

Content, Quality, and Tendency of YouTube Videos Regarding Orthodontics

Ortodontiye İlişkin YouTube Videolarının İçeriği, Kalitesi ve Eğilimi

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ABSTRACT

INTRODUCTION: To assess the content, quality, usefulness, and tendency of the YouTube videos that present information about orthodontic treatment.

METHODS: The keyword "How-to-straighten-teeth" was selected using Google Trends. 84 videos were assessed among the first 150 videos on YouTube search. Videos were classified according to their Global Quality Scale (GQS) and Content Evaluation Score (CES) values. The video sources, video characteristics, GQS, and CES values were analyzed. Videos with high viewing and interaction rates were evaluated to assess audience trends in terms of the treatment methods they describe.

RESULTS: According to the CES value, 63.1% of the videos were classified as low content. According to the GQS value, 41.7% of the videos were classified as useless. 36.7% of videos with the highest viewing and interaction rates were predominantly about clear aligner treatment. 50% of the do-it-yourself (DIY) videos with higher rates were shared by the patients.

DISCUSSION AND CONCLUSION: The videos shared on YouTube mostly had inadequate content and nearly half of them were useless. Patient-sourced videos made up the least percentage but had the highest number of views, likes, dislikes, comments, and viewing rates. The audience trends have focused on clear aligner and DIY treatments while accepting labial fixed orthodontic treatment as an established alternative.

Keywords: Orthodontic treatment, YouTube, Audience trends, Social media, Public health

ÖZ

GİRİŞ ve AMAÇ: Ortodontik tedavi hakkında bilgi veren YouTube videolarının içeriğini, kalitesini, kullanılabilirliğini ve eğilimini değerlendirmek.

YÖNTEM ve GEREÇLER: "Dişleri nasıl düzeltiriz" anahtar kelimesi Google Trendler kullanılarak seçildi. YouTube aramasında ilk 150 video arasından 84 video değerlendirilmiştir. Videolar Global Kalite Ölçeği (GKÖ) değerine ve İçerik Değerlendirme Puanı (İDP) değerlerine göre sınıflandırılmıştır. Video kaynakları, video özellikleri, GKÖ ve İDP değerleri analiz edilmiştir. Yüksek görüntülenme ve etkileşim oranlarına sahip videolar, açıkladıkları tedavi yöntemleri açısından izleyici eğilimlerini değerlendirmeye yönelik olarak değerlendirilmiştir.

BULGULAR: İDP değerine göre videoların %63,1'i düşük içerikli olarak sınıflandırılmıştır. GKÖ değerine göre videoların %41,7'si yararsız olarak sınıflandırılmıştır. En yüksek görüntülenme ve etkileşim oranlarına sahip videoların %36,7'si ağırlıklı olarak şeffaf plak tedavisi ile ilgilidir. Kendin yap (KY) videolarının %50'si daha yüksek oranlarda hastalar tarafından paylaşılmıştır.

TARTIŞMA ve SONUÇ: YouTube'da paylaşılan videolar çoğunlukla yetersiz içeriğe sahiptir ve neredeyse yarısı yararsızdır. Hasta kaynaklı videolar en düşük yüzdeyi oluşturmuştur, ancak en yüksek görüntülenme, beğenilme, beğenilmeme, yorum ve görüntülenme oranlarına sahiptir. İzleyici eğilimleri, labial sabit ortodontik tedaviyi yerleşik bir alternatifi olarak kabul ederken şeffaf plak ve KY tedavileri üzerinde yoğunlaşmıştır.

Anahtar Kelimeler: Ortodontik tedavi, YouTube, İzleyici eğilimleri, Sosyal medya, Halk sağlığı

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INTRODUCTION

YouTube is one of the most popular digital platforms that provides people free, quick, and easy access to numerous visual and auditory information.¹⁻³ Billions of users and their shared videos on YouTube also offers a growing healthcare database worldwide.^{2,4} Patients and laypeople generally have health related video blogs, in other words vlogs, which are based on individual experiences.^{5,6} Health professionals share videos to inform patients about the treatment modalities which may also be assumed as self-advertisement.⁷ Moreover, there are commercial videos regarding different treatment procedures and the products used. YouTube is an interactive platform, which is suitable for sharing, commenting, discussing, and creating.⁸ Thus, it can also have an impact on the society's choices.^{2,9,10}

New treatment systems are developed, and existing systems are updated every day to meet the demands of the patients regarding orthodontic treatment.¹¹ It is undeniable that social media has a great influence on the increased acceptance of the contemporary systems by patients, particularly by youngsters.^{5,12,13} Although the guidance of an orthodontist after an orthodontic examination has great impact in deciding the method of the treatment, most of the patients who desire to receive orthodontic treatment search different orthodontic treatment alternatives on the webpages, and they generally prefer the video information resources.¹³ The patients can be informed by YouTube videos which include alternative orthodontic treatment methods.¹⁴⁻¹⁷ On the other hand, the accuracy and the reliability of the information given in YouTube videos is not subjected to any control or regulation.^{2,13} Therefore, sometimes it might mislead those who want to get information in this field and may even cause disinformation.^{3,4,18}

Assessment of the videos and the audience trends about different orthodontic treatment methods enable clinicians to be conscious about the changing patient expectations with developing technology. The trends of YouTube viewers about orthodontic treatment options can also give us an idea of what orthodontic patients expect from clinicians. Therefore, the purpose of this study is to assess the tendency, content, quality, and usefulness of the YouTube videos which present information about orthodontic treatment. The originality of the current study is the evaluation of YouTube videos containing all possible orthodontic treatment options such as labial and lingual fixed orthodontic treatment, clear aligners, DIY appliances, and removable appliances.

MATERIALS and METHODS

The study was approved by Başkent University Institutional Review Board and Ethics Committee

(Project no: D-KA 21/20). Various word-groups (types of orthodontic treatment, orthodontic treatment options, orthodontic treatment types, different orthodontic treatments, how to straighten teeth) which may include all possible orthodontic treatment methods were searched in English using Google Trends application which provides the most frequently used search terms by calculating search frequency based on the total search volume worldwide. According to the search results, the most frequently used keyword, "How to straighten teeth", was selected (Google Trends, June 25, 2021). Then, the selected keyword was searched by relevance on YouTube (June 25, 2021).

All the cookies and previous searches were deleted before the YouTube search. The first 150 videos were evaluated, as 95% of the users were reported to click on only the first three pages when searching on YouTube.¹⁹ The source locators (URLs) of the 150 videos were copied to a Word sheet. Then, the videos were examined and excluded according to the following exclusion criteria:

- Not related to orthodontic treatments,
- Not containing audio and/or images,
- Longer than 15 minutes,
- Not in English language,
- Poor image quality (incomprehensible),
- Duplicated.

Within the 150 videos, 66 were excluded according to the exclusion criteria because 8 were not related to orthodontic treatments, 29 did not contain audio and/or images, 4 were longer than 15 minutes, 8 were not in English, 1 had poor image quality, and 16 were duplicated. The remaining 84 videos which were themed labial or lingual fixed orthodontic treatment, clear aligners, do-it-yourself (DIY) appliances, or removable appliances were evaluated.

The Global Quality Scale (GQS)^{11,14,16} and 10-point Likert-type Content Evaluation Score (CES) were used to evaluate the content, quality, and usefulness of the videos (Tables 1,2). All examined videos were scored by two experienced orthodontists separately. The CES was created and expanded based on the Information Completeness Score.²⁰ The videos were classified according to the GQS value as "useful" (≥ 3) and "useless" (< 3). Also, videos were classified according to the CES value as "high content" (≥ 5) and "low content" (< 5). The average scores obtained from the video evaluation of the two orthodontists were statistically analyzed. The videos were categorized into 3 groups according to their sources which are orthodontist/dentist, patients, and other sources (Table 3). Using the data obtained, the video characteristics (the number of views, the number of likes, the number of

dislikes, the number of comments, the video duration, days since uploading, the viewing rate, the interaction rate), the GQS and the CES values were assessed (Table 4). The viewing rate and interaction rate were calculated using the following formulas:

Viewing rate (%) = (number of views / number of days since upload) x 100.

Interaction rate (%) = (number of likes - number of dislikes) / number of views x 100.

Table 1. Global Quality Scale (GQS)

Description	Score
Poor quality, poor flow of the video, most information missing, not at all useful for patients	1
Generally poor quality and poor flow, some information listed but many important topics missing, of very limited use to patients	2
Moderate quality, suboptimal flow, some important information is adequately discussed but others poorly discussed, somewhat useful for patients	3
Good quality and generally good flow, most of the relevant information is listed but some topics not covered, useful for patients	4
Excellent quality and flow, very useful for patients	5

Table 2. 10-point Likert Type Content Evaluation Score (CES)

Description	Score
Definition of orthodontic treatment	1
Details of treatment procedure	1
Alternative treatment methods	1
Cost of treatment	1
Benefits of treatment	1
Harms and complications of treatment	1
Duration of treatment	1
Problems which occur during treatment (pain, soft tissue irritation, tooth decay, periodontal problem etc.	1
Things to consider during treatment (oral hygiene, eating, appointment intervals, cooperation etc.)	1
Prognosis and retention of treatment	1

Table 3. Frequency and Percentage of Different Video Sources

Video sources	Frequency (N)	Percentage (%)
Orthodontist/Dentist	43	51.2

Patient	10	11.9
Other sources	31	36.9
Total	84	100.0

Table 4. Descriptive Statistics of the Video Characteristics

Video Characteristics	Mean	SD
Number of views	498,487.4	2,297,006.2
Number of likes	4,136.2	14,650.3
Number of dislikes	262	1,043.5
Number of comments	492.6	1,883.3
Video duration (min)	4	3
Days since uploading	1,338.7	978.1
Viewing rate	43,636.2	166,571.1
Interaction rate	1	1.1
Global Quality Scale (GQS)	2.6	0.8
Content Evaluation Score (CES)	4.1	1.7

SD: Standard Deviation

The videos having higher viewing and interaction rate values than the mean values were evaluated in terms of the treatment methods they explain. Moreover, the correlations between the video characteristics and the GQS or the CES values according to the video sources were separately evaluated. Three weeks later, randomly selected 30 videos were rescoped by the same two orthodontists to evaluate the intrarater reliability. The average scores of the second evaluations were compared with the first evaluations to obtain ICC values.

Statistical analysis

Statistical analysis was performed using the SPSS version 22.0 software program for Windows. Kruskal Wallis Analysis of Variance was used to compare the video characteristics, the GQS, and the CES values according to the video sources. Mann-Whitney U test was used to compare the video characteristics, according to the GQS and the CES values regarding video quality and content. Spearman's Rho Correlation analysis was used to determine the correlation between the video characteristics, and the GQS or the CES values.

RESULTS

The ICC values which presented the intrarater reliability ranged from 0.918 to 0.971. Within the 84 videos evaluated, the mean number of views was 498,487.4, the mean number of likes was 4,136.2, the mean number of dislikes was 262, the mean number of comments was 492.6, the mean video duration was 4 minutes, the mean number of days after uploading was

1,338.7, the mean viewing rate was 43,636.2 the mean interaction rate was 1, the mean GQS value was 2.6, and the mean CES value was 4.1 (Table 4).

51.2% of the videos were uploaded by orthodontists/dentists, 11.9% were uploaded by patients, while the remaining 36.9% were uploaded by the other sources (Table 4). The number of views in the orthodontist/dentist and patient groups were significantly greater

compared to the other sources group. The number of likes, dislikes, comments, video duration, and viewing rate were significantly higher in the patient group compared to the orthodontist/dentist and the other sources groups. The highest CES value was observed in the patient group and significant differences were observed compared to the orthodontist/dentist and the other sources groups (Table 5).

Table 5. Comparison of the Video Characteristics According to the Video Sources

Video Sources	Orthodontist/Dentist (n=43)		Patient (n=10)		Other sources (n=31)		P value	Multiple comparisons
	Mean	SD	Mean	SD	Mean	SD		
Number of views	579,982.9	3,122.2	804,285.1	1,035,954.8	286,801	735,416.8	0.012*	1-3,2-3
Number of likes	3,269.2	15,661.6	8,136.3	14,663.2	4,048.5	13,397.4	0.003*	2-1, 2-3
Number of dislikes	259.8	1,368.5	705.7	859.3	122	288.1	0.007*	2-1, 2-3
Number of comments	479.2	2,317.3	819	722.2	406.1	1,447.1	0.001*	2-1, 2-3
Video duration (min)	3.5	2.8	7.7	3.3	3.5	2.4	0.002*	2-1, 2-3
Days since uploading	1,297.2	962.4	1,305.8	791.1	1,406.9	1,074.7	0.923	-
Viewing rate	43,233	204,220.9	82,101.7	164,631.1	31,787.1	98,007.1	0.013*	2-1, 2-3
Interaction rate	1.1	1.3	1	1.3	0.8	0.8	0.137	-
Global Quality Scale (GQS)	2.5	0.7	2.6	1	2.6	0.8	0.92	-
Content Evaluation Score (CES)	3.7	1.2	5.4	2.5	4.2	1.4	0.047*	2-1, 2-3

*Result of the Kruskal Wallis Variance Analysis; SD: Standard Deviation

According to the CES value 36.9% of the videos were classified as high content and 63.1% of them were classified as low content (Table 6). The number of likes, number of comments, video duration, viewing rate, interaction rate, and the GQS value were found to be significantly greater in the high content videos compared to the low content videos (Table 7).

Table 6. Frequency and Percentage According to GQS and CES Values

Video Characteristic	Classification	Frequency (N)	Percentage (%)
Global Quality Scale (GQS)	Useful Videos	49	58.3
	Useless Videos	35	41.7
Content Evaluation Score (CES)	High Content Videos	31	36.9
	Low Content Videos	53	63.1

Table 7. Comparison of the Video Characteristics Between High Content and Low Content Videos According to Content Evaluation Score (CES)

Video Characteristics	High Content Videos (n=31)		Low Content Videos (n=53)		P value
	Mean	SD	Mean	SD	
Number of views	452,311.7	890,225.2	525,495.9	2,821,783.1	0.106
Number of likes	6,245.4	15,480.6	2902.5	14,146.3	0.02*
Number of dislikes	253.4	531.8	267	1,254.8	0.059
Number of comments	602.3	1,480.2	428.5	2,094.1	0.029*
Video duration (min)	5.3	3.2	3.2	2.5	0.003*
Days since uploading	1,078.2	770.3	1,491	1,058.6	0.103
Viewing rate	54,603.7	132,732.2	37,221.1	184,415.2	0.015*
Interaction rate	1.3	1.4	0.7	0.7	0.013*
Global Quality Scale (GQS)	3.1	0.7	2.2	0.7	<0001*

*Result of the Mann Whitney U-test; SD: Standard Deviation

According to the GQS value 58.3% of the videos were classified as useful and 41.7% of them were classified as useless (Table 6). The video duration and the CES value were observed to be significantly higher in the useful videos compared to the useless videos. No

significant differences were found between the useful and useless videos in terms of number of views, number of likes, number of dislikes, number of comments, number of days since uploading, the viewing rate and the interaction rate (Table 8).

Table 8. Comparison of the Video Characteristics between Useful and Useless Videos According to Global Quality Scale (GQS)

Video Characteristics	Useful Videos (n = 49)		Useless Videos (n = 35)		
	Mean	SD	Mean	SD	P value
Number of views	702,769.4	2,982,065.8	212,492.7	425,985.4	0.259
Number of likes	6,190	18,879.6	1,260.9	2,480.9	0.08
Number of dislikes	333.8	1,332.4	161.5	366.1	0.256
Number of comments	736.9	2,432.6	150.5	312.4	0.107
Video duration (min)	4.4	2.8	3.4	3.1	0.02*
Days since uploading	1,123.3	773.1	1,640.3	1,153.8	0.061
Viewing rate	65,789.3	215,433.4	12,621.8	22,651.6	0.068
Interaction rate	1.1	1.2	0.8	0.8	0.105
Content Evaluation Score (CES)	4.8	1.4	3.2	1.4	0.000*

*Result of the Mann Whitney U-test; SD: Standard Deviation

Table 9. Correlation Between the Video Characteristics and the GQS or the CES Values According to the Video Sources

Video Source	Number of views	Number of likes	Number of dislikes	Number of comments	Video duration (min)	Days since uploading	Viewing rate	Interaction rate	
Orthodontist / Dentist	CES	0.042	0.066	0.049	0.121	0.263	-0.161	0.115	0.145
	GQS	0.198	0.272	0.214	0.306*	0.462*	-0.114	0.281	0.110
Patient	CES	-0.153	-0.08	-0.183	-0.018	0.844*	-0.550	-0.171	0.226
	GQS	-0.076	0.076	-0.152	0.076	0.467	-0.669	-0.051	0.543
Other Sources	CES	0.360*	0.525*	0.451*	0.552*	0.432*	-0.259	0.505*	0.491*
	GQS	0.219	0.301	0.165	0.212	-0.018	-0.242	0.338	0.311

*Result of the Spearman's Rho Correlation Analysis

CES: Content Evaluation Score

GQS: Global Quality Scale

35 videos having higher viewing and interaction rate values than the mean values were evaluated in terms of the treatment methods they explain. 34% of the videos had content about labial fixed orthodontic treatment, 32% clear aligners, 21.2% DIY treatments, 8.5% removable appliances, and 4.3% lingual fixed orthodontic treatments. 36.7% of the videos having the highest viewing and interaction rates were predominantly involving clear aligner treatment. Videos predominantly involving DIY treatments took second place with 33.4%. The remaining predominant contents were labial fixed orthodontic treatments with 20%, removable appliances with 6.6%, and lingual fixed orthodontic treatments with 3.3%.

When the contents of the videos having higher viewing and interaction rates were evaluated according to their sources, it was found that 50% of the DIY videos were shared by the patients. The orthodontists/dentists shared 30% of the DIY videos and the other sources shared the remaining 20%. Clear aligner videos having

higher viewing and interaction rates were shared by the orthodontists/dentists with 55%. The other sources shared 36% of the clear aligner videos and the patients shared 9% of them. Labial fixed orthodontic treatment videos having higher viewing and interaction rates were shared by the orthodontists/dentists with 80% and by the other sources with 20%.

A significant poor correlation was seen between the GQS score and the number of comments in the orthodontist/dentist group. Additionally, the GQS score, and the video duration were found to be correlated with a significant moderate degree in the orthodontist/dentist group. On the other hand, a significant strong correlation was found between the CES value and the video duration in the patient group. Moreover, in the patient group, a significant strong negative correlation was found between the GQS score and the number of the days since loading. A significant poor correlation was found between the CES value and the number of views in the other sources group. Besides, in the other sources group,

the CES value showed a significant moderate correlation with the number of likes, the number of dislikes, the number of comments, the video duration, the viewing rate, and the interaction rate (Table 9).

DISCUSSION

In the recent times, due to the ongoing technological developments, the most common source that individuals use to access information became the internet. YouTube appears as the most frequently referred video content platform to obtain information in the current virtual environment.¹ Nevertheless, it should be noted that videos can be uploaded to the YouTube platform without any evaluation in terms of scientific accuracy, technical competence, and information quality.² There have been studies examining the YouTube videos about a single orthodontic treatment procedure so far. Nevertheless, to the best of our knowledge, no study has been found in the literature that evaluates YouTube videos containing all possible orthodontic treatment options such as labial and lingual fixed orthodontic treatment, clear aligners, DIY appliances, and removable appliances, in the same study.^{11,14,15,16,17} Therefore, our study aimed to investigate the content, quality, and usefulness of the videos shared on YouTube about orthodontic treatment. The major objective of this research was to determine the extent, accuracy, usefulness, informative quality, and tendency of the YouTube videos mentioning any possible type of orthodontic treatment that can straighten teeth.

In this study, the mean Content Evaluation Score (CES) value of the total of 84 videos was found to be 4.1, which indicates “low content” as it is <5. Similarly, the mean Global Quality Scale (GQS) value of the total of 84 videos was found to be 2.6, which indicates “uselessness”, as it is <3. The findings of this study, emphasize the inadequacy of the content and quality of the videos shared on YouTube that aims to provide information about different orthodontic treatment alternatives. Similarly, Knösel and Jung²¹ also reported that the YouTube videos they assessed were poor in terms of information content and underrepresented the orthodontic profession.

Within the 84 videos examined, the videos shared by the patients constitute the lowest percentage. Nevertheless, the highest number of views, likes, dislikes, comments, and viewing rate belong to the patient-sourced videos. The possible reason for this situation may be that the duration of the videos uploaded by the patients is significantly longer than those of the other groups. The fact that the duration of the patient-sourced videos is above a certain time may be the reason to draw more attention and to provide more detailed information which improves the content and quality.¹⁴ The CES value of the videos uploaded by the patients was also found to be significantly higher than those of the other groups, which can similarly be elucidated by the

long duration of the patient-sourced videos. In addition, the videos uploaded by the patients often do not involve commercial concerns or puzzling technical terms. Therefore, it is easier for the audience to develop empathy with the patients who share their experiences about orthodontic treatment.¹³

Another matter that should be considered when evaluating the video characteristics is the recently emerged marketing strategy within social media which is called influencer marketing.²⁰ Patients having numerous subscribers on YouTube can attract followers by posting inviting contents which are sponsored by orthodontic companies. The number of subscribers of the uploaders and the number of views were found to be positively correlated in the former studies which means that when a video is posted by a vlogger (video blogger) having more subscribers, the total view count is also higher.²⁰

When the videos were classified as high-content and low-content according to the Content Evaluation Score, the number of likes, number of comments, video duration, viewing rate, interaction rate, and the GQS value of the high content videos were significantly higher than those of the low content videos. These finding highlights that even these data that can be considered subjective and manipulative, such as the number of likes and comments, they are significantly affected by the quality of the content. It shows that the content adequacy, information quality, and usefulness level of the videos have an important impact on the tendencies of the viewers. Therefore, it can be recommended that the content and usefulness of the videos should be prioritized, while creating videos about orthodontic treatments.

Although one third of the videos having higher viewing and interaction rates involved labial fixed orthodontic treatment, 36.7% of these videos were predominantly about clear aligner treatments and 33.4% of them were predominantly about DIY treatments. These findings show that the audience trends involved clear aligner and DIY treatments while accepting the labial fixed orthodontic treatment as an established alternative. Moreover, half of the DIY treatment videos having higher viewing and interaction rates were shared by the patients. Thus, it can be concluded that the patients were mostly interested in orthodontic treatments that can be performed by themselves and disintermediating the clinicians. On the other hand, more than half of the videos having higher viewing and interaction rates that were about clear aligner and labial fixed orthodontic treatments were shared by the clinicians.

According to the correlation analysis, the longer the duration of the videos uploaded, the higher GQS and CES values were obtained, which shows an increase in usefulness, quality, and content. Based on the positive correlations observed between the video duration and either the GQS or the CES values, it can be recommended

that the video uploaders should avoid short videos to produce more informative and useful videos. It can also be concluded that the recently uploaded videos by the patients were more useful, based on the strong negative correlation between the GQS value and the number of days since uploading.

A reasonable correlation relationship can be observed in the videos uploaded by the other sources for the CES value. The moderate positive correlation between most of the video characteristics and the CES value may be interpreted as the increase in the number of views, likes, dislikes, comments, video duration, viewing rate, and interaction rate is the result of the increase in the informative content of the videos.

Like many other studies that analyze social media, the limitation of this study is that it consists of an instant analysis. Due to the dynamic nature of the platforms such as YouTube, uploaded videos may be deleted, new ones may be uploaded, and the number of views, likes, dislikes, and comments may change within time. Although a new method or a new evaluation scale have not been added to the literature with this study, when the findings are evaluated within the limitations, they are able to provide valuable information about the quality of the videos available on internet about different orthodontic treatment alternatives and the audience trends related with them.

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CONCLUSION

- The videos shared on YouTube which give information about different orthodontic treatment alternatives were mostly found insufficient in terms of content adequacy, and nearly half of them were useless.
- When the videos were classified according to their sources, although the videos based on patient experiences made up the least percentage, they had the highest number of views, likes, dislikes, comments, and viewing rates.
- The number of likes, number of comments, video duration, viewing rate, interaction rate, and the Global Quality Scale (GQS) value were observed to be higher in the high content videos which were classified according to the Content Evaluation Score (CES).
- The audience trends have focused on clear aligner and DIY treatments while accepting labial fixed orthodontic treatment as an established alternative.
- The patients were mostly interested in orthodontic treatments that can be performed by themselves while disintermediating the clinicians.

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