Are YouTube Videos Reliable Sources of Information About Devital Bleaching?[*]

YouTube Videoları Devital Beyazlatma Hakkında Güvenilir Bilgi Kaynakları mıdır?

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ABSTRACT

Objectives: Nowadays, YouTube is widely used to find information on any subject. The aim of this study was to research the quality and content of the most relevant YouTube™ videos about devital bleaching.

Materials and Methods: "Internal bleaching" was determined as the searching term after consulting with "Google Trends" application, and the search on YouTube was conducted on 25th of January 2022 without using any filters. Videos have been evaluated and scored for usefulness and Global Quality Score (GQS). For statistical analysis, Kruskal-Wallis test, Pearson test and Pearson Chi-Square were performed.

Results: 100 videos were evaluated, 35% of which met the inclusion-exclusion criteria. Most of the video uploaders were dental professionals (56.9%). Videos had a generally moderate usefulness score (mean±SD: 3,37 ± 2,09). According to the ownership, there was no difference between the median overall usefulness scores (p=0.611). There is a statistically significant positive correlation between video length and overall usefulness score (p<0.001). Similarly, there is a statistically significant positive correlation between the number of likes and the overall usefulness score (p=0.002). The median viewing rate value of 'moderate' videos was significantly lower than 'poor' and 'good' videos (p=0.048).

Conclusions: Devital bleaching-related information on YouTube™ could not be considered entirely dependable. Patients should be selective to obtain information from reliable sources.

Keywords: YouTube, Social Media, Devital Bleaching, Dental Bleaching

ÖZ

Amaç: Günümüzde YouTube herhangi bir konuda bilgiye ulaşmak için yaygın olarak kullanılmaktadır. Bu çalışmanın amacı, devital beyazlatma ile ilgili en alakalı YouTube™ videolarının içeriğini ve kalitesini değerlendirmektir.

Gereç ve Yöntem: Google Trends uygulaması ile arama terimi olarak "İnternal bleaching" belirlenmiş ve YouTube'da 25 Ocak 2022 tarihinde herhangi bir filtre kullanılmadan arama yapılmıştır. Videolar, kullanışlılık ve Global Kalite Puanı (GQS) açısından değerlendirilmiş ve puanlanmıştır. İstatistiksel analiz için Kruskal-Wallis testi, Pearson testi ve Pearson Ki-Kare uygulanmıştır.

Bulgular: 100 video değerlendirilmiş ve bunların %35'i kriterlere uymadığı için çalışmaya dahil edilmemiştir. Video yükleyenlerin çoğunluğunun diş hekimleri olduğu görülmüştür (%56,9). Videoların genel olarak orta düzeyde kullanışlılık puanına sahip olduğu tespit edilmiştir (ortalama±SS: 3,37 ± 2,09). Videoları yükleyenkere göre, medyan genel kullanışlılık puanları arasında fark yoktur (p=0.611). Video uzunluğu ile genel kullanışlılık puanı arasında istatistiksel olarak anlamlı pozitif bir ilişki vardır (p<0.001). Benzer şekilde, beğeni sayısı ile genel kullanışlılık puanı arasında istatistiksel olarak anlamlı pozitif bir ilişki vardır (p=0.002). 'Orta' videoların medyan izlenme oranı değeri, 'zayıf' ve 'iyi' videolardan önemli ölçüde düşüktür (p=0.048).

Sonuç: YouTube™ devital beyazlatma hakkında tamamen güvenilir bir bilgi kaynağı olarak kabul edilemez. Hastalar güvenilir kaynaklardan bilgi almak için seçici olmalıdır.

Anahtar Kelimeler: YouTube, Sosyal Medya, Devital Beyazlatma, Diş Beyazlatma

Introduction

The Internet provides a desirable and effective platform for patients searching for health-related informative content.[1] Nowadays, in dentistry, among the most widely used information sources is the internet. besides face-to-face patient-practitioner communication. The Internet has made it easier to access information, which encourages people to use online resources to do their research because of the patients' wince to perform clinician face-to-face communication, the lengthy wait periods for patients in the clinics, and COVID-19 pandemic.[2]

Today, more and more people are concerned about the aesthetic appearance. Considering the importance of anterior teeth, defects in hue and shape could provide a poor aesthetic and lead to psychological and social issues with appearance. Discoloration resulting from traumatic injuries is the most common cause of poor aesthetics.[3,4] Pulp hemorrhaging after the traumatic injury can cause intrinsic discoloration. The initial pink transformation might only last a short while. A darker grayish coloring may result from the necrotic and hemorrhaging pulp of a devitalized tooth as hydrogen sulfide reacts with the iron released by the blood's breakdown into hemin, hematoidin, hemosiderin, and hematin to generate ferric sulfide.[5,6] In addition, incorrect preparations and incorrectly applied filling substances during root canal treatment may cause discoloration.[7]

There is an increase in the time and cost spent to regain the lost aesthetics after the coloration.[8] Internal bleaching is frequently used to resolve these problems because, for stained, devital teeth, it is a minimally invasive, easy, and economical procedure.

There are different treatment methods available such as composite veneers, porcelain veneers, porcelain crowns, and whitening treatments to restore the aesthetic appearance of the devital teeth. Intracoronal bleaching treatment, which is less costly, easier, more conservative, and more convenient for the patient, is one of these methods.

A few studies have been on vital dental whitening.[9,10] However, no articles have researched YouTube™ content about devital teeth whitening that needs application due to trauma or other reasons. The purpose of this research was to assess the informational value of the most relevant YouTube™ videos about devital bleaching (teeth whitening).

Material and methods

In the present study, "internal bleaching" was determined as the searching term after consulting with "Google Trends" application, and the search on YouTube was conducted on 25th of January 2022 without using any filters. The first 100 videos were screened, and 65 videos were included after excluding 35 videos for number of reasons. Our exclusion criteria were non-English videos, videos without video or audio, duplicated videos, and off-topic videos. The included videos were evaluated independently by two investigators to note the duration of videos, their upload date and source, and their number of views and likes and scoring the videos.

To evaluate the usefulness of the content, each video was assessed in terms of aetiology, supporting media, indication, endodontic examination, complication, follow-up, quality of coronal restoration, application procedures, was given a score of 1 or 0 and an overall content score was calculated over 8. In addition, the videos' quality was evaluated using the Global Quality Score (GQS) which scores the videos from 1 (poor quality) to 5 (excellent quality) (***Table 1***).

Table 1. Global Quality Score

Scores	Description
1	Poor quality; very unlikely to be of any use to patients
2	Poor quality but some information present; of very limited use to patients
3	Suboptimal flow, some information covered but important topics missing; somewhat useful to patients
4	Good quality and flow, most important topics covered; useful to patients
5	Excellent quality and flow; highly useful to patients

Viewing rate was calculated same as described in previous studies (number of views/number of days since upload)*100%).[11] In case of a disagreement between researchers in scoring, researchers reviewed the literature and came to an agreement.

Data were analyzed with IBM SPSS V23. Shapiro Wilk and Kolmogorov Smirnov tests were used to assess compliance with the normal distribution. Data that were not normally distributed in groups of three or more were compared using the Kruskal-Wallis H test, and multiple comparisons were made using the Dunn's test. Pearson Chi-Square test statistics were used to examine the relationship between categorical variables according to groups. For the evaluation of the relationship between data that did not show normal distribution, Spearman's rho correlation was used. For quantitative data, the mean, median (minimum-maximum), and standard deviation were provided, whereas for categorical variables, the frequency (percent) was used. Significance level was taken as $p < 0.05$.

Results

After applying our have a statistically significant positive association. exclusion criteria, 65 videos were selected out of the initially screened 100 videos. The videos excluded from the study and their reasons are as follows: Non-English: 3, No Audio: 0, No Video: 0, Duplicated: 5, Irrevalent: 27, and Total Excluded: 35. ***Table 2*** displays the descriptive statistics of the assessed video demographics.

Table 2. Descriptive data of the YouTube™ videos about the internal bleaching

	Mean±SD	Median (Min. - Max.)
Overall(0-8)	3,37 ± 2,09	3 (0 - 8)
GQS(1-5)	2,75 ± 1,12	3 (1 - 5)
Duration	1160,05 ± 3887,05	219 (13 - 22563)
Views	15712,4 ± 29292,02	3176 (2 - 116180)
Age	1277,98 ± 1129,85	818 (73 - 4827)
Like	143,02 ± 240,45	24 (0 - 1200)
Viewing Rate	3079708292,79 ± 2174178015,41	2658861789 (0,38 - 9952261307)

The distribution of usefulness scores based on content and source of upload are showed in ***Table 3***. When the video contents were evaluated, it was seen that the subjects related to complications were mentioned the least, while the application procedures were mentioned the most. When the source of upload is evaluated, it is seen that the highest rate is dentists.

Table 3. Distribution of content scores

Content	N	(%)
Aetiology		
0	35	53,8
1	30	46,2
Supporting media		
0	27	41,5
1	38	58,5
Indication		
0	48	73,8
1	17	26,2
Endodontic examination		
0	41	63,1
1	24	36,9
Complication		
0	51	78,5
1	14	21,5
Follow-up		
0	53	81,5
1	12	18,5
Quality of coronal restoration		
0	35	53,8
1	30	46,2
Application procedures		
0	11	16,9
1	54	83,1
Poor (0-2)-Moderate (3-6)-Good (7-8)		
Poor	27	41,5
Moderate	33	50,8
Good	5	7,7
Ownership		
Dentist	37	56,9
Commercial	6	9,2
Other	22	33,8

The relationship between usefulness scores, video demographics, and GQS is presented in *Table 4*. There was a statistically significant positive correlation between GQS and Overall ($p<0.001$). There is a statistically significant positive correlation between video length and overall usefulness score ($p<0.001$). Similarly, there is a statistically significant positive correlation between the number of likes and the overall usefulness score ($p=0.002$). There was no statistical difference between other variables ($p>0.050$).

Table 4. Relationship between usefulness scores and video demographics and GQS

	Overall	
	r	p
GQS	**0,832**	**<0,001**
Duration	**0,625**	**<0,001**
Views	0,206	0,099
Age	-0,027	0,832
Like	**0,383**	**0,002**
Viewing Rate	-0,193	0,124

r: Spearman Rank Correlation

Table 5 shows a comparison of YouTube™ video demographics based on GQS. There is a statistically significant positive correlation between the length of the videos and GQS (p<0.001). There was also a statistically significant positive correlation between the views and GQS (p=0.024). Similarly, there is a statistically significant positive correlation between the number of likes and GQS (p=0.001).

Table 5. Comparison of YouTube video demographics based on GQS

	GQS	
	r	p
Duration	**0,534**	**<0,001**
Views	**0,279**	**0,024**
Age	-0,060	0,637
Like	**0,413**	**0,001**
Viewing Rate	-0,221	0,077

r: Spearman's rank correlation coefficient

A comparison of usefulness scores of videos based on the source of upload is presented in **Table 6**. There was no statistically significant difference amongst videos uploaded from different sources in terms of overall usefulness scores. (p=0.380).

Table 6. Comparison of usefulness scores of videos based on source of upload

Overall Score	Ownership			Total	p*
	Dentist	Commercial	Other		
Poor (0-2)	17 (45,9)	1 (16,7)	9 (40,9)	27 (41,5)	
Moderate (3-6)	18 (48,6)	5 (83,3)	10 (45,5)	33 (50,8)	0,380
Good (7-8)	2 (5,4)	0 (0)	3 (13,6)	5 (7,7)	

*Pearson chi square test

Table 7 shows that GQS and overall usefulness scores are compared according to the upload source. There was no difference between the GQS median values according to the ownership (p=0.751). According to the ownership, there was no difference between the median overall usefulness scores (p=0.611).

Table 7. Comparison of GQS and Overall usefulness scores according to source of upload

	GQS		Overall Usefulness Score	
	Mean±SD	Median (Min. - Max.)	Mean±SD	Median (Min. - Max.)
Dentist	2,68 ± 1,18	3 (1 - 5)	3,14 ± 2,06	3 (0 - 8)
Commercial	2,67 ± 0,82	2,5 (2 - 4)	3,17 ± 0,75	3 (2 - 4)
Other	2,91 ± 1,11	3 (1 - 5)	3,82 ± 2,36	4 (0 - 8)
p*	0,751		0,611	

*Kruskal Wallis H test

Table 8 shows the variables according to the usefulness score. GQS median value of 'poor' videos was significantly lower than 'moderate' and 'good' videos (p<0.001). There was a difference between the median duration value of 'poor' videos was significantly lower than 'moderate' and 'good' videos (p<0.001). The median number of likes of 'moderate' videos was significantly higher than 'poor' and 'good' videos (p=0.028). The median viewing rate value of 'moderate' videos was significantly lower than 'poor' and 'good' videos (p=0.048).

Table 8. Comparison of GQS, Duration, Views, Age, Like, Viewing Rate values according to usefulness score

	Usefulness scores			p*
	Poor	**Moderate**	**Good**	
	Median (Min. - Max.)	**Median (Min. - Max.)**	**Median (Min. - Max.)**	
GQS(1-5)	2 (1 - 3)[a]	3 (1 - 5)[b]	4 (4 - 5)[b]	**<0,001**
Duration	98 (15 - 777)[a]	326 (13 - 21617)[b]	1159 (512 - 22563)[b]	**<0,001**
Views	1837 (22 - 116180)	4437 (2 - 104149)	1837 (411 - 37887)	0,152
Age	818 (73 - 4827)	784 (82 - 3375)	896 (344 - 1398)	0,897
Like	5 (0 - 646)[a]	78 (0 - 1200)[b]	24 (3 - 713)[ab]	**0,028**
Viewing Rate	3638356164 (1014480874 - 8768971332)[a]	1687791861 (0,38 - 9952261307)[b]	2783333333 (1069196429 - 5924418605)[ab]	**0,048**

*Kruskal Wallis H test; [a-b] There is no difference between groups with the same letter

Discussion

Although the primary purpose of YouTube™ is not education, today, with the effect of the Covid19 pandemic, it is used by many users to access educational videos online before meeting face-to-face with experts in different fields. Al-Silwadi et al. reported that social media platforms that disseminate audiovisual content, like YouTube™, raised the patient's level of knowledge.[12] However, there is a fundamental handicap in this regard. Although most of the videos about dental issues appear to be uploaded by dentists, specialists, or hospitals, the information declared by the video owners and the content of the videos they upload is not pre-evaluated for their accuracy. Similar to some other studies, most of the video uploaders were dental professionals in this study.[13,14]

Smile aesthetics is an essential part of facial aesthetics, and nowadays, the amount given to aesthetics has increased considerably. People are quite interested in tooth color, and some feel that they do not have white enough teeth.[15] For this reason, people are very interested in teeth whitening and try to get information online. Considering the results of this study, even the videos about devital whitening have a very high viewing rate. When accessing the information on any subject, one should be selective in using information sources such as YouTube™, where the accuracy of the content of the uploaded videos is not subject to preliminary evaluation by professionals.

Especially the content of follow-up, indication, and complications was missing in the uploaded videos, which led to a decrease in the completeness score of the video. The evaluated videos' GQS and overall completeness scores were determined at a moderate informative content. Şimsek et al. similarly noted that most videos had moderate-information quality.[10] The usefulness score was found to be generally poor in other oral health-related YouTube™ studies.[11,16,17] No significant relationship was found between the age of the videos and the GQS or usefulness score in the present study. Since dental materials and methods are a developing field of science, the history of the videos and the last time they were updated is critical for the audience to access up-to-date and accurate information.[14]

There is a statistically significant positive correlation between the number of likes, the usefulness score (p=0,383), and the GQS (p=0,413). However, this number of likes is far from indication of reliability in evidence-based dentistry and is subjective.[11] As in many previous studies, the completeness score and GQS had no statistically significant association to one another in this study (p>0.05). Since the ranking of the posts on YouTube™ is shaped by the number of views and the number of likes, videos with a higher completeness score may not appear in the front rows. It may become more difficult for the audience to reach higher-quality videos.[11,16,17]

In this study, those who uploaded the videos were classified as a dentist, commercials, and others, and it was determined that the ones who uploaded the most videos were dentists. However, it has been observed that the level of usefulness of the videos is moderate, regardless of the uploaders. Similarly, Gaş et al. also declared no association between video usefulness and its source of upload.[18] On the other hand, studies report that the educational level of the videos poseby dental professionals is higher.[14,17] The low scores can explain this difference in results in the videos in this study, which did not address critical issues such as indications and complications. In addition, the reason why there is a usefulness score and GQS close to dental professionals in commercials can also be explained by the support of these commercial companies from dental professionals, their better sound and image quality, and advertising to create a dental market. Bezner et al. reported that laypeople's videos serve a more social purpose and that medical organizations' videos are generally more educational.[19]

There was a difference between the duration value of 'poor' videos was significantly lower than 'moderate' and 'good' videos (p<0.001) in this study. Video duration should be sufficient to cover all the topics covered, however, despite more video content, it appears that viewers have lost interest in lengthy videos., so it is crucial that viewers are given the topics in new video material in reasonable amounts of time.[20]

The limitations of this study are that YouTube™ has dynamic content, there are many factors in ordering videos, and videos can be uploaded and deleted frequently. Therefore, search inquiry results may vary depending on search time, and each person may receive a different list of videos on YouTube™. In this study, the sort by relevance filter was used, as a society thought it was more preferred. This search filter prioritizes the most viewed and liked videos, not the video content quality. Another limitation is that only videos in which the video language is English are evaluated, thus limiting our findings. Additionally, there is no standard methodology for assessing video-based sources.[14] Therefore, the videos were analyzed subjectively by three researchers according to our checklist, as done in several other studies in dentistry.[10,11,13,14,17]

YouTube is user-friendly, with much of its content being free, so it is a highly preferred medium for the public to access information. However, one should be aware of YouTube's limitations, and videos using peer-reviewed scientific publications and recommendations by dental professionals should remain the primary sources of information. Finding videos with quality content along with being crucial for patients, it can also be advantageous for dentists and dentistry.

Conclusion

Devital bleaching-related information on YouTube™ could not be considered entirely dependable. In order to reach more accurate information, videos should be uploaded by dental professionals and dentists should direct their patients to appropriate resources in order for them to have access to current and accurate information. In particular, the evaluation of the content by the professionals before the videos published on sources such as YouTube on health-related topics can be considered in terms of expanding accessibility to correct information.

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Author Contributions

Gülbahar Erdinç: Study conception and design, control/supervision, data collection, data analysis and interpretation, literature review, writing the article, critical review.

Yağız Özbay: Design, control/supervision, data collection, data analysis and interpretation, literature review, writing the article, critical review.

Neslihan Yılmaz Çırakoğlu: Study conception, control/supervision, data collection, data analysis and interpretation, literature review, writing the article, critical review.

References

1. AlGhamdi KM, Moussa NA. Internet use by the public to search for healthrelated information. Int J Med Inform 2012;81(6):363-73.

2. Gholami-Kordkheili F, Wild V, Strech D. The impact of social media on medical professionalism: A systematic qualitative review of challenges and opportunities. J Med Internet Res 2013;15(8):2708.

3. Arens D. The role of bleaching in esthetics. Dent Clin North Am 1989;33(2), 319-336.

4. Hill HD. Complete Dental Bleaching. J Am Dent Assoc 1996;127(12):1713.

5. Guldener PHA, Langeland K. Endodontologie. 3rd ed. Stuttgard: Thieme; 1993.

6. Attin T, et al. Review of the current status of tooth whitening with the walking bleach technique. Int Endod J 2003;36(5):313-329.

7. Pontefract H, et al. Development of methods to enhance extrinsic tooth discoloration for comparison of toothpastes: 2. Two-product clinical study. J Clin Periodontol 2004;31(1):7-11.

8. Zimmerli B, Jeger F, Lussi A. Bleaching of nonvital teeth. A clinically relevant literature review. Schweizer Monatsschrift fur Zahnmedizin 2010;120(4):306-320.

9. Sılva Mcb Da, Trevızan L, Monteıro Junıor S. Would YouTube a reliable source of information about dental bleaching in Brazil? Rev Odontol UNESP 2020;49.

10. Simsek H, et al. "How I whiten my teeth": YouTubeTM as a patient information resource for teeth whitening. BMC Oral Health 2020;20(1):1-6.

11. Özbay Y, Çırakoğlu NY. YouTube as an information source for instrument separation in root canal treatment. Restor Dent Endod 2021;46(1):8.

12. Al-Silwadi FM, et al. Effect of social media in improving knowledge among patients having fixed appliance orthodontic treatment: A single-center randomized controlled trial. Am J Orthod Dentofac Orthop 2015;148(2):231-237.

13. Hutchison CMD, et al. YouTubeTM as a source for patient education about the management of dental avulsion injuries. Dent Traumatol 2020;36(2):207-211.

14. Nason K, Donnelly A, Duncan HF. YouTube as a patient-information source for root canal treatment. Int Endod J 2016;49(12):1194-1200.

15. Alkhatib MN, Holt R, Bedi R. Prevalence of self-assessed tooth discolouration in the United Kingdom. J Dent 2004;32(7):561-566.

16. ElKarmi R, et al. YouTube as a source for parents' education on early childhood caries. Int J Paediatr Dent 2017;27(6):437-443.

17. Hassona Y, et al. YouTube as a source of information on mouth (oral) cancer. Oral Dis 2016;22(3):202-208.

18. Gaş S, Zincir Ö, Bozkurt AP. Are youtube videos useful for patients interested in botulinum toxin for bruxism? J Oral Maxillofac Surg 2019;77(9):1776-1783.

19. Bezner SK, et al. Pediatric surgery on YouTubeTM: Is the truth out there? J Pediatr Surg 2014;49(4):586-589.

20. Lena Y, Dindaroglu F. Lingual orthodontic treatment: A YouTubee video analysis. Angle Orthod 2018;88(2):208-214.