ORIGINAL ARTICLE

Turk Endod J 2023;8(2):57–61
doi: 10.14744/TEJ.2023.30602

YouTube as an information and education source for use of mineral trioxide aggregate in endodontics: Quality and content analysis

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Purpose: This study aimed to evaluate the content and educational quality of videos on YouTube about mineral trioxide aggregate (MTA) in endodontics.

Methods: YouTube (https://www.youtube.com/) was searched for videos using the search term "endodontics, MTA," which was determined using Google Trends. The video contents were analyzed under three categories (etiology, procedure, and prognosis) and the Global Quality Score (GQS). The descriptive statistics were evaluated, and the statistical analyses included Fleiss Kappa, Kruskal-Wallis, and Tamhane's T2 test.

Results: The total number of videos, 67.5% were uploaded by specialists. The content completeness was significantly different among the uploaders (4.2±1.69). The highest mean GQS was found for videos published by specialists (4.03±1.09). The videos generally shared content about furcation perforation repair, management of teeth with open apex and apical plug technique, and product presentations.

Conclusion: Specialists should post more videos focused on information about MTA in root canal treatment and regenerative endodontics.

Keywords: Endodontics, internet, MTA, social media.

Introduction

Mineral trioxide aggregate (MTA) is a versatile material that finds widespread applications in dentistry. MTA is a powder mixture consisting of Portland cement, bismuth oxide, and gypsum (1). It is used for various dental procedures such as pulp capping, vital pulp therapy (pulpotomy and apexogenesis), apexification, regeneration, root perforation, and root end filling (2). MTA is highly biocompatible and can promote tissue healing and regeneration. Due to its excellent sealing properties and ability to set in the presence of moisture, MTA is considered a reliable choice for these dental procedures. Its versatility and efficacy make it an essential component of modern dentistry.

YouTube is a video-sharing website founded in February 2005, and it is currently available in over 100 countries. With its two billion monthly active users, it has become a popular social media platform for sharing information. Educators can utilize the platform to disseminate information through videos, and researchers also consider it an effective learning tool (3). While free access to YouTube

Cite this article as: Hançerlioğulları D, Türkyılmaz A, Dürüst Barış S, Erdemir A. YouTube as an information and education source for use of mineral trioxide aggregate in endodontics: Quality and content analysis. Turk Endod J 2023;8:57-61.
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Submitted: January 12, 2022 Revised: April 06, 2023 Accepted: May 10, 2023

is considered an advantage, the ability to upload videos without any scientific filtering should also be considered a major disadvantage. Although the adequacy, quality, and up-to-dateness of information are not checked, it is clear that users will continue to use YouTube as a convenient online source of information. Given the increasing reliance on social media as a go-to source of information for health-related issues, it is crucial that professionals undertake further investigations to verify the reliability of uploaded videos.

The quality and content analysis of videos on YouTube have been evaluated in relation to a variety of dental topics, such as genioplasty, early orthodontic treatment, lingual orthodontic treatment, impacted canine teeth, dental avulsion injuries, separated instruments, and root canal treatment (4-10). However, no investigation has been conducted on the use of YouTube videos as an information and educational resource for MTA in endodontics. Therefore, the present study aimed to evaluate the content and accuracy of videos about MTA as an information source for clinicians and patients.

Materials and Methods

A video search was performed on the online video-sharing site YouTube (https://www.YouTube.com) on August 10, 2022, between 15:00-17:00, using the keyword "MTA in endodontics", and "sort by relevance" as the filter. As search results may vary on different days, the initial 157 video links were stored. 157 videos were further evaluated by two observers, who were specialists with at least 5 years of clinical experience in endodontics (DDS, Ph.D.). Among all, 117 videos with no audio or visual content, are not in English language, and having irrelevant subjects were excluded. The remaining 40 videos that met the inclusion criteria were further analyzed by two observers. The ethics committee evaluation was not required becasue the study design did not include any human participants or animals and used publicly available data.

Subject of the videos were determined as the composition of MTA, sealing, mixing, root perforation, apical plug, pulpotomy, apical surgery, regenerative endodontics, apexogenesis, apexification, and product marketing was mentioned in the video. The uploaders were categorized as the source who prepared the videos and were classified as dentist or specialist, hospital, commercial (dental manufacturing companies), and other (non-experts or an unclear source). After the evaluation of the videos, demographic features such as duration in seconds, upload time, the number of views, days since upload, number of likes, and target audience were recorded.

A scoring system was decided for the evaluation of the etiology, treatment, and prognosis of clinical conditions that require the use of MTA. The observers assessed the completeness of each video based on numerically scoring 0–2 (0 = incomplete, 2 = very complete) in 3 contents (etiology, treatment, and prognosis), yielding a total possible score of 6. The 5-point Global Quality Score (GQS) (Table 1) index was scored according to the flow, quality, and educational usefulness in a range between 1 (poor quality) and 5 (excellent quality) (5). The viewing rate was estimated according to formula (number of views/number of days since upload) × 100%.

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

GQS: Global quality score.

Statistical Analysis

The statistical analysis of the data was performed using the SPSS version 24. Fleiss Kappa analysis was used to analyze interobserver agreement. The normality of the distribution of the data was evaluated with the Shapiro-Wilk test. Since all parameters showed deviation from normal distribution, nonparametric tests were conducted. The Kruskal-Wallis test was used to analyze continuous variables. Post hoc analysis was performed with Tamhane's T2 test and p-values < 0.05 were considered to indicate statistical significance.

Results

After evaluation according to exclusion criteria, 40 videos were screened. The reasons for exclusion are presented in

Table 2. Reasons for exclusion

Reasons	Value
Not in English	1
No audio	26
No video	0
Duplicated	4
Longer than 15 min	17
Irrelevant	22
Case sharing without speech	47
Total excluded	117

Table 3. Descriptive statistics of the YouTube videos about MTA Search term (MTA, endodontics) Mean ± SD

Views	Likes	Comments	Duration (in s)	Age of videos (days)	Viewing rate
13005.25±18479.15 (Range 8–72480)	139.38±163.85 (Range 0–782)	12.80±18.49 (Range 0–92)	372.47±251.99 (Range 72–967)	1654.23±1217.78 (Range 64–4385)	732.5338 (Range 12.50–2731.18)

MTA: Mineral trioxide aggregate.

Table 4. Completeness score and global quality score by source of upload

Scores	Dentist/specialist	Hospital	Commercial	Other	p-value
Etiology	1.19±1.00	0±0	0±0	0±0	<0.001
Treatment/Procedure	2±0	1.5±1	2±0	0.67±1.15	<0.001
Prognosis	1.11±1.01	0±0	0±0	0±0	<0.001
Overall score (0–6)	4.29±1.64	1.5±1	2±0	0.67±1.15	<0.001
GQS (1–5)	4.03±1.09	3.5±0.57	2.33±1.21	1±0	<0.001

GQS: Global quality score.

Table 2. The first video was uploaded in 2010. Regardless of the uploader, 20 videos were uploaded between 2010-2018, and 20 videos were uploaded between 2019 and 2022. 67.5% of the videos were uploaded by dentists or specialists (n = 27), 10% by hospitals (n = 4), 15% by companies (n = 6), and 7.5% by other sources (n = 3).

Descriptive statistics on video characteristics are presented in Table 3. The mean length of the YouTube videos about MTA was 372,47 s (range, 72 s–967 s). The mean number of views of the videos was 13005,25 (range, 8–72480). The mean value of the number of likes was 139,38 (range, 0–782). The mean viewing rate was 732,5338 (range, 12,50–2731,18).

The information completeness scores and GQS are presented in Table 4. The mean values for etiology and prognosis were statistically different for videos uploaded by dentists or specialists than the other groups ($p < 0.001$). There was no statistically significant difference in treatment procedures and GQS between the uploaders of dentists/specialists, and hospitals ($p > 0.05$), but these values were significantly different than those of the other uploader ($p < 0.05$). The videos submitted by dentist/specialist showed significantly greater content completeness score compared to the other uploaders ($p < 0.001$).

Among the contents of the 40 videos, "repair of furcation perforation and product marketing" was the most com-

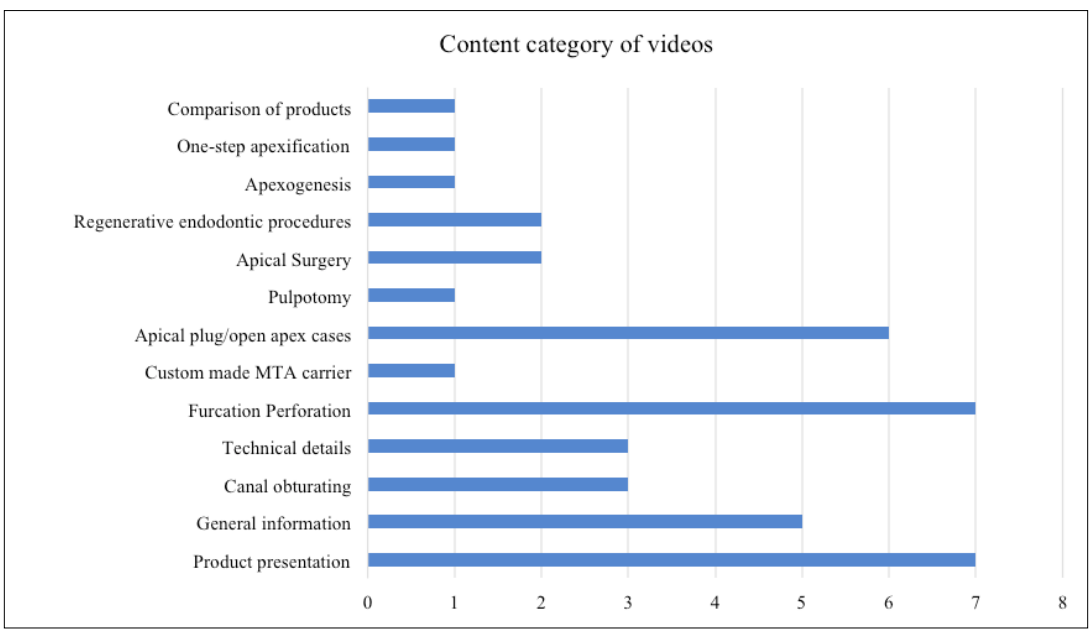

Fig. 1. Frequency distribution of videos by content category

monly uploaded topic (17.5%), followed by "management of apical plug/open apex cases" (15%), "general information" (12.5%), and "canal obturating, mixing" (7.5%). The other contents in decreasing order were "apical surgery, regenerative endodontic procedures" (5%), apexogenesis, one-step apexification technique, comparison of products, and custom-made MTA carrier (2.5%)" (Fig. 1).

Discussion

The proliferation of internet adoption has fundamentally transformed our customary behaviors about consumerism, work-related engagements, and obtaining knowledge regarding diseases. Aside from providing space for patients to share their experiences, YouTube also serves as a platform where dentists can present their clinical practices. The present study aimed to evaluate the content of MTA as an information source for dentists and patients.

YouTube provides filters for "view count," "upload date," and "video duration." In this study, "sort by relevance," which was the most preferred filter in previous studies (11). While the first video uploaded was from 2010, it was determined that 50% (n = 20) of the videos were shared in the last 3 years. This result may be attributed to the increasing interest in MTA in recent years. In addition, it was determined that the target audience in all the videos (n = 40) was dentists and specialists.

In many studies evaluating the quality of health-related YouTube videos (4,12,13), insufficient information content was associated with videos of patients (14). In this study, it was determined that the videos have high-quality and fluent information content. This may be attributed to the fact that most uploaders were professionals, which is consistent with the findings of the study conducted by Yavuz et al. (15)

YouTube videos are typically uploaded on topics that are of interest to users. Previous studies by Nason et al. (7) and Ozbay et al. (4) have reported that uploaders are seldom interested in discussing etiology and prognosis. Consistent with the previous studies, the videos in this study primarily focused on treatments and procedures, with little to no content on etiology and prognosis, regardless of the uploader. Nason et al. (7) reported that 46% of the videos were uploaded by a dentist or specialist when the search term "root canal" was used, while this percentage increased to 70% for uploads under the search term "endodontics." They reported that 18% of the uploads were contributed by non-experts. Dental professionals and commercial sources shared more complete videos than others. In this study, the proportion of videos uploaded was 67.5% by specialists and 7.5% by others. As the topics of etiology, treatment or procedure, and prognosis require scientific explanations, videos uploaded by specialists were found to have a significantly higher completeness score compared to those uploaded by others. The majority of videos were related to procedures such as furcation perforation repair and management of open apex cases, often using a dental microscope with high magnification. Videos featuring less common topics included apical surgery, regenerative endodontic procedures, apexogenesis, and one-step apexification techniques. While scientific journals, guidelines, and association websites are often the first choices for educational materials, accessing clinical cases shared by specialists could also be beneficial for both dentists and dental students.

Due to the YouTube algorithm, uploaders have the ability to edit videos and modify comments and data, which may lead to changes in search results over different time periods (16). Since the search for videos included in this study was conducted on August 10, 2022, the results may vary after that date. The interaction index and dislike data could not be calculated because YouTube has removed the ability to see the number of dislikes on videos.

The limitation of this study is the creation of a checklist based on a literature review, analyzed subjectively with two different scoring methods, as in previous studies. The completeness score was used to evaluate the accuracy and reliability of the videos. The video flow, quality, and educational usefulness were determined using the GQS, which is based on a 5-point scale (17,18). While the GQS values varied in the previous studies, the reason for the low scores may be due to the lack of universities or professional organizations among the uploaders (18-20). In this study, an average of 4.03 points was determined for the videos mostly posted by specialists.

Based on the study, videos related to MTA on YouTube were primarily generated by dentist and specialists, suggesting that they can be assumed as dependable sources of information. The most frequently discussed subject in these videos was clinical applications. Within the limitations of this study, it can be inferred that YouTube videos concerning MTA may serve as an additional resource for practitioners as they provide accurate and useful information on treatment procedures.

Conclusion

Although the content and quality of the uploaded videos were found to be beneficial regarding treatment, there was a lack of content on etiology and prognosis. Therefore, specialists should create and share more comprehensive videos to increase interest in endodontic treatment options.

Authorship Contributions: Concept: D.H.; Design: D.H.; Supervision: D.H.; Materials: D.H., A.E.; Data: D.H., S.D.B.; Analysis: D.H., S.D.B., A.T.; Literature search: D.H.; Writing: D.H.; Critical revision: D.H., S.D.B.

Source of Funding: None declared.

Conflict of Interest: None declared.

Ethical Approval: No clinical data, human samples, or laboratory animals were included in this study. All the information was obtained from public YouTube videos, and no personal privacy data exists.

References

1. Sarkar N, Caicedo R, Ritwik P, et al. Physicochemical basis of the biologic properties of mineral trioxide aggregate. J Endod 2005; 31: 97–100. [CrossRef]
2. Tawil PZ, Duggan DJ, Galicia JC. MTA: a clinical review. Compend Contin Educ Dent 2015; 36: 247–52.
3. Shariff SBM, Shah PM. Pupils perception of using YouTube and autonomous learning. Creat Educ 2019; 10: 3509–20. [CrossRef]
4. Özbay Y, Çırakoğlu NY. YouTube as an information source for instrument separation in root canal treatment. Restor Dent Endod 2021; 46: e8. [CrossRef]
5. Ayranci F, Buyuk S, Kahveci K. Are YouTube™ videos a reliable source of information about genioplasty? J Stomatol Oral Maxillofac Surg 2021; 122: 39–42. [CrossRef]
6. Bozkurt AP, Gaş S, Zincir ÖÖ. YouTube video analysis as a source of information for patients on impacted canine. Int Orthod 2019; 17: 769–75. [CrossRef]
7. Nason K, Donnelly A, Duncan H. YouTube as a patient-information source for root canal treatment. Int Endod J 2016; 49: 1194–200. [CrossRef]
8. Ozturk T, Gumus H. YouTube as an information and education source for early orthodontic treatment. Am J Orthod Dentofacial Orthop 2022; 162: e123–32. [CrossRef]
9. Hutchison CM, Cave V, Walshaw EG, et al. YouTube™ as a source for patient education about the management of dental avulsion injuries. Dent Traumatol 2020; 36: 207–11. [CrossRef]
10. Lena Y, Dindaroğlu F. Lingual orthodontic treatment: a YouTube™ video analysis. Angle Orthod 2018; 88: 208–14. [CrossRef]
11. Kaval ME, Demirci GK, Atesci AA, et al. YouTube™ as an information source for regenerative endodontic treatment procedures: quality and content analysis. Int J Med Inform 2022; 161: 104732. [CrossRef]
12. Hassona Y, Taimeh D, Marahleh A, et al. YouTube as a source of information on mouth (oral) cancer. Oral Dis 2016; 22: 202–8. [CrossRef]
13. Oremule B, Patel A, Orekoya O, et al. Quality and reliability of YouTube videos as a source of patient information on rhinoplasty. JAMA Otolaryngol Head Neck Surg 2019; 145: 282–3. [CrossRef]
14. Knösel M, Jung K. Informational value and bias of videos related to orthodontics screened on a video-sharing Web site. Angle Orthod 2011; 81: 532–9. [CrossRef]
15. Yavuz MC, Buyuk SK, Genc E. Does YouTube™ offer high quality information? Evaluation of accelerated orthodontics videos. Ir J Med Sci 2020; 189: 505–9. [CrossRef]
16. Kuru T, Erken HY. Evaluation of the quality and reliability of YouTube videos on rotator cuff tears. Cureus 2020; 12: e6852. [CrossRef]
17. ElKarmi R, Hassona Y, Taimeh D, et al. YouTube as a source for parents' education on early childhood caries. Int J Paediatr Dent 2017; 27: 437–43. [CrossRef]
18. Singh AG, Singh S, Singh PP. YouTube for information on rheumatoid arthritis—a wakeup call? J Rheumatol 2012; 39: 899–903. [CrossRef]
19. Erdem MN, Karaca S. Evaluating the accuracy and quality of the information in kyphosis videos shared on YouTube. Spine 2018; 43: E1334–9. [CrossRef]
20. Ferhatoglu SY, Kudsioglu T. Evaluation of the reliability, utility, and quality of the information in cardiopulmonary resuscitation videos shared on open access video sharing platform YouTube. Australas Emerg Care 2020; 23: 211–6. [CrossRef]