

# Özgün Araştırma Makalesi

## Quality of Information in Youtube™ Videos on Dental Sedation

### *Youtube™ Videolarında Diş Sedasyonu ile İlgili Bilgilerin Kalitesi*

Mehmet Emin Toprak<sup>1</sup> , Necmiye Şengel<sup>2</sup> , Bedreddin Cavlı<sup>3</sup> 

#### ABSTRACT

**Aim:** We aimed to identify and analyze the quality of YouTube™ videos on dental sedation.

**Material and Methods:** YouTube website was independently searched by researchers for videos on dental sedation published before December 27, 2020. Appropriate videos were determined according to the inclusion and exclusion criteria of the research. All data about each video was recorded. Included videos were classified according to standardized quality criteria.

**Results:** 106 of the first 202 videos reached were included in the study. Most of the videos were from health professionals (88.68%). It was determined that the video contents of 15 videos were poor (14.15%), 81 moderate (76.42%), and 10 excellent (9.43%). There was no significant relationship between the content quality of the videos and the interaction index ( $p=0.108$ ) and viewing rates ( $p=0.302$ ). Significantly greater quality difference was seen between video sources ( $p=0.013$ )

**Conclusions:** The videos on YouTube™ about dental sedation procedures cover some important aspects of treatment; however, data such as risk, contraindications, and cost are shared insufficiently in general. YouTube™, which is accessed frequently around the world, needs to work with healthcare professionals to provide accurate information, especially for content related to medical procedures, and offer some filtering options for these videos.

**Keywords:** Dental sedation; Information; Internet; YouTube™

#### ÖZET

**Amaç:** Dental sedasyonla ilgili YouTube™ video içeriklerinin kalitesini değerlendirmeyi amaçladık.

**Gereç ve Yöntem:** YouTube™ internet sitesinde 27 Aralık 2020 tarihinden önce yayınlanan dental sedasyon ile ilgili videolar araştırmacılar tarafından bağımsız olarak değerlendirilmiştir. Araştırmaya dahil etme ve hariç tutma kriterlerine göre uygun videolar belirlenmiş, her video ile ilgili tüm veriler kaydedilmiştir. Dahil edilen videolar standartlaştırılmış kalite kriterlerine göre değerlendirilmiştir.

**Bulgular:** Değerlendirilen ilk 202 videodan 106'sı çalışmaya dahil edilmiştir. Videoların çoğunun sağlık profesyonellerinin yayınladığı videolar olduğu görülmüştür (%88.68). Değerlendirme kriterlerine göre 15 videonun video içeriklerinin zayıf (%14.15), 81'inin orta (%76.42) ve 10 videonun (%9.43) mükemmel olduğu belirlenmiştir. Videoların içerik kalitesi ile etkileşim indeksi ( $p=0.108$ ) ve izlenme oranları ( $p=0.302$ ) arasında anlamlı bir ilişki olmadığı; video kaynakları arasında, önemli ölçüde kalite farkı olduğu görülmüştür ( $p=0.013$ ).

**Sonuç:** YouTube™daki dental sedasyon prosedürleriyle ilgili videolar tedavinin bazı önemli yönlerini kapsamakta; risk, kontrendikasyonlar, maliyet gibi veriler genel olarak yetersiz paylaşılmaktadır. Dünya genelinde sıklıkla erişilen YouTube™'un özellikle tıbbi prosedürlerle ilgili içerikler için doğru bilgiler vermesi ve bu videolar için bazı filtreleme seçenekleri sunması için sağlık profesyonelleri ile birlikte çalışması gerektiği çalışmamızda görülmüştür.

**Anahtar Kelimeler:** Dental sedasyon; Bilgi; İnternet; YouTube™

Makale gönderiliş tarihi: 30.06.2022; Yayına kabul tarihi: 19.07.2022

İletişim: Dr. Necmiye Şengel

Gazi University Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Gazi University, Ankara, Turkey. Bişkek Cd.(8.Cd.) 1.Sk. No:4 06490 Emek – ANKARA

E-posta: [necmiyesengel@hotmail.com](mailto:necmiyesengel@hotmail.com)

<sup>1</sup> DDS, Phd, Assist. Prof., Gazi University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Ankara, Turkey

<sup>2</sup> MD, Gazi University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Ankara, Turkey

<sup>3</sup> Assist. Prof., Kutahya Health Science University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Kütahya, Turkey

## INTRODUCTION

Sedation is a widely used anesthesia technique in which communication with the patient can be maintained during this period and limited doses of drugs with a wide safety margin that suppress the central nervous system are used.<sup>1</sup> It is preferred for the safe treatment of patients with severe anxiety and phobia and in certain medical conditions or complex treatments that do not allow working with standard local anesthesia.<sup>2,3</sup> It is preferred in many surgical procedures and radiologic imaging techniques because of its advantages such as being cost-effective, having a lower rate of complications, being more easily manageable, and being less complicated than general anesthesia procedures.<sup>4</sup>

Dental anxiety is considered a universal phenomenon with a high prevalence worldwide. For a patient with dental anxiety, the option of undergoing procedures without anxiety and pain-reducing methods is highly attractive. However, patients cannot make healthy decisions about the implementation of informed consent and written instructions without having detailed information about the scope of the risks and benefits of this procedure. However, healthcare professionals often find the patients' ability to understand the information conveyed about the procedure to be insufficient.<sup>5,6</sup> In this process, patients tend to obtain medical information over the internet and find people who share their experiences.<sup>7</sup> YouTube™ is a website that allows users to search for free, watch, and upload both individual and commercially created videos and is currently the second most visited website after Google™ (Alexa 2021). The accuracy of YouTube™ videos is not objectively evaluated before they reach the user. Therefore, patients can obtain false and misleading information in videos.

The quality of the information obtained from the internet concerns both the patient and the physician, and erroneous information can cause significant problems.<sup>8</sup> Although the problem first arises in the treatment plan created by the decision of the patient and the physician, a healthy patient-physician relationship can deteriorate, and it can also affect preoperative anxiety and postoperative patient satisfaction.<sup>9,10</sup> YouTube™ videos have been evaluated in many studies in terms of patient

education and health promotion in different health fields.<sup>11-14</sup> However, as far as we know, there has not been a study evaluating YouTube™ videos about sedation procedures in dentistry. This study aimed to evaluate the accuracy, usefulness, and quality of the information in the videos presented to patients on the YouTube™ platform about sedation procedures used in dental treatments.

## MATERIALS AND METHODS

### Study Design

The study was conducted cross-sectionally using videos on the YouTube™ platform about dental sedation application between 09:00 - 24:00 on December 27th, 2020. In the search address bar of YouTube™ (<https://www.YouTube.com>), "dental sedation" was used as a keyword based on Google Trends. All filters were removed for YouTube™ searches and videos were sorted using the "sort by relevance" option. Most studies using YouTube™ as a search engine used the first 60-200 ranked videos.<sup>15</sup> It has been shown that YouTube™ users generally scan the first 30 videos and the first 3 pages<sup>16</sup> and that 95% of online searchers do not look beyond the first three pages of search results.<sup>17</sup>

The first 202 videos listed for the term "dental sedation" were viewed and the access links were copied. Videos published in languages other than English, duplicate videos, satirical, conference lectures or irrelevant videos, advertisements, drama-based videos, videos without titles or sound, and videos with very poor image quality were excluded from the study. Only videos in English with acceptable video quality, whose main content was dental treatments under sedation, were included in this study.

### Variables

For each video, the number of views, video duration, upload date to YouTube™, number of comments, likes, dislikes, video quality, country of origin, and uploader source were recorded as of the working date. The interaction index and viewing rate values of the videos were calculated using the obtained data. The interaction index (interaction index: number of likes-dislikes/total number of views until the day of the study) was used to see how much interaction the videos received from the viewers. The index

of viewing rate (viewing rate: total number of views of the video/number of days from the day the video was uploaded to the day of the research) was used to determine how much the audience liked the video.

Each video was classified as university, hospital, educational institution, health worker, health companies or informative websites, individual users, and other (e.g. TV channels, news agencies) according to the source that uploaded it. In addition, the content types of the videos were categorized as patient experiences, educational material (physician or healthcare worker), videos containing scientifically incorrect or unproven information.

Content quality of videos was evaluated based on eight different types of information regarding the explanation, indications, contraindications, advantages, procedures to be performed, complications, prognosis and survival, and the cost of the procedure. If the video content provided correct information, it was scored 1 (one) and if not, then it was scored 0 (zero), accordingly, the content quality of videos was scored 0-8. Three researchers (M.E.T., N.Ş., and B.C.) watched and analyzed the videos independently. If the video quality content score was between 0-2, it was defined as “poor”, between 3-5 as “moderate”, and between 6-8 as “excellent”. The information contained in the weak videos (0-2 points) was quite limited and its usefulness to the patient was rather poor. Although the “moderate” quality videos (3-5 points) provided good information on certain subjects and showed a certain level of benefit for the patient, they were evaluated as “somewhat useful” because superficial information was given or no information was given or the patients were misdirected in some categories.

The videos that were evaluated as having “excellent” (6-8 points) video content quality were very useful for the patient, containing comprehensive, detailed, and accurate information.

This study was exempted from the Research and Ethics Committee approval.

### Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistical Software version 25 (Armonk, New York: IBM Corp.). Interobserver agreement was calculated as the k score. Continuous variables were analyzed using analysis of variance (ANOVA) and the Kruskal-Wallis test, and categorical variables were analyzed using the Chi-square test. Inter-rater correlations were determined using the Pearson test. Statistical significance was accepted as  $p < 0.05$ .

## RESULTS

In this study, in which the YouTube™ video contents of dental sedation procedures were evaluated, a total of 202 videos were examined. Among these videos, 96 videos were excluded without being evaluated (20-day news video, 62 commercial videos, one device introduction, three conference videos, three non-English videos, and eight off-topic videos). It was observed that 80 of the 106 videos that could be included in the study were from the United States of America (USA), and the other videos were uploaded from England (n=11), India (n=7), United Arab Emirates (n=4), Canada (n=3), and Ireland (n=1), respectively.

Evaluated according to content quality, 15 of 106 videos were categorized as poor (14.15%), 81 as moderate (76.42%), and 10 as excellent (9.43%). It was

**Table 1.** Descriptive Statistics of Video Properties

	<b>N</b>	<b>Min. value</b>	<b>Max. value</b>	<b>For all videos (Total)</b>
<b>Views</b>	106	13	1,117,448	4,137,861
<b>Video Duration (Seconds)</b>	106	27	6170	632,429
<b>Number of Comments</b>	106	0	3368	5946
<b>Likes</b>	106	0	18,000	34,089
<b>Dislikes</b>	106	0	514	1315
	<b>N</b>	<b>Min. value</b>	<b>Max. value</b>	<b>Median</b>
<b>Interaction Index</b>	106	0	0.171	0.023
<b>Views Rate</b>	106	0.023	2024,362	200,788
<b>Content Quality (Total)</b>	<b>N</b>	<b>Poor</b>	<b>Moderate</b>	<b>Excellent</b>
	106	15 (14.15%)	81 (76.42%)	10 (9.43%)

determined that the videos were watched 4,137,816 times in total, the total video duration was 632,429 seconds, and 5946 comments were made. It was observed that the interaction index of the patients with the videos was positive in 2.3% (range, 0-17%). The number of views, video duration, number of comments, number of likes and dislikes, interaction index, viewing rate, and content quality of the 106 videos evaluated for content quality from YouTube™ videos about dental sedation are given in Table 1.

The most scored criteria in the 106 videos evaluated were the advantages of dental sedation with 95.3% (n=101), the explanation of the technique with 86.8% (n=92), and the indications for dental sedation with 80.2% (n=85). The least evaluated criteria were the cost of the procedure with 1.9% (n=2) and the com-

**Table 2.** Evaluation of Content Quality of Videos

Evaluation Criteria	Score	Frequency	Percentage (%)
Explanation	0	14	13.2
	1	92	86.8
Indications	0	21	19.8
	1	85	80.2
Contraindications	0	96	90.6
	1	10	9.4
Advantages	0	5	4.7
	1	101	95.3
Actions to be Applied	0	42	39.6
	1	64	60.4
Complications	0	97	91.5
	1	9	8.5
Prognosis and Survive	0	53	50.0
	1	53	50.0
Cost	0	104	98.1
	1	2	1.9

**Table 3.** The relationship between the content quality of YouTube™ videos about dental sedation and the number of views, duration, comments, likes and dislikes, interaction index, and viewing rate

Evaluation	Weak (n=15)	Moderate (n=81)	Excellent (n=10)	K-W* Test	p
Views	17,742,20	47,375,58	3,430,60	1.192	0.551
Video Duration (minutes)	224.13	250.27	974.00	6.103	<b>0.047**</b>
Number of Comments	30.80	67.32	3.10	0.424	0.809
Number of Likes	208.33	379.23	24.60	2.516	0.284
Number of Dislikes	5.60	14.94	2.10	2.222	0.329
Interaction Index	0.009	0.012	0.011	4.450	0.108
Viewing Rate	16.531	52.583	3.339	2.398	0.302

\*Kruskall-Wallis Test value \*\*p<0.05

**Table 4.** The relationship between the source that uploaded the video and the video content quality

Source Uploaded the Video	Video Content Quality				Fisher's Exact Test	
	Weak	Moderate	Excellent	Total	Value	p*
University-Hospital-Educational institution	0	0	0	0 (0%)	14.210	<b>0.013*</b>
Health employee	0	1	0	1 (0.94%)		
Healthcare Companies or Informational Websites	9	75	10	94 (88.68%)		
Individual User	1	1	0	2 (1.89%)		
Other	5	4	0	9 (8.49%)		

\*p<0.05

plications of the procedure with 8.5% (n=9) (Table 2).

The relationship between the content quality of YouTube™ videos about dental sedation and the number of views, the duration of the video, the number of comments, the number of likes and dislikes, the interaction index, and the viewing rate are shown in Table 3. It was observed that there was a significant

difference between the evaluation groups only for the duration of the video, and the videos evaluated as excellent had a significantly longer duration than the weak and moderate videos (p<0.05).

Of the 106 evaluated videos, 94 (88.68%) were made by health companies or informative websites, two (1.89%) by individual users, one (0.94%) by healthcare professionals, and nine (8.49%) by TV

channels, news agencies or they were videos with a social media extension. As of the date of the study, it was determined that no video was uploaded from a source such as universities, hospitals or educational institutions. The relationship between the content quality of the video and the uploading source is shown in Table 4. All videos categorized as excellent were uploaded via health companies or informative websites ( $p < 0.05$ ). Overall interobserver agreement, calculated as 0.84 (range, 0.83 to 0.87).

## DISCUSSION

In dentistry, dental sedation can be used to reduce anxiety, facilitate the implementation of complex surgical interventions, and cope with the systemic medical conditions of patients more easily.<sup>2-4</sup> It is known that patients tend to research the treatment options offered to them on the internet and the information they obtain has a significant impact on the decision mechanisms in the treatment processes.<sup>8,10,18</sup> YouTube™ is a user-oriented platform. The quality of the videos at the stage of uploading to the system and accessing the users (except for non-specific quality criteria such as reference links and interactions on other informative websites) is still not tested, and YouTube™ does not yet direct people in accessing videos with correct information during use. Therefore, a user who wants to get information about dental sedation treatment may be technically equally interested in videos with correct, incomplete, or misleading content. It is known that making health-related decisions under the guidance of unverified virtual informations may result in wrong decisions.<sup>18,19</sup>

Only 9.43% of the videos included in our study were rated excellent in content, and all of these videos were found to be uploaded by healthcare companies or informative websites. Three-quarters (76.4%) of the videos were evaluated as moderate quality with limited content, which did not cover all aspects of the technique but provided useful information on some topics. According to these results, it is predicted that patients can get useful information about dental sedation from YouTube™, albeit partially, and find healthy answers to some of their questions. However, in our study, while the videos evaluated in parallel with similar studies in the literature focused on explanations of advantages, explanations, and

indications, it was determined that information about the possible complications, contraindications, and cost of the procedure was quite limited.<sup>20-23</sup>

It is known that information obtained by patients on the internet is very effective in the decision-making process regarding the treatment processes presented to them.<sup>8,10,18</sup> It was seen that very few of the videos conveyed information about dental sedation comprehensively and sensitively (9.43%). One reason for such insufficient sharing of information from professional sources may be the targeted interests of dental sedation providers, particularly in private practice. In addition, they can direct their patients with treatment discounts to advertise the services they provide.<sup>16</sup> Insufficient access to therapeutic risks, in particular, leaves the patient very vulnerable at the stage of informed decision-making in assessing the balance of risk and benefit. At the stage of informed consent, patients should be fully presented with all treatment-related parameters.<sup>21</sup> The physician should keep in mind that patients who undertake pre-examination and preoperative research may present with high expectations and insufficient risk and cost information.

There are many videos about dental sedation on YouTube™. In our study, the evaluated videos had over 4 million views, with an average of 39,036 views per video. These statistics show that many users are extensively reviewing YouTube™ videos to learn more about sedation therapy. However, we observed that patients shared less of their own experience with dental sedation (only two videos). Delli et al.<sup>24</sup> reported that videos about patients' experiences contained more misleading information than other types of videos. In addition, although these videos had limited usefulness, they could reach a much higher number of views.<sup>25</sup> It is seen that YouTube™ videos with individual sharing of patients are usually related to medical procedures for which aesthetic results are expected.<sup>15,26</sup> However, we think that the fact that patients do not share their individual experiences about dental sedation may be related to the abundance of informative websites and professional posts on this subject, the fact that the information and practice covered by the relevant medical treatment are more related to the physician, and the low traceability of situations such as the relationship between expectation and risk.

It was seen that the duration of the videos evaluated as excellent was significantly longer than those of moderate and poor quality, but there was no difference between the videos in terms of comments, likes, dislikes, number of views, and interaction index. Similar to our study, Lena et al.<sup>27</sup> found that videos with perfectly scored content had longer durations. However, they also reported that people interacted more with these videos—unlike in our study.

Numerous studies evaluating online platforms related to dental treatments and oral health have been published.<sup>7,9,14,15,20,22,25,27,28</sup> In the study of Heggie et al.<sup>21</sup> in which mostly dental professionals evaluated websites, they stated that less than 3% of the web pages fully met the criteria, and the quality of the available internet information about dental intravenous sedation was insufficient. In our study, we encountered similarly unbalanced content in the parameters (e.g indication, advantage, risk) we used to measure video quality. According to our study results, YouTube™ videos about dental sedation were considered as a moderate quality resource that could provide accurate scientific information to patients. However, we think that there is a need for the production of content that can be a reference and that comprehensively covers all aspects of treatment and alternative treatments by sedation service providers.

A study evaluating YouTube™ videos on pediatric tonsillectomy treatment found that 25.6% of the videos were very or moderately useful, 72.4% were somewhat useful or not useful, and 1.9% were misleading. It was reported that physician-derived videos were at least moderately useful with a rate of 58%.<sup>20</sup> Nason et al.<sup>28</sup> investigated the quality of the videos obtained by searching the terms “root-canal treatment”, “root canal treatment”, and “endodontics” on YouTube™ and the difference between them. They emphasized that like-dislike rates and comment content should not be considered as useful directions, commenting that technical information on root canal treatment was mentioned in many videos, but highlighted that videos as old as 7 years might become out of date with the techniques and opportunities that were renewed every day. Although the literature on dental sedation techniques did not change significantly in recent years, there were videos uploaded 12 years ago that were evaluated as having moderate quality content in our study.

Hassona et al.<sup>25</sup> encountered mostly useless and less useful videos about oral cancer. They observed that some patient experience videos garnered much attention. In addition, they observed that seven (3.7%) videos containing misleading information (unproven cancer treatment methods, snuff dipping or advocated unproven therapies) had high viewing rates. They stated that the free, open-to-everyone video-sharing opportunity offered by YouTube™, without specifying the source and evidence, could cast doubt on the ability to access accurate information in the field of health on the platform.

Although the internet has the advantages of providing fast access to large communities, active user interaction, and low cost, it carries the risk of insufficient resources and sharing the information in the idea stage as if it is proven.<sup>10,16,18,21</sup> However, it must be recognized that it would be unreasonable to expect each video to comprehensively cover every aspect and phase of dental sedation techniques, so it should be assumed that some videos, while incomplete, contain accurate and valuable content. It is important in our work that the video quality of professional sources is significantly higher. This shows that the videos of professional organizations often have a more educational purpose.<sup>29</sup>

Our study had several limitations. First, there was no validated assessment tool to evaluate video-based resources, such as DISCERN scoring for written resources.<sup>30</sup> To overcome this situation, we created our study using the generally accepted method used in many other publications.<sup>15,16,25,27,28</sup> Secondly, a different keyword and different filtering options that we would use in our study would affect the results due to the technical structure of YouTube™. In addition, an observational study is possible only with certain time limits on YouTube™, which has a dynamic and variable structure. Many videos can be added and many can be removed in a few days. YouTube™ uses cookies and previous searches for effective audience reach. Therefore, the video lists can be sorted differently according to each user using the platform.

There were videos with a wide variety of content quality on YouTube™ about dental sedation procedures. It was seen that the videos were mostly uploaded by health companies and informative

web pages, and all videos with content that could be classified as excellent were produced by these sources. It was observed that the uploaded videos mostly only covered some important aspects of treatment and YouTube™ could be a useful resource to provide patients with some accurate data on dental sedation. However, in general, it was predicted that insufficient sharing of data such as risk, contraindication, and cost might lead to high expectations and indirectly erroneous information in patients. None of the video parameters (like, like, dislike, watch, engagement index) differentiated between educationally useful and unhelpful videos.

## CONCLUSION

In today's world, where patients refer to internet information during their treatment and it is not possible to prevent this, health professionals should also be present on the internet with excellent information sources. For the sedation used in dental procedures to be applied safely, quality and reliable information that can be accessed in the digital environment should be produced and reliable sources should be recommended to patients by physicians. In addition, we recommend that platforms such as YouTube™, which are accessed frequently around the world, work with professional teams to reach accurate information, especially for content related to medical procedures, and offer some filtering options for these videos.

## REFERENCES

1. Craig DC, Wildsmith JAW. Conscious sedation for dentistry: an update. *Br Dent J* 2007;203:629-31.
2. Licheri L, Erriu M, Bryant V, Piras V. A Clinical Audit of Escorts' Awareness And Patients' Safety Following Intravenous Sedation In Adult Oral Surgery. *SAAD Dig* 2016;32:17-22.
3. Boyle CA, Newton T, Milgrom P. Who is referred for sedation for dentistry and why? *Br Dent J* 2009;206:12.
4. Whitaker EE, Mukherjee A, Liu T, Hong B, Heitmiller E. Introduction to moderate and deep sedation. Urman RD, Kaye AD, Editörs. *Moderate and Deep Sedation in Clinical Practice*, Cambridge University Press; 2012. 1-7.
5. Coulter A, Entwistle V, Gilbert D. Sharing decisions with patients: is the information good enough? *BMJ* 1999;318:318-22.
6. Goold SD, Lipkin Jr M. The doctor-patient relationship: challenges, opportunities, and strategies. *J Gen Intern Med* 1999;14:26-33.
7. Riordain RN, Hodgson T. Content and quality of website information on the treatment of oral ulcers. *Br Dent J* 2014;217:15
8. Eysenbach G, Powell J, Kuss O, Sa ER. Empirical studies assessing the quality of health information for consumers on the world wide web: a systematic review. *JAMA* 2002;287:2691-700.
9. Ostler S, Kiyak HA. Treatment expectations versus outcomes among orthognathic surgery patients. *Int J Adult Orthodon Orthognath Surg* 1991;6:247-55.
10. Grünloh C, Myreteg G, Cajander Å, Rexhepi H. "Why do they need to check me?" patient participation through eHealth and the doctor-patient relationship: qualitative study. *J Med Internet Res* 2018;20:8444.
11. Brooks FM, Lawrence H, Jones A, McCarthy MJH. YouTube™ as a source of patient information for lumbar discectomy. *Ann R Coll Surg Engl* 2014;96:144-6.
12. Loeb S, Sengupta S, Butaney M, Macaluso Jr JN, Czarniecki SW, Robbins R, et all. Dissemination of misinformative and biased information about prostate cancer on YouTube. *Eur Urol* 2019;75:564-7.
13. Sahin AN, Sahin AS, Schwenter F, Sebahang H. YouTube videos as a source of information on colorectal cancer: what do our patients learn? *J Cancer Educ* 2019;34:1160-6.
14. Knösel M, Jung K, Bleckmann A. YouTube, dentistry, and dental education. *J Dent Educ* 2011;75:1558-68.
15. Hegarty E, Campbell C, Grammatopoulos E, DiBiase AT, Sherriff M, Cobourne MT. YouTube™ as an information resource for orthognathic surgery. *J Orthod* 2017;44:90-6.
16. Gaş S, Zincir ÖÖ, Bozkurt AP. Are YouTube videos useful for patients interested in botulinum toxin for bruxism? *J Oral Maxillofac Surg* 2019;77:1776-83.
17. Desai T, Shariff A, Dhingra V, Minhas D, Eure M, Kats M. Is content really king? An objective analysis of the public's response to medical videos on YouTube. *PLoS One* 2013;8:824-69.
18. Lau AY, Gabarron E, Fernandez-Luque L, Armayones M. Social media in health—what are the safety concerns for health consumers? *Health Inf Manag* 2012;41:30-5.
19. Lau AY, Kwok TMY, Coiera E. How online crowds influence the way individual consumers answer health questions. *Appl Clin Inform* 2011;2:177-89.
20. Strychowsky JE, Nayan S, Farrokhyar F, MacLean J. YouTube: a good source of information on pediatric tonsillectomy? *Int J Pediatr Otorhinolaryngol* 2013;77, 972-5.
21. Heggie C, McKernon SL, Gartshore L. Quality of available internet information regarding IV sedation for dental treatment. *Br Dent J* 2020;228:279-82.
22. Yagiz O, Yavuz GY, Keskinruzgar A, Acibadem E. Analyses of Youtube Videos on Botox Treatment of Gummy Smile. *J Craniofac Surg*. 2021 Nov 12.

- 23.** Brooks FM, Lawrence H, Jones A, McCarthy MJH. YouTube™ as a source of patient information for lumbar discectomy. *Ann R Coll Surg Engl* 2014;96:144-6.
- 24.** Delli K, Livas C, Vissink A, Spijkervet FK. Is YouTube useful as a source of information for Sjögren's syndrome?. *Oral Dis* 2016;22:196-201.
- 25.** Hassona Y, Taimeh D, Marahleh A, Scully C. YouTube as a source of information on mouth (oral) cancer. *Oral Dis* 2016;22:202-8.
- 26.** Almarghoub MA, Alghareeb MA, Alhammad AK, Alotaibi HF, Kattan AE. Plastic surgery on YouTube. *Plast Reconstr Surg Glob Open* 2020;8:2586.
- 27.** Lena Y, Dindaroğlu F. Lingual orthodontic treatment: a YouTube™ video analysis. *Angle Orthod* 2018;88:208-14.
- 28.** Nason K, Donnelly A, Duncan HF. YouTube as a patient-information source for root canal treatment. *Int Endod J* 2016;49:1194-200.
- 29.** Bezner SK, Hodgman EI, Diesen DL, Clayton JT, Minkes RK, Langer JC, et al. Pediatric surgery on YouTube™: is the truth out there? *J Pediatr Surg* 2014;49:586-9.
- 30.** Charnock D, Shepperd S, Needham G, Gann R. DISCERN: an instrument for judging the quality of written consumer health information on treatment choices. *J Epidemiol Community Health* 1999;53:105-11.