccurate and incomplete information [20]. Using YouTube videos for the education of patients and clinicians has been explored in many different medical and dental studies. There are several YouTube videos on oral health issues, such as oral cancers, Sjögren's syndrome, dental implants, early childhood caries, root canal treatment, digital dentistry, root resorption, traumatic dental injuries, regenerative endodontic treatment, and endodontic access cavity preparation [10,12,14,15,21-26].

A comprehensive search for YouTube videos on rubber dam applications was conducted on October 4, 2022. Following duplicate removal, 73 videos were identified and subsequently assessed against predefined inclusion criteria. This process yielded a final sample of 34 videos deemed suitable for analysis. The relatively modest sample size reflects the inherent limitations of YouTube as a data source for this specific topic. This is consistent with previous studies utilizing YouTube as a data source. For instance, Jamleh *et al.* [14,27] evaluated 41 videos on access cavity preparation, while their investigation of periradicular surgery included 42 videos. The relative scarcity of relevant videos may be attributed to the limited target audience of rubber dam applications. Additionally, awareness and use of the rubber dam among clinicians was low prior to the COVID-19 pandemic, further contributing to the limited number of educational videos available. Given the limitations of the platform and topic, our sample size of 34 videos is consistent with similar studies in the literature, and provides valuable insight into the content of rubber dam videos on YouTube. However, new videos about rubber dam should be uploaded to YouTube. It may be useful to re-evaluate the contents of these videos with a larger sample size in the future.

Several studies have focused on the effectiveness and perception of videos as a learning tool in medical and dental education [28-31]. When first-year dental students were asked to compare video-based learning with textbook-based learning, the former was reported to be much more effective [30]. In a study conducted on 479 dental students, which investigated the effectiveness of YouTube in learning clinical procedures, 95% found videos helpful. However, 36% reported being unsure of the videos' information content [31].

The benefits of video-based lectures reported by medical and dental students include ease of access, the ability to view content according to one's pace, the flexibility to download material at any time, and the ability to revisit previous material [28,32,33]. Video-based courses on online platforms can be used by educational institutions for distance learning and to deal with problems concerning the lack of faculty members and financial deficiencies [34].

Rubber dam has positive benefits: it reduces microbial contamination, the potential for patients to swallow or inhale irrigation solutions, files, and infected tooth debris, and enhances the field of view of clinicians and patients [35]. Evidently, rubber dam is considered the gold standard in endodontic treatments [36]. However, as studies have revealed, rubber dam is not quite frequently used in endodontic treatments, which is probably because of clinicians' lack of knowledge about how to use them [37]. Especially after the COVID-19 pandemic, clinicians and dentistry students started using YouTube for educational purposes, with videos on rubber dam applications being the most in-demand, as it has been reported that rubber dams can significantly decrease airborne particles in up to 3-foot diameter of the operational field by 70% [38]. According to past research, YouTube viewers go through the first 3 pages of search results, and the majority of the videos are in English [39]. In light of

this, and since the language of the literature is English, we evaluated only the English videos on the first 3 pages. Moreover, since YouTube decided in 2021 to hide the number of dislikes received by a video, we did not take the same into account.

Regarding study limitations, only English videos were evaluated, and this can be considered a geographical limitation. Moreover, YouTube is a dynamic platform, with new videos constantly uploaded, but only the videos uploaded close to the date of the study were evaluated.

Creating informational content headings to analyze the videos and evaluate their quality has been reported to directly influence the study data [40,41]. In this study, after conducting the literature review, 8 information content headings were decided in line with the suggestions of Patel and Hamel [6].

The “presentation of rubber dam kit” was the most mentioned content (61.7%), as most of the videos started by introducing rubber dam pieces. There is thus fruitful information on this subject in the videos. Moreover, we think that physicians’ confusion regarding the wide variety of clamps can be alleviated by the videos, as we found that this information content has been frequently mentioned. Moreover, the videos can help patients recognize the material applied to their teeth and mouths.

Video duration is an important standard for providing detailed information to the audience. However, sometimes, when the duration increases, viewers find it difficult to focus on the subject [22,42]. In the present study, a positive correlation between duration and information content was found. This finding similar to that of previous studies is probably because there are more opportunities to discuss related content in a longer video [10,22,43].

Moreover, although insignificant, videos with good information content were found to have the highest number of likes and views. As the information content of the videos increased, patients’ and clinicians’ interest in them increased, and these videos were clicked on more and attracted more attention. Similar to Demirci and Dindaroğlu [26] we found that information flow (VIQI 1) increases with an increase in information content. This can be associated with a more fluent progression of videos with good information content.

## CONCLUSIONS

We found that the existing YouTube videos on rubber dams are generally moderately informed and insufficient. They are insufficient as sources of information for patients and clinicians; however, can be considered supplements. More YouTube videos with quality information on dental and current issues should be produced in the future.

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