Original Article / Özgün Araştırma

Is Youtube Qualified as an Information Source for Regenerative Endodontics?

Youtube Rejeneratif Endodonti için Nitelikli Bir Bilgi Kaynağı mı?

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Abstract

Objective: This study assessed the educational quality and reliability of YouTube videos about regenerative endodontics.

Materials and Methods: The YouTube videos were viewed using the searching terms 'regenerative endodontic treatment', 'endodontic regeneration', 'pulp regeneration', 'pulp revascularization', and 'pulp revitalization'. The first 60 videos (300 videos, in total) were searched for each term and after initial screening, 70 videos were selected for analysis by three reviewers according to the inclusion criteria. The global score for educational value and modified DISCERN score was used to evaluate the quality and reliability of the videos. Kruskal-Wallis test and chi-square test were used to analyze data. Correlations analyzed using Pearson-Spearman test.

Results: The mean of Modified DISCERN score of the YouTube videos about regenerative endodontics was 3.02±1.07 which was categorized as moderate reliability. The mean of global score for educational value of the videos was 2.05±1.13 and 37.1% (n=26) of them were in a poor quality while 14.3% (n=10) were in a good quality due to the scoring of this value. No excellent quality video was found.

Conclusion: It can be concluded that the amount of educational and reliable information on YouTube videos about regenerative endodontics is limited.

Keywords
Educational quality, endodontic regeneration, regenerative endodontic treatment, YouTube

Anahtar Kelimeler
Eğitim kalitesi, endodontik rejenerasyon, rejeneratif endodontik tedavi, YouTube

Received/Geliş Tarihi : 25.02.2021
Accepted/Kabul Tarihi : 29.04.2021

doi:10.4274/meandros.galenos.2021.02693

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Öz

Amaç: Bu çalışma, rejeneratif endodonti ile ilgili YouTube videolarının eğitim kalitesini ve güvenilirliğini değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntemler: Bu çalışmada 'rejeneratif endodontik tedavi', 'endodontik rejenerasyon', 'pulpa rejenerasyonu', 'pulpa revaskülarizasyonu' ve 'pulpa revitalizasyonu' arama terimleri kullanılarak ilgili YouTube videoları görüntülendi. Her bir terim için ilk 60 video (toplam 300 video) tarandı ve ilk taramada dahil edilme kriterlerine göre seçilen 70 video üç gözlemci tarafından analiz edildi. Videoların kalitesi ve güvenilirliğini değerlendirmek amacıyla 'eğitim değeri global skoru' ve 'modifiye DISCERN skoru' kullanıldı. Verilerin analizi için Kruskal Wallis ve ki-kare testleri kullanıldı. Veriler arasındaki korelasyonlar Pearson-Spearman testi kullanılarak analiz edildi.

Bulgular: Rejeneratif endodonti ile ilgili YouTube videolarının Modifiye DISCERN puanlama ortalaması 3,02±1,07 olup, ortalama güvenilirlik olarak kategorize edildi. Videoların global eğitim değeri puanlama ortalaması 2,05±1,13 olarak bulunmuş olup, bu puanlamaya göre %37,1'inin (n=26) kötü kalitede, %14,3'ünün (n=10) iyi kalitede olduğu görüldü. Videoların hiçbiri mükemmel kalitede bulunmadı.

Sonuç: YouTube videolarında rejeneratif endodonti ile ilgili eğitici ve güvenilir bilgi miktarının sınırlı olduğu görülmektedir.

Introduction

Conventional endodontic treatments are quite successful to save teeth with pulp and periapical diseases. Nevertheless, the root canal treatment of immature permanent teeth has been a challenge for dentists, because of the thin dentin walls which renders the teeth fragile and open apices which is difficult to get proper apical seal (1). Possible treatment options for immature teeth are calcium hydroxide multi-visit apexification and the use of tricalcium silicate-based materials (mineral trioxide aggregate, etc.) as an apical barrier (2). Recently, regenerative endodontic therapies (RET) have come in view as alternative procedures for apexification which are associated with increased dentin wall thickness and root length with reduction in apical diameter (3,4). Regenerative endodontics (RE) targets replacing the damaged pulp and related tissues (5) and it is based on the use of tissue engineering including stem cells, scaffolds and bioactive growth factors in order to regenerate the effected endodontic tissues by trauma, infection etc (6). The terms of 'revascularization' and 'revitalization' are also used in the literature synonymously with 'RE' (7).

Seventy-five percent of people prefer searching the Internet for medical information (8). There are some advantages of using the Internet such as being cheap and having ability to reach more data for the population about health-related consultation and education (9). YouTube is a worldwide free video-sharing website that is builded in 2005, and it is the second biggest search engine around the world. There are 30 billion active daily YouTube users and a total of 5 billion videos are watched per day (https://www.omnicoreagency.com/youtube-statistics/ Last updated: 9/4/19). These statistics suggest the potential power of YouTube as an information source in various issues including dentistry and alternative dental treatments for patients, students, professionals and lay people to assess. On the other hand, the videos on YouTube are not disinterestedly reviewed; therefore, users may approach deceptive or incorrect information on this platform (10). Inconsistent quality of information is a concern (11). Various studies have been worked through analyzing the content and quality of YouTube videos on dentistry, mostly for patients (10,12,13). Undoubtedly, educationally designed videos with high quality enhance the intelligibility of dental treatment modalities using illustrations, images, simulation or real treatment procedures. To the best of our knowledge, there is no study about RE researching the quality and reliability of YouTube as an information source. The main objective of this study was to assess the content and quality of information about RE available on YouTube for dental students, specialty students, dental practitioners and the general public. The null hypothesis was that YouTube videos on RE were sufficient for patients, professionals and dental students.

Materials and Methods

Study Design and Data Collection

As this analytical cross-sectional study is not related to any materials collected from humans or animals, no ethical approval was taken. We searched YouTube (www.youtube.com) videos related to endodontic regeneration on December 2, 2020 between 10 AM and 7 PM. The following four searching terms were used; 'regenerative endodontic treatment', 'endodontic regeneration', 'pulp regeneration', 'pulp revascularization' and 'pulp revitalization'. The results due to the searching terms were 1180, 315, 2810, 178 and 116 videos, respectively. The only search filter used was the 'sort by relevance'. It has been stated that the first 60 videos (first three pages) were scanned by most of the YouTube users (14). We also viewed 60 videos for each term and 300 videos in total. The videos other than English, irrelevant and duplicate videos, videos with no sound, heading or visuals, advertisements and conference lectures were excluded from the study by initial screening. Seventy appropriate videos were selected to analyze. For each video; country of origin, source and date of upload, duration of the video, number of views, comments, likes and dislikes were recorded. The sources of upload were classified as health care professionals, health companies, information websites and others (individual users, TV channels, etc.) (13). Three observers, who were specialist dentists, viewed and analyzed the videos on one's own and they didn't see each others' answers. Also, the reviewers were blinded to likes, dislikes and comment counts until completing the analyzes to be objective.

Interaction index (like-dislikes/total number of viewings×100) and viewing rate (Number of views/

Number of days since upload ×100%) were calculated as viewers' interactions. The following parameters were scored to assess the educational value: definition, indications, contraindications, advantages, procedures involved, complications, cost, prognosis and survival (12). Depending on whether each parameter is available or not, it is scored as 0 or 1. By considering the average of these scores, global score for educational value (GSEV) (15) was determined. A score of 0-2, 3, 4-5, 6-7 and 8 indicated poor quality, generally sparse quality, moderate quality, good quality and excellent quality, respectively. Moreover, videos were determined for their reliability using a 5-point Modified DISCERN (mDISCERN) scale which is developed from the DISCERN reliability tool for evaluation of written health information (16,17) (Table 1).

Statistical Analysis

Data were evaluated using statistical software (SPSS Inc. version 21 IBM, Chicago, IL). A kappa score calculated for the interobserver agreement. Descriptive statistics were evaluated for each variable. To the test the normality of data, Shapiro-Wilk test was used. Kruskal-Wallis test were used to assess continuous variables. For categorical variables, chi-square test were used. Pearson-Spearman tests were used to determine correlations. A statistical significance level was assessed at $p<0.05$.

Results

After the initial screening of 300 videos (60 videos for each term) for relevance based on our selection criteria, 230 videos were excluded. The remaining 70 videos were analyzed with 3 different researchers (P.D., E.A., B.K.) in this study. The overall interobserver agreement calculated as a weighted kappa score was 0.86 (range: 0.83-0.92). YouTube videos about endodontic regeneration were uploaded by health care professionals' channels [65.7% (n=46)], information website channels [20.0% (n=14)], others' channels [8.6% (n=6)], health company channels [5.7% (n=4)], respectively. Approximately 46% (n=32) of videos were uploaded by users in the United States of America and 17.1% (n=12) uploaded by users in India. These countries were followed by Egypt, Germany, Pakistan, Spain, Greece, Canada (all n=2, 2.9%). The country of 12 videos (17.1%) was not known.

The mean number of days since uploaded was 1325.57±1218.47. The mean number of comments, views of videos, likes and dislikes were 4.91±7.58, 4123.03±7023.52, 52.11±103.53 and 1.80±3.71, respectively. The mean video duration was 13 minutes 16 seconds ± 18 minutes 52 seconds. The mean of interaction index score was 1.92±2.45 while the mean of viewing rate was 315.45±491.64. The mean of GSEV was 2.05±1.13, while the mean of mDISCERN score was 3.02±1.07 which was categorized as moderate reliability (Table 2).

In the evaluation of GSEV for all selected videos, it has been determined that 37.1% (n=26) of YouTube videos about endodontic regeneration were in a poor quality. The remaining 20.0% (n=14) of the videos were in a generally poor quality, 28.6% (n=20) of them were in a moderate quality and 14.3% (n=10) of videos were in a good quality. None of the videos were in an excellent quality (Figure 1).

In the mean of video duration values, others' channels were significantly higher than health care

Table 1. The Modified DISCERN score (1 point for every yes, 0 points for no)

Item	Questions
1	Are the aims clear and achieved?
2	Are reliable sources of information used? (i.e., publication cited, speaker is specialist in diabetes)
3	Is the information presented both balanced and unbiased?
4	Are additional sources of information listed for patient reference?
5	Are areas of uncertainty mentioned?

Table 2. Demographics of videos included for analysis. All data was given as Mean ± SD

	Analyzed videos (n=70)
Number of days	1325.57±1218.47
Number of comments	4.91±7.58
Number of views	4123.03±7023.52
Number of likes	52.11±103.53
Number of dislike	1.80±3.71
Video duration (min)	13.16±18.52
Interaction index	1.92±2.45
View rate	263.60±395.58
Mean GQS scores	2.05±1.13
Mean modified DISCERN score	3.02±1.07

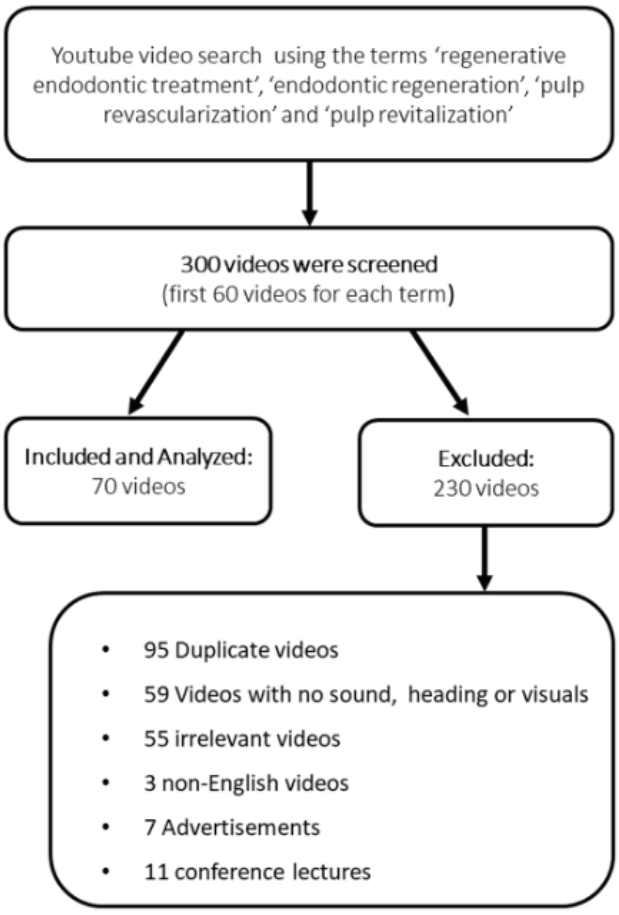

Figure 1. Quality of Youtube videos (%)

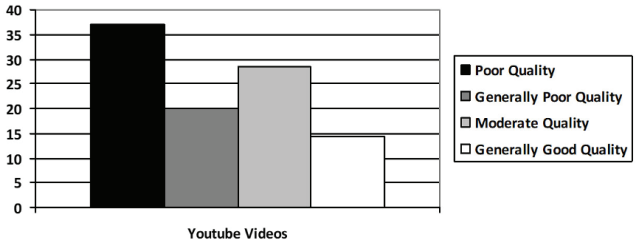

Figure 2. Video features of Youtube videos (%)

professional and information website channels (p=0.003, p=0.001; p<0.05). According to the contents of the videos, in 80% (n=56) of videos were explained indication and procedure involved. It is followed by definition content with a percentage of 60% (n=42). The prognosis and survival of procedures were mentioned in 40% (n=22) of the videos. None of the videos presented an explanation about the cost of RET (Figure 2).

In comparison with mDISCERN question value means, only mean scores of question 4 values were found significantly different among the groups (p<0.05). It was found that others' channels mean scores of question 4 values were significantly higher than health care professionals, health company and information website channels (all, p=0.001) (Table 3). There was no significant difference between the total discern score and the source of uploads (p=0.293).

Pearson correlation analysis showed a significant positive correlation between day count and the number of views and negative correlation between day count and interaction index, global score for educational values, DISCERN question 1, 2 and 3 scores and total DISCERN score (p<0.05). Number of views, number of likes, number of dislikes, interaction index and viewing rate showed a positive correlation with the number of comments (p<0.05). GSEV was found to have a positive correlation with total video duration, interaction index, DISCERN question scores and total DISCERN score (p<0.05).

Discussion

In the present study, as YouTube videos on RE was mostly found to be in a poor quality and moderate reliability, the null hypothesis was rejected. The results of this study showed that YouTube videos' information related to RE has been uploaded mostly by health care professionals. On the other hand, there was no relationship between the sources of the videos according to total the mDISCERN score or global score for educational value. Interestingly, this highlights that reliability or educational quality did not depend on the source of upload of the videos according to the results in our study. There was no significant difference between the source of upload and videos' demographics except for the video duration. Zincir et al. (10), in another YouTube study, evaluated the potential patient education of the videos about wisdom tooth surgical removal. In contrary to our results, researchers showed that there was relationship between source of upload and videos' demographics significantly (10). The difference between the results might be because of different study designs and searching terms. The number of likes was greater than the number of dislikes which specifies that most of the viewers found the videos were useful subjectively. Unlike this data, only 14.3% (n=10) of the videos were in a good quality and none of them were in an excellent quality according

Table 3. Comparison of DISCERN scores according to source of upload. All data were expressed as median (Q1-Q3) unless otherwise noted

DISCERN questions	Health care professionals (n=46)	Information website (n=14)	Health company (n=4)	Others (n=6)	p
Are the aims clear and achieved?	4.00 (3.00-5.00)	4.00 (3.00-5.00)	-	5.00 (3.00-5.00)	0.132
Are reliable sources of information used (i.e., speaker is a health professional, publications were cited)?	4.00 (1.00-4.00)	2.00 (2.00-4.00)	-	4.00 (3.00-5.00)	0.094
Is the information presented balanced and unbiased?	3.00 (1.00-4.00)	2.00 (1.00-2.00)	4.50 (3.25-5.00)	4.00 (3.00-5.00)	0.692
Are additional sources of information listed for patient reference?	1.00 (1.00-2.00)	1.00 (1.00-2.00)	1.00 (1.00-1.75)	3.00 (1.00-5.00)	0.020*
Are areas of uncertainty mentioned?	1.00 (1.00-2.00)	1.00 (1.00-2.00)	-	2.00 (1.00-5.00)	0.138
Total DISCERN score	2.20 (1.40-3.05)	2.00 (2.00-2.60)	3.30 (.....-....)	3.00 (2.80-5.00)	0.293
Kruskal-Wallis test	*p<0.05 Signicant difference between groups				
Mann-Whitney U test with	†p=0.003 significantly higher than health care professionals' channels				
Bonferonni correction	‡p=0.001 significantly higher than health company channels				

to GSEV. Several studies evaluated the YouTube information quality for the patients using the global quality scale (GQS) about different topics (17,18). It can be clearly seen that the score descriptions in this scale have been created to evaluate the information quality, particularly for patients. On the other hand, we aimed to assess the quality and reliability of the YouTube videos about endodontic regeneration not only for patients but also for professionals, dentists and students. Therefore, we used a very similar scale to GQS named GSEV that is modified from it by Fischer et al. (15).

mDISCERN Score is defined by Singh et al. (17) originally and it estimates reliability, bias, clarity, reference addition and suspicion areas of information in YouTube videos (19). This score has been used in terms of investigating the videos' reliability (20). In our study, we found that the videos were 'moderate reliability' in general. Even though mDISCERN tool and GSEV are subjective scales, interobserver agreement was strong according to the kappa coefficient. This indicates that the technique used in the current study is valid. Moreover, GSEV was graded depending on the average of the video contents parameters which were scored before. Pearson correlation analysis showed a positive correlation between global score for educational values and total mDISCERN score. This outcome is important in terms of being between two subjective scales.

A significant portion of the videos indicated the important parameters like definition, indications and procedures involved while less than half of the videos mentioned prognosis and survival of procedures. In our opinion, this finding is essential to inform both lay people and professionals or students about the endodontic regeneration topic. None of the videos mentioned about the cost of the RET. This is a lack of information in particular for the patients who might wonder about the price of the procedures.

Our study has some limitations especially since YouTube is a dynamic platform that videos can be added or deleted in time. We analyzed the videos only in the period time that we looked at. Another limitation is that other than English videos were excluded from the study. Indeed, there are more spoken languages than English such as Chinese or Spanish in the world which means that a part of the videos about endodontic regeneration might have been overlooked (21).

In their study, which was the first and only one evaluating YouTube Videos' content on Endodontics, Nason et al. (12) found that the videos were generally incomplete when using the search terms 'endodontics', 'root canal treatment' and 'root canal'. Similarly, in this study, it can be stated that educational information about RE is incomplete as well, according to our results. Today, RET have become popular and preferable in cases with indication, because of the advantages

among the dentists in particular for endodontists. There are many new studies on this subject in the literature. Consequently, it is expected that many people involving endodontists, dentists, dentistry students and patients might search about RE on the Internet and YouTube. It's essential to improve YouTube videos' educational quality and reliability on RET.

Conclusions

Within the limitations of this study, it was found that most of the YouTube videos about endodontic regeneration were in a poor quality and moderate reliability. Internet using is increasing rapidly among the people including patients, professionals and students. Although it's unknown how many of videos' viewers are specialist dentist, dental practitioners, dental students or dental specialist students, it's the fact that videos with high quality and reliability could improve the learning abilities of dental stuff and students. Also, educational high qualified and reliable videos could be useful for patients to be informed about the updated endodontic treatment options. It is very important to increase the content, quality and reliability of YouTube videos related to RE in the near future.

Ethics

Ethics Committee Approval: As this analytical cross-sectional study is not related to any materials collected from humans or animals, no ethical approval was taken.

Informed Consent: Informed consent is not required.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: P.M.D., B.K., E.A., Design: P.M.D., B.K., E.A., Data Collection or Processing: P.M.D., B.K., E.A., Analysis or Interpretation: B.K., Literature Search: P.M.D., Writing: P.M.D.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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